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An Analysis of Teachers' Classroom Instructional Activities Based on NWEA "Measures of Academic Progress" (MAP) Data

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An Analysis of Teachers' Classroom Instructional Activities Based on NWEA "Measures
of Academic Progress" (MAP) Data

By
Rhonda S. Medford

A Dissertation Submitted to the
Gardner-Webb University School of Education
in Partial Fulfillment of the Requirements
for the Degree of Doctor of Education

Gardner-Webb University
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Approval Page

This dissertation was submitted by Rhonda S. Medford under the direction of the persons listed below. It was submitted to the Gardner-Webb University School of Education and approved in partial fulfillment of the requirements for the degree of Doctor of Education at Gardner-Webb University.

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Abstract

An Analysis of Teachers' Classroom Instructional Activities Based on NWEA "Measures of Academic Progress" (MAP) Data, Medford, Rhonda S., 2014: Dissertation, Gardner-Webb University, Elementary School/Formative Assessment/MAP/Measures of Academic Progress/Student Assessment/Lesson Planning/Differentiation/Classroom Environment

This dissertation was designed to examine and assess the effectiveness of the Measures of Academic Progress formative assessment tool on the planning, differentiation, and classroom environment at a rural elementary school in western North Carolina. The teachers had used the MAP testing data for over 5 years. The tools used for data collection revealed how the school was using the data and other formative assessment tools for lesson planning and student differentiation, and the effects on classroom environment.

This case study utilized the mixed methods approach in order to successfully collect and analyze the data to develop a conclusion so others can see the importance of using formative assessment correctly. In order to give the researcher an appropriate amount of data to determine the impact of the Measures of Academic Progress (MAP) on the formative assessment process, the following data collection tools were utilized: teacher surveys, student surveys, teacher focus group, student focus groups, and individual teacher interview.

The results from this mixed methods case study indicate that teachers at the selected school were using the Measures of Academic Progress (MAP) assessment program as well as other methods of formative assessment to form future instruction. The teachers and students involved in the study use the MAP assessment data and formative assessment to monitor student achievement, influence lesson planning, differentiation lessons, and influence classroom environment.

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Chapter 1: Introduction

Background

“More than 65 percent of 4th graders continue to score below proficiency in reading,” according to the 2012 Annual Report *Building a Grad Nation* (Balfanz, Bridgeland, Fox, & Moore, 2012, p. 7). Reading and mathematics are core components of kindergarten through twelfth-grade education, of higher education, and of life (Fiester & Smith, 2010). According to Fiester and Smith (2010), all competencies are based on reading and math. Fiester and Smith stated in their report,

Up until the end of third grade, most children are learning to read. Beginning in fourth grade, however, they are reading to learn, using their skills to gain more information in subjects such as math and science, to solve problems, to think critically about what they are learning, and to act upon and share that knowledge in the world around them. (p. 9)

Academic difficulties can start early and continue throughout the students' academic careers. For the students who have not mastered reading by fourth grade, struggling to keep up academically becomes an issue resulting in grade retention, behavioral and social issues, and absenteeism. School becomes a struggle, moving students to the drop-out track (Balfanz, Bridgeland, Moore, & Fox, 2010; Fiester & Smith, 2010). Most students learn to read and perform basic mathematics skills on a normal progression, yet for a large majority of students, performance is below a sufficient level to meet the increasing demands of a global society (Snow, Burns, & Griffin, 1998). As the demands of school increase, students become detached, and with the struggles many students face, dropping out of school becomes an option. According to The National Center for Higher Education Management Systems (Public High School

Graduation Rates, 2013), national cohort survival rates have ranged from 67.1% to 71.2% since 1990 with North Carolina ranging from 58.7% to 68.0%. Table 1 shows the cohort graduation rates comparing the national average to the North Carolina average.

Table 1

The National Center for Higher Education Management Systems (NCHEMS)

Year	National Average	North Carolina Average
1990	71.2%	68.0%
1995	68.6%	65.5%
2000	67.1%	58.7%
2002	68.2%	60.8%
2003	69.7%	62.4%
2004	69.7%	64.2%
2005	68.8%	65.7%
2006	68.6%	65.2%
2008	70.1%	65.9%

Formative assessment provides windows into student learning that teachers can use to improve student learning (Moss & Brookhart, 2009, p. 10). Formative assessment “engages students in how to learn” allowing them to grow into self-aware learners. Learners become “self-regulated” (Moss & Brookhart, 2009, p. 10). Providing this type of engagement could have a strong effect on high school retention. There are a number of reasons why students drop out of high school, but 45% of dropouts reported they felt unprepared for high school (Bridgeland, Dilulio, & Morison, 2006). Students reported they had fallen behind in elementary and middle school and felt they could not catch up or succeed. Poor performance such as low test scores, grade retention, and course failure are precursors to dropping out. The predictors that students may not graduate show up in data collected in the elementary school years (Aarons & Sawchuk, 2010; Tyler & Lofstrom, 2009). According to Princiotta and Reyna (2009), academic failure is one of

the primary factors that drive students to drop out of school. In the 2012 Annual Report, *Building a Grad Nation*, research showed proficient reading by the end of third grade is an important predictor of school success and high school graduation (Balfanz, Bridgeland, Bruce, & Fox, 2012). According to Hernandez, “One in six children who are not reading proficiently in third grade do not graduate from high school on time, a rate four times greater than that for proficient readers” (p. 3). The Civic Marshall Plan in *Building a Grad Nation*, described steps that must be achieved. Two of the steps are “grade-level reading” and “early warning indicator and intervention systems” (Balfanz et al., 2012, p. 8). Both of these are built on quality data systems which can be used to derive student data. Making data-driven decisions strengthens the learning experience of students (Balfanz et al., 2012).

Formative assessment is one of the methods that can be utilized by teachers to determine academic struggle. By specific, direct, and defined questioning, teachers can determine if the student has successfully mastered the objective, goal, or lesson just taught. These actions help determine intervention and redirection, if needed. Although the terms formative and summative assessment are commonly used in teaching, very few teachers fully understand the difference between the assessments and how to effectively use each (Garrison & Ehringhaus, 2013). Margaret Heritage (2010), in collaboration with the Council of Chief State School Officers, stated, “many so-called formative assessments are actually interim assessments administered several times each year” (p. 3). Heritage stated, “the student learning gains triggered by formative assessment were among the largest ever reported for educational interventions with the largest gains being realized by low achievers” (p. 2).

Continual changes in accountability and testing policies are allowing teachers to

have more access to student data (Hamilton et al., 2009). Other changes are the continued push for more formative assessments through *Race to the Top* (U.S. Department of Education, 2009). Race to the Top (RttT) Assessment Program has funded areas to develop new systems of assessment to help compare students against a set of college and career ready standards (Heritage, 2010). Hamilton et al. (2009) stated,

Although accountability trends explain why more data are available in schools, the question of what to do with the data remains primarily unanswered. Data provide a way to assess what students are learning and the extent to which students are making progress toward goals. However, making sense of data requires concepts, theories, and interpretative frames of reference.

Some ways teachers can use the data to monitor student progress and to individualize instruction are as follows.

1. Prioritizing instructional time.
2. Targeting additional individual instructions for students who are struggling.
3. More easily identify individual student strengths and provide instructional interventions.
4. Monitor instructional effectiveness.
5. Refine instructional methods. (Hamilton et al., 2009, p. 5)

Although data are present and accessible for most teachers, teachers “frequently seek to monitor student learning and triangulate assessment data in a variety of different ways” (Light et al., 2005, p. 2). Frequently monitoring student performance data can guide teachers in the “right direction, while providing interactive and recursive feedback for mid-course adjustments” (Supovitz, & Klein, 2003, p. 1). Teachers who are monitoring student progress through the use of formative assessments allow for

readjustment in teaching and learning; therefore, gaps within student learning can be corrected. Formative assessment is defined by Chappuis and Chappuis (2007) as “an ongoing, dynamic process that involves far more than frequent testing” (p. 15).

Formative assessment should be continuous and changing, allowing the teacher to assess if the student has met the goal or objective. The assessment must vary to accommodate different learning styles and various situations. Richard Halverson (2010) listed three types of formative assessment in the classroom; the teacher level, student level, and teacher-student. Teachers need information about the specific outcomes of student learning to provide appropriate instruction. Students need to be able to self-assess. Teacher-student is the interaction to fill in the gaps of learning (Halverson).

Narrowing the Achievement Gap Student-by-Student

The achievement gap had the first documented comprehensive examination in 1966 (Chubb & Loveless, 2002). In 1970, the federal government started the National Assessment of Educational Progress (NAEP). The NAEP’s job was to “randomly test American students every two to four years and a means, for the first time, to track student achievement nationwide” (Chubb & Loveless, 2002, pp. 1-2). Achievement gaps translate from “educational inequality to socioeconomic inequality” (Murphy, 2010, p. 6). Joseph Murphy (2010), stated the achievement gap is wider now than in the 1960s. Closing the achievement gap is critical due to making the United States economically competitive and increasing our productivity. The achievement gap covers many areas. Poverty is one of the factors affecting this gap (Murphy). In 2011, approximately 21% of school-age children, or 1.9 million children, lived in poverty (Aud et al., 2013). Table 2 shows the breakdown of racial/ethnic groups by poverty for 2011 for children under 18 years of age (Aud et al., 2013, p. 27).

Table 2

Racial/Ethnic Groups by Poverty

Race/Ethnicity	Percentage in Poverty (2011)
Black	39%
American Indian	36%
Hispanic	34%
Native Hawaiian	30%
Bi-racial	22%
White	13%
Asian	12%
Mother only	45%
Father only	27%
Married couple	11%

Lesli Maxwell (2012) stated higher income families spend more than 1,300 more hours in “novel” places than families in poverty, one instance of how poverty can affect the achievement gap (p. 22). Higher income families provide more “cognitive stimulation” than lower income families (Maxell, p. 22). According to *Income Inequality Producing a New Kind of Achievement Gap* (2012), higher income families spend as much as “400 hours more than low-income children in literacy activities” (p. 6). Pearce (2006) proposed that social structural factors play a major role in the achievement gap. This theory states,

Patterns of poverty across generations because children confront structural conditions similar to those faced by their parents. As applied to this study, social structural theory posts that particular social structural elements support and lead to achievement. Therefore, gender, socioeconomic status, urbanicity, family composition, immigrant status, and parent education will influence achievement and attainment because these specific social factors create barriers to or increase

opportunities for individual achievement. (Pearce, 2006, p. 78)

Loeb (2007) stated, “By the time children enter kindergarten, dramatic socio-economic and racial school-readiness gaps are deeply entrenched” (p. 517).

Although there were achievement gaps in various classifications such as poverty and ethnicity, Roskos and Neuman (2012) defined achievement gap as “the gap between where students are and where they need to go” (p. 535). Roskos and Neuman called formative assessment “a gap-minder because it helps the teacher to stay alert to gaps in individual students’ development and to adjust instruction” (p. 535). According to Hattie and Timperley (2007), achievement gains have been seen in their studies regarding descriptive feedback and how it works to support learning to help students meet standards and learning objectives. In Stiggins and Chappuis’s (2005), Black and Wiliam (1998) were cited as stating, “improved [student-involved] formative assessment helps low achievers more than other students and so reduces the range of achievement while raising achievement overall” (Stiggins & Chappuis, p. 15). This result has direct implications for districts seeking to reduce achievement gaps between and among subgroups of students (Stiggins & Chappuis). Stiggins and Chappuis also supported teachers meeting the following four conditions to reduce the achievement gap.

1. Assessment development must always be driven by a clearly articulated purpose.
2. Assessments must arise from and accurately reflect clearly specified and appropriate achievement expectations.
3. Assessment methods used must be capable of accurately reflecting the intended targets and are used as teaching tools along the way to proficiency.
4. Communication systems must deliver assessment results into the hands of

their intended users in a timely, understandable, and helpful manner.

In Black and Wiliam's (1998) studies, teachers who used effective formative assessment in their classroom had students with achievement gains of 15 to 25 percentile points. If this type of increase was applied to the international assessment results, the United States' rank would move from the middle to the top five nations (cited in Chappuis, 2009, p. 3). Rodriguez (2004) concluded an increase in student learning when examining the relationship between teacher assessment practices and student achievement. Effective and timely formative assessments will work in reducing the achievement gaps, but the "vast majority of teachers and administrators" do not understand how to apply formative assessment to reduce the achievement gap (Stiggins & Chappuis, 2005, p. 4).

Northwest Evaluation Association (NWEA) provides time-stamped longitudinal data for every student in their MAP assessment tool. The data are independent of grade or age and can be used to monitor growth over time. This continual data history can be used as a predictor of student success and can be used to monitor progress in closing the achievement gap. NWEA stated some advantages of using longitudinal data:

- It allows for analysis of individual and group academic growth and proficiency over time.
- It provides information to assess student performance and monitor progress in closing the achievement gap.
- It facilitates analysis of cause and/or influencing factors like mobility, retention and attrition on scores.
- It enhances the probability of complete test histories for individual

students since prior achievement is a predictor of future performance

- It provides stored data that is consistent and valid over periods of time so that educators can determine whether they are adequately preparing students. (Historical data, 2014)

Elementary School District A had been using MAP data for 5 full years; therefore, a sufficient student history has been built.

Profile of School District A

A school district in western North Carolina, which is referred to as School District A throughout this study, was working toward increasing student proficiency and student growth in math and reading by reducing the achievement gap within individual classifications of students and from student-to-student. In the school year 2011-2012, School District A reported end-of-grade (EOG) testing for math at 70.8% compared to the state average of 71.2%; and for reading, School District A reported 81.6% compared to the state average of 82.8% (NC School Report Card, 2012). Table 3 depicts the reading data.

Table 3

School District A Reading End-of-Grade Testing Results

	Grade 3	Grade 4	Grade 5	Grade 6	Grade 7	Grade 8	Overall
District	72.0	76.0	74.0	75.9	64.0	62.6	70.8
State	68.8	71.6	72.3	75.2	68.2	71.1	71.2

School District A also provided teachers with additional tools and worked with students to diversify instruction to meet the diverse group of learners on their level. Increasing student proficiency in reading and math will reduce the achievement gap (Bridgeland et al., 2006).

In School District A, for the school year 2010-2011, seven of the 18 schools, or 38.9%, made Adequate Yearly Progress (Adequate Yearly Progress (AYP) Reports For 2010-2011, 2011). The original goal established by No Child Left Behind (NCLB) was for all students to be 100% proficient on state standardized tests by the end of the 2013-2014 school year in order to continue to receive federal funds. Schools were to meet AYP toward the set goals (NCLB, 2004). Currently, RttT funding is the federal mandate to improve student achievement. RttT is funding provided by the federal government to

Develop assessments that are valid, support and inform instruction, provide accurate information about what students know and can do, and measure student achievement against standards designed to ensure that all students gain the knowledge and skills needed to succeed in college and the workplace. These assessments are intended to play a critical role in educational systems; provide administrators, educators, parents, and students with the data and information needed to continuously improve teaching and learning; and help meet the President's goal of restoring, by 2020, the nation's position as the world leader in college graduates. (U.S. Department of Education, 2009, p. 1)

RttT provided funds for states implementing “coherent, compelling, and comprehensive education reform” (U.S. Department of Education, 2009, p. 1). North Carolina received RttT funds providing additional incentive for School District A to increase student achievement. In the school year 2012-2013, School District A adopted the Common Core Standards, again striving for increased student achievement. This change in curriculum required teachers to refocus their instructional practices; thus, further requiring the need for the correct implementation of formative assessment.

School District A, with 9,000 students is comprised of three high schools, three

middle schools, 10 elementary schools, one early college-high school, and one alternative school. The demographics for the school year 2009-2010 were .61% Asian, 3.69% multi-racial, 4.62% Hispanic, 13.28% African American, and 77.79% Caucasian; with 51.01% male and 48.99% female (Adequate Yearly Progress Reports for 2009-2010, 2010). In 2009-2010, School District A had a total of 38 administrators and 584 certified teachers: 18 administrators and 229 teachers serving elementary schools, nine administrators and 181 teachers serving middle school, and 11 administrators and 174 teachers serving high school (NC School Report Card, 2012).

School District A and Measures of Academic Progress

In the school year 2007-2008, School District A purchased a license from NWEA to test math and reading for all students in kindergarten through eighth grades. This license provided computer-adaptive testing to assess all students in kindergarten through eighth grade resulting in 6,386 students tested three times a year. The computer-adaptive testing program is called Measures of Academic Progress and is referred to as MAP throughout this research. The cost for these three assessments in math and reading was \$13.00 per student, resulting in a cost of over \$83,000 (Confidential personal communication, 2010). Cost was significant to any educational budget but especially significant in a difficult economy. Considering the significant cost of MAP, the lost instructional time due to testing, and the need for measureable student achievement, a study into the benefits of MAP as related to student growth and how teachers used the MAP testing data in the classroom was needed.

MAP is a formative assessment tool which is computer based and adaptive. The MAP data can “generate accurate and useful descriptive information about a student’s academic performance and progress” (Best Value and Uses of MAP® Data, 2011, p. 4).

According to Rush (2005), MAP provides formative assessments which provide “clear direction for curriculum action” (p. 9).

School District A began using MAP in the spring of 2008. Teacher and administrator training on the interpretation and use of MAP reports began immediately and were made available throughout the summer. The first complete testing year of MAP was the 2009-2010 school year. MAP can produce many reports such as student growth over a selected time period and a breakdown of student weaknesses and strengths by standard strand. This information can provide data to the teacher as to what is needed to customize lessons and provide individualized student instruction (Measures of Academic Progress: A Tool for Teachers, 2013).

Elementary School A

For this study, one elementary school was chosen. This school is referred to as Elementary School A. Elementary School A, in 2011-2012, had a total student population of 300 students with 157 students in third through fifth grades. The student demographics for third through fifth grades were 85.4% White, 8.3% Black, 4.5% two or more races, 1.9% other, 18.5% with disabilities, and 67.5% were economically disadvantaged. Attendance for students was at 95% or higher for all demographics. All classes were taught by highly qualified teachers. Elementary School A had 26% of its teachers with advanced degrees with four being National Board Certified (NC School Report Card, 2012).

Problem Statement

Formative assessment that provided the “kind of descriptive feedback that identifies, points out, explains, and models exemplary achievement, however, is not necessarily intuitive” (Roskos & Neuman, 2012, p. 538). Teachers worked at formative

assessment and incorporated it purposely into their lesson plans. The problem was teachers were not adequately prepared to conduct formative assessments in their classroom and were overburdened with data without the expertise to interpret the data and apply it to their individual classroom. Heritage and Chang (2012) found that though formative assessment is important, many teachers did not understand what the assessment data determined or how to incorporate the assessment data back into their teaching. Many teachers, according to Heritage and Chang, felt formative assessment only showed needed remediation.

Without reading and math proficiency, students will not be prepared for the academic challenges of middle and high school (Bridgeland et al., 2006). Therefore, the problem addressed in this study is Elementary School A teachers are not adequately prepared to conduct formative assessments in their classroom and can be overburdened with data without the expertise to interpret the data and apply it to their individual classrooms.

Although Heritage and Chang's (2012) original study was an analysis of teacher feedback in focus groups about online learning, they stated in their evaluation that

A number of teacher's comments reflected an evaluative stance to formative assessment, which is more consistent with a summative view and reflective of familiar forms of teacher summative assessment such as end-of-unit tests and letter grades assigned when a course is finished. (p. 3)

The research pool for Heritage and Chang was English Language Learner teachers from three school districts with 7-24 years of teaching experience. Of the teachers, Heritage and Chang felt all teachers understood that "some action" was needed based on the data, but only one teacher saw the formative assessment as evaluative in nature (p. 4).

Although Heritage and Chang's (2012) study was not on how teachers used formative assessment, their summaries provided insights into the lack of understanding by many teachers. Heritage and Chang found that "participants perceived the formative assessment that was presented to them as a tool to evaluate their students" (pp. 4-5).

Another example of how formative assessment was lacking as a teacher tool was through the 2008 Blue Ribbon Commission's report which prompted North Carolina to develop an online formative assessment professional development tool called NC FALCON. NC FALCON was

intended to serve as a primer for teachers to learn more about the impact formative assessment can have on their instruction and help their students achieve targeted learning goals. Whether a beginning or seasoned teacher, the NC FALCON formative assessment modules provide a solid framework on which to build effective formative assessment practices in the classroom. Implementing these strategies provides feedback to adjust ongoing teaching and learning that will improve students' achievement of intended instructional outcomes. (Public Schools of North Carolina, n.d. b, p. 1)

In the school year 2010-2011 and 2011-2012, Elementary School A reported for Grades 3-5 an overall student performance on EOG testing as follows in Table 4 (North Carolina School Report Card, 2012).

Table 4

Elementary School A End-of-Grade Testing Results

School Year 2010-2011								
	Grade 3		Grade 4		Grade 5		Overall	
	Reading	Math	Reading	Math	Reading	Math	Reading	Math
School A	81.4%	>95%	71.1%	91.1%	73.5%	79.4%	75.0%	87.2%
District	72.7%	88.6%	74.5%	87.1%	75.5%	83.7%	70.2%	83.5%
State	67.6%	82.1%	71.6%	83.8%	72.3%	82.0%	70.7%	82.4%
School Year 2011-2012								
	Grade 3		Grade 4		Grade 5		Overall	
	Reading	Math	Reading	Math	Reading	Math	Reading	Math
School A	84.7%	91.5%	89.6%	87.5%	70.2%	74.5%	81.8%	85.1%
District	72.0%	85.9%	76.0%	87.3%	74.0%	81.3%	70.8%	81.6%
State	68.8%	82.8%	71.6%	85.1%	72.3%	82.1%	71.2%	82.8%

Although Elementary School A was above the district and state averages in math and reading for both years, these were proficiency numbers and do not represent growth. Students were learning to read through third grade and read to learn from fourth grade throughout their lives; therefore, if students do not excel in reading, then learning is limited due to the reading. In analyzing School District A's data for the past 7 school years, both reading and math scores fluctuated, resulting in inconsistencies from year to year. This chart also did not take into account student growth over time.

Elementary School A was one of three elementary schools that fed into the middle school. Although Elementary School A was performing above the state average, the middle school these students will move into showed a deficit in proficiency. Table 5 is a chart of the middle school NC Report Card for 2011-2012 (North Carolina School Report Card, 2012).

Table 5

School District A Middle School End-of-Grade Testing Results

	Grade 6		Grade 7		Grade 8		Overall	
	Reading	Math	Reading	Math	Reading	Math	Reading	Math
Middle School	72.6%	76.8%	63.7%	73.8%	68.1%	72.3%	68.2%	74.4%
District	75.9%	80.2%	64.0%	78.2%	62.6%	77.3%	70.8%	81.6%
State	75.2%	80.5%	68.2%	81.1%	71.1%	85.2%	71.2%	82.8%

Although this study did not address MAP testing and formative assessment in the middle school, Table 5 illustrates that any inferences or practices learned from this study could be passed to the middle school.

Purpose of the Study

The purpose of this study was to examine Elementary School A focusing on how formative assessment using MAP was used and supported, determine the extent to which teachers were using the formative assessment data to prepare lesson plans, plan personalized student instruction and differentiation, and to determine to what extent the utilization of MAP impacted the learning environment. The study provided recommendations on how the formative assessment practices could be strengthened as well as increase dialogue of effective formative assessment practices. The influence of formative assessment data on teachers' approaches to reading and math instruction was also examined. This study focused on formative assessment data as they were implemented in Grades 3-5 for a total of seven classrooms: three third-grade classes, two fourth-grade classes, and two fifth-grade classes.

Need for the Study

Individualized student instruction through formative assessments provided the needed support to bridge the achievement gap (Madison-Harris & Muoneke, 2012). North Carolina has realized the need for formative assessment through the Blue Ribbon Commission recommendations, the Framework for Change, and the NCDPI response to the Framework for Change (Public Schools of North Carolina, n.d. a). The Blue Ribbon Commission provided information for the North Carolina Board of Education in January 2008. The Blue Ribbon Commission stated in the findings of the report, “Teachers need on-going, formative assessments to ensure that all students graduate from high school globally competitive for work and postsecondary education and prepared for life in the 21st Century” (North Carolina State Board of Education, 2008, p. 4). Also in the report were recommendations for support and resources which stated “teachers and principals be provided with extensive and intensive quality professional development focused on the new curricula and the use of formative assessment to improve instruction” (North Carolina State Board of Education, 2008, p. 4). School District A has incorporated the NC FALCON training developed by the state for all teachers.

Teachers who can make data-driven decisions regarding their students’ strengths and weaknesses can target weak areas and provide instruction to make each student successful regardless of the other factors the student may be facing (Olson, 2005). Teachers have the data needed to more effectively identify achievement gaps because MAP measures academic growth and achievement. MAP provided the detailed, individualized student data; and teachers had access to this data. With proper training, teachers can interpret the data and customize student assignments and interpret data to increase proficiency (Olson, 2005). The results were beneficial for all stakeholders: students, teachers, administration, parents, and community.

Research Questions

After researching the capabilities of MAP coupled with the goals of reducing the high school dropout rate through preparing students academically in the elementary and middle school years, the following questions were created:

1. To what extent did MAP reading and math data drive lesson planning?
2. To what extent did MAP reading and math data impact differentiation?
3. To what extent did the impact of the utilization of MAP have on the learning environment of the classroom?

Definition of Terms

Adequate yearly progress (AYP). The “measure by which schools, districts, and states are held accountable for student performance under Title I of the No Child Left Behind Act of 2001 (NCLB).” (AYP, 2004, p. 1)

Cohort survival rate. Defined as the percentage of enrollees at the beginning grade or year in a given school year who reached the final grade or year of the elementary or secondary level (No Child Left Behind High School Graduation Rate, 2008).

Data-driven decision making. Teachers, principals, and administrators “systematically collecting and analyzing various types of data, including demographic, administrative, process, perceptual, and achievement data, to guide a range of decisions to help improve the success of students and schools” (Gottfried, Ikemoto, & Orr, 2011, p. 1).

North Carolina end-of-course (EOC) tests. Used to sample a student’s knowledge of subject-related concepts as specified in the North Carolina Standard Course of Study and to provide a global estimate of the student’s mastery of the material in a particular content area (North Carolina EOC Test, n.d.).

North Carolina end-of-grade (EOG) tests. Designed to measure student performance on the goals, objectives, and grade-level competencies specified in the North Carolina Standard Course of Study (North Carolina EOG Test, n.d.).

Growth index. The amount of unexpected growth of a student from one year to the next year (Growth as a Measure, 2013).

Measures of Academic Progress (MAP). Computerized, adaptive tests which provide detailed, actionable data about where each child is on their unique learning path (Map® Measures of Academic Progress, 2013).

National Assessment of Educational Progress (NAEP). The largest national organization that evaluates America’s students uniformly using the same set of test booklets across the nation thus providing a clear picture of student achievement over time (National Assessment of Educational Progress, n.d.).

Rasch unit (RIT).

The RIT Scale is a curriculum scale that uses individual item difficulty values to estimate student achievement. An advantage of the RIT scale is that it can relate the numbers on the scale directly to the difficulty of items on the tests. In addition, the RIT scale is an equal interval scale. Equal interval means that the difference between scores is the same regardless of whether a student is at the top, bottom, or middle of the RIT scale and it has the same meaning regardless of grade level. (The RIT Scale, 2013, p. 1)

NWEA Overview

MAP was developed by NWEA in 1976. The Kingsbury Center is the research organization for NWEA. NWEA houses the “single largest know repository of student growth data in the United States” known as the Growth Research Database (GRD) (Our

Mission: Using Research to Educate and Illuminate, n.d., p. 1). This database contains demographic and student achievement data for nearly 10% of the U.S. population (Our mission: Using Research to Educate and Illuminate, n.d.). NWEA tested in 5,456 school districts, 20,936 schools across the United States, and 11,384,822 students in 2012-2013. In North Carolina, NWEA was used in 60 school districts and 205 schools with 64,170 students being tested in 2012-2013 (Grd™ Data, 2013).

In 2004, NWEA took data from 270,000 students over 22 states over three testing sessions and determined a growth index for each student. A positive growth value indicates more than expected growth. A negative growth value indicates lower than expected growth. The growth is displayed between testing windows providing the teacher with information on student learning (McCall, Kingsbury, & Olson, 2004).

MAP assessments can be administered up to four times per year with the recommended number of assessments being three administrations. The recommended assessment schedule and the one School District A used is a fall administration that began in September. The second administration, called the winter assessment, began in December and ran through February. The final assessment, called the spring assessment, began in March and went through May. Typically, School District A wanted the spring administration to occur at least 4-6 weeks before EOG or EOC testing occurred. In School District A, MAP was administered from kindergarten through eighth grade. Although MAP has tests for math, reading, language arts, and science, School District A used only math and reading. The math includes algebra I and geometry.

NWEA has a computerized item bank of more than 15,000 test items that are continually adjusted (Van Horn, 2003) with an item pool generally containing 1,200-2,400 items (NWEA Technical Manual for Use With Measures of Academic Progress

and Achievement Level Tests, 2003). For a question to be used in the test bank, the question must be tested with 300 students and meet all criteria before being added (Van Horn, 2003). According to Ginger Hopkins, the vice president of partner relations for NWEA, “It allows teachers to adjust whole-group instruction and create flexible grouping for students at similar achievement levels” (Ash, 2008, p. 20). CATs are designed by algorithms based on the item response theory (IRT) (Way, 2006). IRT calibrates the test questions to a “common difficulty scale” and scores the students on a “common ability scale” (Way, 2006, p. 1). Two IRT models are used in high-stakes testing programs: the Rasch model and the tree-parameter logistic model. NWEA uses the Rasch model which considers performance on a test question to be “a function of the student’s ability and the item’s difficulty level” (Way, 2006, p. 1). Advantages of this model are the *equal interval* characteristic. With this model, the measurement scale is equal interval, meaning tick marks are evenly placed like that of a ruler. This *ruler-type* measuring is possible by using the Rasch RIT model (NWEA Technical Manual for Use with Measures of Academic Progress and Achievement Level Tests, 2003). Also, the Rasch model provides data based on student performance, not age or grade. This same equal interval measurement is applied to all students so growth over time can easily be measured (NWEA Technical Manual for Use with Measures of Academic Progress and Achievement Level Tests, 2003).

NWEA also conducts regular alignment studies for each state to examine the relationship between MAP and the state standardized test. NWEA stated,

Each study identifies the specific Rasch Unit (RIT) scale scores from MAP that correspond to the various proficiency levels for each subject (reading, mathematics, etc.) and for each student grade. These studies also estimate the

probability that a student with a specific RIT score would achieve a status of “proficient” or better on her/his state test. Because all states may use different tests for measuring student achievement, linking studies are usually necessary for each state. (NWEA: Linking MAP to State Tests: Proficiency Cut Score Estimation Procedures, n.d., p. 1)

A study comparing the alignment of the NWEA RIT scale with the North Carolina EOG testing was completed in 2009 for math and reading (NWEA, 2009).

NWEA has aligned their MAP tests with the Common Core State Standards (NWEA: Frequently Asked Questions, 2012). NWEA has worked through a transition plan with each of its partners to ensure the integrity of the data (Common Core Standards, 2013).

Common Core State Standards

The Common Core State Standards Initiative is a “state-led effort that established a single set of clear educational standards for kindergarten through 12th grade” (Common Core State Standards Initiative, 2012, p. 1). Forty-five states have adopted the Common Core Standards (Common Core State Standards Initiative, 2012). School District A began using the Common Core Standards in the 2012-2013 school year. With this adoption, formative assessment becomes even more important in helping students move toward proficiency. NWEA listed five levels of classroom reform:

1. Clarifying, sharing, and understanding learning targets and success criteria;
2. Engineering effective classroom discussions, questions, and learning tasks that elicit evidence of learning;
3. Providing feedback that moves learners forward;

4. Activating students as the owners of their own learning; and
5. Activating students as instructional resources for one another. (Dyer, 2013)

Summary

In looking at the Common Core State Initiatives and how these initiatives push formative assessments, the educational theory of constructivism is again being explored. In a constructivist classroom, students do not come into a classroom with no prior knowledge but they should build on their prior knowledge using the resources they have, such as past experiences and cultural and personal experiences. In a constructivist classroom, students learn best by making sense of their learning themselves through discussions with teachers and peers, through learning with and through others, and through integrating what they already know to direct what they are learning. The teacher is the facilitator, not the person with all the knowledge (Marlowe & Page, 2005).

With MAP testing, data can be collected to see the progression of students and their growth over time. This study centered on how teachers used the formative assessment data generated by MAP testing to inform, plan, and implement instruction in the classroom and the impact this information has on the learning environment.

Chapter 2: Literature Review

As Allan Olson (2005), the Executive Director of NWEA, stated throughout his article *Improving Schools One Student at a Time*, an assessment should measure and report individual student achievement growth as it relates to content and performance standards. In addition, these assessments provide data that inform instruction and identify needed curriculum adjustments. Finally, they deliver results that lead to action quickly, establishing growth targets for each student and provide data that teachers can use to evaluate their own effectiveness, both with individuals and with groups of students (Olson, 2005). The purpose of this study was to determine the extent to which teachers in Elementary School A were integrating the MAP math and reading data into their class lesson plans to personalize student instruction and to what extent the classroom learning environment had been changed.

The literature review has five basic sections which are related to this case study: computer-adaptive testing, data-driven decision making, formative assessment, differentiated instruction, and learning environment.

Computer-Adaptive Testing

Computer-adaptive testing (CAT), according to Royal Van Horn (2003), professor of education at the University of North Florida, is “simply a test that makes continuous adjustments in the difficulty of items so that they match a student’s performance level” (p. 567). Adaptive testing provides growth details, which help evaluate instruction and intervention effectiveness (Yeh, 2006). CAT measures individual student growth over time and provides immediate feedback detailed enough for teachers to immediately begin performing the next needed step (Wilson, 2005). MAP utilizes CAT and has given over 24 million assessments (NWEA: Our History, 2013).

CAT was an important testing instrument and can be used by teachers for

- Identifying whether the examinee has met the specific objective of a course.
- Indicating the examinee's level of achievement in a skill domain.
- Identifying specific areas in which a student needs additional education experiences.
- Diagnosing the student's skill area strengths and weaknesses.
- Detecting whether candidates have met minimum course requirements as demonstrated in a mastery test. (Georgiadou, Triantafillou, & Economides, 2006, p. 266)

Alfred Binet originally constructed adaptive testing in 1905 for use with his intelligence tests. Binet's goal was to provide in-depth individualized testing. To accomplish this, questions were ranked in order of difficulty and administered until the tester failed a question (Georgiadou et al., 2006). Tests were created to determine if a group of test-takers had met expected performance levels (Linacre, 2000). With CAT, the first time a student begins a test, a question of medium difficulty is given and graded immediately. If the student answers the question incorrectly, the next question will be slightly less difficult. If the student answers the question correctly, the next question will be a slightly more difficult. The testing experience drills in on the student's true ability by eliminating the wasted questions that are too hard or too easy for the student, providing an excellent measure of each child (Van Horn, 2003; Linacre, 2000). The computer continually statistically reevaluates the ability of the student until the "accuracy of the estimate reaches a statistically acceptable level or when some limit is reached such

as when a maximum number of test items are presented” (Georgiadou et al., 2006, p. 263). The more items administered, the more accurate the student score becomes (Linacre, 2000). This practice results in fewer test questions needed and a moral boost for the student because the student is actually answering questions within his/her capability (Van Horn, 2003). This type of testing provides differentiated testing for each student (Stokes, 2005). This type of formative assessments advances the student’s zone of proximal development by providing the teacher the information to determine what the student can do independently and what scaffolding still needs to occur (Chaiklin, 2003).

CAT can be ended in four ways. The first way is by a fixed-length method, which is a specific number of questions to be asked (Way, 2006). Examples of fixed-length tests are the Graduate Record Examinations (GRE) and the Scholastic Aptitude Test (SAT) (Eignor, Steffen, Stocking, & Way, 1993). The second way to end a computer-adaptive test is once a specific score is achieved. Both types can be used depending on the circumstances and goal of the test (Way, 2006). The third way is when the item bank is exhausted and lastly, when the ability of the tester is substantially low so that the pass criterion cannot be reached (Linacre, 2000).

Advantages to CAT

Students sitting beside each other receive different questions due to the personalization of the questions administered. This reduces cheating (Dunkel, 1999; Van Horn, 2003; Way, 2006). The test is also adjusted to the student performance because the test is adjusting the question difficulty based on the previous answer, which helps to obtain a true picture of what the student knows (Dunkel, 1999; Van Horn, 2003). The difficulty of test questions is based on previous questions. Data are accumulated so once the initial test is given, data are maintained so growth over time can be measured

(Dunkel, 1999; Kingsbury & Hauser, 2004). The results are immediate with numerous reports available (Van Horn, 2003; Way, 2006). Savings in costs of printing and scoring are enormous (Olson, 2005; Rabinowitz & Brandt, 2001). CAT can include text, audio, graphics, full motion video, and graphs resulting in very detailed questions accommodating various learning styles (Dunkel, 1999). Since the testing reflects the students' capabilities, children remain engaged and are challenged but not frustrated (Cheng & Basu, 2008; Kingsbury & Hauser, 2004; Olson, 2005). This reinforces the student's zone of proximal development (Chaiklin, 2003). Children who usually feel frustrated at their inability suddenly feel successful because they have successfully answered questions on their level, and students who excel do not waste time with questions below their ability, providing a clear, detailed, data-based perception of their abilities. Adaptive tests can "zero in on exactly the areas where students are weak" (Yeh, 2006, p. 501). Decreased administrative burden such as security issues and stacks of booklets and testing material, papers, and testing keys are eliminated (Rabinowitz & Brandt, 2001; Tucker, 2009; Way 2006; Yeh, 2006). CAT testing allows for a more flexible testing schedule which can work better for schools and students (Way, 2006). Paper and pencil tests take time to grade. CAT is scored immediately, and reports are usually ready with 24 hours, allowing immediate evaluation (Tucker, 2009).

EOG and EOC tests are given at the end of the year. By the time descriptive data are received, the students have left for the summer and were either promoted or retained. The detailed data of strengths and weaknesses are not passed up to the next grade or used in the next school year. No growth data are provided by EOG and EOC testing (Yeh, 2006).

Disadvantages to CAT

Scheduling of CAT is one disadvantage (Van Horn, 2003). Unless a school has computer access for every student, testing time must be scheduled, which could result in weeks of testing. Most schools have two or three computer labs, which result in teachers taking turns to gain computer access. This is a tremendous disadvantage. Some schools are purchasing or leasing laptops, iPads, Macbooks or some other computer-related technology for each student, which results in testing any time the testing window is open.

Also, students should be exposed to CAT-type testing before actually taking a CAT high-stakes test (Rabinowitz & Brandt, 2001). CAT is expensive. School District A pays \$13 per student in Grades 3-8 to test three times a year, resulting in \$83,000 per year (Personal communication, 2010). Question banks have to be continually revisited, revised, and checked for validity (Latu & Chapman, 2002; Linacre, 2000). Another disadvantage is once a student progresses to the next question, the student cannot return to a previous question. Therefore, once an answer is selected and the student moves to the next question, changing the answer is impossible. Another disadvantage is for students who do not have regular access to a computer, CAT may be intimidating (Olson, 2005). Most of these disadvantages are of no consequence for School District A due to all students in sixth through twelfth grades having Macbooks and all elementary schools having access to multiple Macbook labs and iPad labs.

Data-Driven Decision Making

Data-driven decision making (DDDM) is defined as “the process by which administrators and teachers collect and analyze data to guide a range of educational decisions” (Levin & Datnow, 2012, p. 179). Data-driven decisions should happen at the school classroom level with the analysis being used to inform teachers (Bernhardt, 2009;

Picciano, 2005). Examples of why a school needs to begin implementing data-driven decisions are not making AYP, diverse cultures whose primary language is not English, and increasing free and reduced lunch population (Bernhardt, 2009). Student data can contain assessment scores, histories, and socioeconomic and demographic information to name a few (Wayman & Stringfield, 2006).

According to Halley Potter (2013), in *Boosting Achievement by Pursuing Diversity*, “a students’ socioeconomic background has a huge effect on their academic outcome . . . Poor students in mixed-income schools do better than poor students in high-poverty schools” (p. 39). Teachers want data-driven decisions related to students to understand why and where gaps exist and what is and is not working; teachers want to predict student success and prevent student failure (Bernhardt, 2009). Teachers also can pull resources when teaching diverse groups due to socioeconomic factors. As seen in the social structural theory, children growing up in poverty tend to stay in poverty but being exposed to peer interactions across various social networks can boost academic achievement (Potter, 2013).

Teachers need to know how the student did compared to a previous test (Ediger, 2010). Assessments need to measure individual student growth related to state content and to performance standards and the results need to be produced quickly to allow the teacher to readjust instruction (Olson, 2005). Data can help teachers and leaders narrow the achievement gaps, improve teacher quality, improve curriculum development, find the root causes of the problems, share best practices, communicate with stakeholders, motivate students, and increase parental involvement (Messelt, 2004). Assessments are a means to an end and cannot alone raise achievement (Gandal & McGiffert, 2003).

EOC and EOG tests are administered after a year of instruction. Therefore,

testing feedback provides information in which the teacher had no control; the feedback was too late and comes after a complete year of instruction. The feedback did not provide any information as to the future success of the student. Data need to be real-time, interpretable, and not tied to punitive merits (Salpeter, 2004). “Tests were constructed to assess major content domains according to a collective understanding of how the domain is parceled out into grade-specific units” (Kingsbury & Hauser, 2004, p. 1). One of the requirements of NCLB is testing material specifically addressing the content material for that particular grade (Kingsbury & Hauser, 2004). With data being computerized, accessibility is readily available (Picciano, 2005).

Barriers of DDDM

Barriers to DDDM are broken down by several components. First, goals need to be established. These goals include school goals, grade-level goals, specific-course goals and classroom goals (Wohlstetter, Datnow, & Park, 2008). Each set of goals needs to correspond to the overall school goal and to assist with student improvement. Second, curriculum and assessments must be aligned. Assessment data are useless if the interpretation cannot be tied directly back to the taught curriculum (Wohlstetter et al., 2008). The principal of the school is a key player in modeling, disseminating, and utilizing effecting data-driven decisions (Levin & Datnow, 2012). Principals may lack the professional training to analyze the data or may simply state the areas needing improvement and leave the details to the teachers. The principal has to be the change agent in the school and participate actively (Levin & Datnow, 2012). Teachers need to understand the data that are presented and how they can be related back to their individual students in real time. Teachers also need to be comfortable with their classroom data being discussed and welcome assistance in determining ways to reach

each individual student (Salpeter, 2004; Schmoker, 2003).

According to Victoria Bernhardt (2009), Executive Director of the Education for the Future Initiative and college professor, data-driven decisions are important for a school but the school has to work together to achieve results for every student. Every subject, every grade level, and every subgroup must be evaluated by data. Decisions affecting the students should come from the data and be across the board for every teacher working with that student (Bernhardt). The data has to be what the teacher needs and in workable, useable form for focused analyses (Schmoker, 2003).

Using data to integrate diversity based on socioeconomic factors is one example of how the data can be used. Although difficult to achieve and opposed by most school districts, according to Halley Potter (2013) with the Century Foundation, socioeconomic integration has been successful in narrowing the achievement gap and moving students in poverty to being academically successful.

Another barrier to affect data-driven decisions is understanding how to interpret the data. Many school systems have data and provide the data to the teachers and administrators but either the educator does not know how to interpret the data or the data is not broken down in the needed criteria to be aligned with the standards (Marsh, McCombs, & Martorell, 2010). Teacher professional development is another area of concern. Even with all the student data becoming available, teachers need training in how to interpret and apply the data to their classroom instruction and back to individual student success (Goldberg, 2004; Hirsh, 2005).

Formative Assessment

Professors Volante, Beckett, Reid, and Drake (2010) from Brock University stated that formative assessment is “assessment for learning” and summative assessment

is “assessment of learning” (p. 3). Summative assessments are quizzes, tests, exams, etc. that form a student’s final grade which determine a competency (Volante et al., 2010; Stiggins, 2005). “Formative assessments occur concurrently with instruction” which guide teaching and learning (Tomlinson & McTighe, 2006, p. 71). Formative assessment provides the feedback a teacher needs to modify the teaching and learning activities (Black, Harrison, Lee, Marshall, & Wiliam, 2004). As Laura Greenstein (2010) stated in her book *What Teachers Really Need to Know About Formative Assessment*,

Achievement needs to be viewed not as a test-based number but as measureable growth over time. In this context, achievement means that students are working to improve their knowledge and skills. Different students will undertake this in different ways—perhaps some taking smaller steps than others—but progress is being made nonetheless. . . . Formative assessment allows both the teacher and students to measure learning by inches, ounces, and degrees. The results can inform teacher and student decisions about what to do next on an hour-to-hour, day-to-day, or month-to-month basis. (pp. 2-3)

Some common examples of formative assessments are questioning, grading feedback, peer and self-assessments, journaling, check lists, etc. Learning Point associates Nick Pinchok and Christopher Brandt (2009), in their article *Connecting Formative Assessment Research to Practice: An Introductory Guide for Educators*, defined formative assessment as

Ranging from a five-second assessment to a scoring guide reviewed periodically by students and teachers while producing the product. The purpose of the assessment items, tasks, or activities must be that they are windows into the students’ cognitive processes. Assessments that allow students to show their

thinking, allow teachers to best elicit evidence about these cognitive processes. (p. 2)

According to Sarah McManus (2011), in coordination with the North Carolina Department of Public Instruction, effective formative assessment

Involves collecting evidence about how student learning is progressing during the course of instruction so that necessary instructional adjustments can be made to close the gap between students' current understanding and the desired goals.

Formative assessment is not an adjunct to teaching but, rather, integrated into instruction and learning with teachers and students receiving frequent feedback. (p. 3)

Formative assessments are ongoing and are linked directly to the teaching and learning going on in the classroom. Robert J. Marzano (2009), in his book *Formative Assessment and Standards-Based Learning*, went a little further defining assessment as “anything a teacher does to gather information about a student’s knowledge or skill regarding a specific topic” (p. 22). The formative assessment data can be used to individualize the student instruction (Pinchok & Brandt, 2009). Formative assessments should guide improvement in a student’s learning (Black et al., 2004). Interim and benchmark assessments can be used as formative assessments (For Every Child Multiple Measures: What Parents and Educators Want From K-12 Assessments, 2012). Interim and benchmark assessments are assessments administered at different intervals during a school year. Research completed by Grunwald Associates with NWEA stated,

Interim/benchmark assessments are administered at different intervals throughout the year to evaluate student knowledge and skills relative to a specific set of academic goals. Results are used to inform instruction and decision making at the

classroom, school and district level, and can be used to measure student growth over time. (For Every Child Multiple Measures: What Parents and Educators Want From K-12 Assessments, 2012, p. 3)

According to the National Center for the Improvement of Educational Assessment, interim assessments are designed to

Evaluate students' knowledge and skills relative to a specific set of academic goals, typically within a limited time frame and to inform decisions at both the classroom and beyond the classroom level. . . . Interim assessments may serve multiple purposes as well, by providing aggregate information on student achievement at a district level, while providing specific feedback on where the gaps in a particular student's knowledge are at the classroom level. Many currently-available interim assessments have been called "early-warning tests" or, more pejoratively, "mini-summative tests." Their purpose is to determine whether the student is on track to succeed on the summative assessment. These tests may also serve formative purposes as they should diagnose and provide corrective feedback to help the student get on track to succeed on the summative assessment and not to simply predict how the student will perform on the end of year test. (Perie, Marion, & Gong, 2007, pp. 4-5)

The primary purpose of any formative assessment is to drive instruction (Perie et al., 2007). North Carolina used the Blue Ribbon Commission Report on Testing and Accountability to revise the testing program and accountability system. The revisions resulted in the Framework for Change. One of the outcomes of the Framework for Change was the North Carolina's Formative Assessment Learning Community's Online Network (NC FALCON) online training (Framework for Change: The Next Generation

of Assessments and Accountability, 2008). NC FALCON is formative assessment by providing professional development through an online series of modules.

According to North Carolina Department of Instruction Accountability Services Division, formative assessment is defined as

A process used by teachers and students during instruction that provides feedback to adjust ongoing teaching and learning to help students improve their achievement of intended instructional outcomes. Formative assessment includes questioning, discussions, learning activities, feedback, conferences, interviews, and student reflection. Formative assessment is found at the classroom level and happens minute-to-minute or in short cycles. Formative assessment is not graded or used in accountability systems. The feedback involved in formative assessment is descriptive in nature so that students know what they need to do next to improve learning. (Public Schools of North Carolina, n.d. a, p. 1)

All teachers in School District A were expected to go through all modules in the NC FALCON series to implement formative assessment in the classroom beginning in 2010. As of 2011, 72% of North Carolina teachers had completed the NC FALCON training (McManus, 2011). Comparisons between pre and post surveys of teachers completing the NC FALCON modules showed a better understanding of formative assessment and how it should apply to the classroom (McManus, 2011).

North Carolina is also partnering with Pearson School Systems to obtain a web-based management system called PowerTeacher/PowerSchool. The management system is an efficient tool to track and analyze student data. The teacher can monitor each student's progress on a variety of learning outcomes and see progress for previous grading periods (PowerTeacher, 2013). This system will become available for teachers in

School District A in the 2013-2014 school year.

Formative Assessment Feedback

The important component of formative assessment is feedback. Teachers use formative assessment to “decide how much and what kind of learning, support, and practice a student needs to reach the goal” (Greenstein, 2010, p. 2). Feedback should be “timely, specific, understandable and allow for adjustment” (Tomlinson & McTighe, 2006, p. 77). The feedback is for both the teacher and the student. For the teacher, Greenstein (2010) said formative assessment feedback informs the teacher “what to do next on an hour-to-hour, day-to-day, or month-to-month basis” (p. 2). According to Greenstein, formative assessments can help teachers by

- Considering each student’s learning needs and styles and adapting instruction accordingly.
- Tracking individual student achievement.
- Providing appropriately challenging and motivating instructional activities.
- Designing intentional and objective student self-assessments.
- Offering all students opportunities for improvement. (p. 16)

Formative assessments should provide the student with tools as well. Greenstein stated that formative assessment works with the student by

- Emphasizing learning outcomes.
- Making goals and standards transparent to students.
- Providing clear assessment criteria.
- Closing the gap between what students know and desired outcomes.
- Providing feedback that is comprehensible, actionable, and relevant.

- Providing valuable diagnostic information by generating informative data. (p. 19)

Formative assessment should avoid comparisons to other students. Formative assessment should compare the student to areas where the student can improve. According to Sarah McManus (2011), in coordination with NC Department of Public Instruction,

Descriptive feedback should be about the particular qualities of student learning with discussion or suggestions about what the student can do to improve. It should avoid comparisons with other pupils. Specific, timely feedback should be based on the learning goal and criteria for success. It should help the student answer three basic questions: Where am I going? Where am I now? How can I close the gap. (p. 4)

As Hattie and Timperley (2007) stated, “Feedback has no effect in a vacuum; to be powerful in its effect, there must be a learning context to which feedback is addressed” (p. 82). Nancy Frey and Douglas Fisher (2011), in their book *The Formative Assessment Action Plan: Practical Steps to More Successful Teaching and Learning*, stated that “feedback reassigns responsibility back to the learner” (p. 5). This means when a student gets back assignments, the student should be responsible as is the teacher, in learning. Feedback then is the responsibility of both teacher and student with the goal being to “reduce discrepancies between current understandings and a desired goal” (Frey & Fisher, p. 9). As students get descriptive feedback from the teacher, the student work improves, the teacher can see where discrepancies of learning occur, and understanding and achievement can occur (Moss & Brookhart, 2009). Roskos and Neuman (2012) stated,

For formative assessment to be effective it needs to occur in a culture that

cultivates a learning orientation; a belief that ability is not fixed, but rather can be increased by effort. To foster this belief in students' hearts and minds, the formative assessment process needs to focus feedback on student effort, evidence of thinking strategies, and the salient features of quality work products. (p. 538)

Feedback methods are important also. Timing, amount, mode, and audience are important considerations when providing feedback as are the focus, function, clarity, specificity, and tone of the feedback (Moss & Brookhart, 2009). Feedback is more powerful when it is linked to student performance and the performance is still in the student's mind. Feedback needs to be specific. Grades do not reflect feedback. The student wants to know what he/she can do to improve (Frey & Fisher, 2011). Feedback needs to be "tailored to the needs of the learner" (Frey & Fisher, 2001, p. 64). Providing effective and timely feedback to formative assessments can promote student learning.

Differentiated Instruction

Differentiated instruction is personalized instruction or alternative approaches to instructional planning (Tomlinson, 1999). Differentiated instruction focuses on "whom we teach, where we teach, and how we teach. Its primary goal is ensuring that teachers focus on processes and procedures that ensure effective learning for varied individuals" (Tomlinson & McTighe, 2006, p. 3). It allows "all students to access the same classroom curriculum by providing entry points, learning tasks, and outcomes tailored to students' learning needs" (Watts-Taffe et al., 2012, p. 304). Student differentiation can occur by differentiating how students learn, how the learning is presented or demonstrated by the student, the environment in which the student learns, or the content they are learning is diverse (Watts-Taffe et al., 2012). Tomlinson (2000) called these *classroom elements*. These elements are

1. Content—what the student needs to learn or how the student will get access to the information.
2. Process—activities in which the student engages in order to make sense of or master the content;
3. Products—culminating projects that ask the student to rehearse, apply, and extend what he or she has learned in a unit.
4. Learning environment—the way the classroom works and feels. (Tomlinson, 2000, p. 1)

Tomlinson (2000), in the article *Differentiation of Instruction in the Elementary Grades*, stated,

At its most basic level, differentiation consists of the efforts of teachers to respond to variance among learners in the classroom. Whenever a teacher reaches out to an individual or small group to vary his or her teaching in order to create the best learning experience possible, that teacher is differentiating instruction.

(Tomlinson, 2000, p. 1)

Differentiation also means being “attuned to students’ varied learning needs,” such as the teacher-student relationship (Tomlinson & McTighe, 2006, p. 18). Other factors Tomlinson and McTighe (2006) encouraged for successful differentiation are attending to the learning environment, building bridges with students and their backgrounds, and preparing students’ readiness and motivation.

Learning Environment

Teaching involves many components, but the learning environment is critical. Many components are involved in making a positive student learning environment. One of the challenges of the classroom today is learner diversity. Tomlinson and McTighe

(2006), in their book *Integrating Differentiated Instruction & Understanding by Design*, stated,

Teachers find it increasingly difficult to ignore the diversity of learners who populate their classrooms. Culture, race, language, economics, gender, experience, motivation to achieve, disability, advanced ability, personal interests, learning preferences, and presence or absence of an adult support system are just some of the factors that students bring to school with them in almost stunning variety. Few teachers find their work effective or satisfying when they simply “serve up” a curriculum—even an elegant one—to their students with no regard for their varied learning needs. (p. 1)

Bransford, Brown, and Cocking (1999) stated that positive learning environments include four different yet related environments: a learner-centered environment, a knowledge-centered environment, an assessment-centered environment, and a community-centered environment. Learner-centered environments take into consideration the culture, personal, and social situations of the learner. Knowledge-centered environments help the student develop a deep understanding so as to be able to apply the knowledge learned. The assessment-centered environment provides opportunities for feedback and revision. The community-centered environment includes the classroom norms, the grading policy, and connecting the outside world to what is learned in the classroom (Bransford et al.).

Another component involved in making a positive student learning environment is the teacher-student relationship (Marzano & Dean, 2012). According to Marzano and Dean (2012), teachers who create a learning environment that produces learning are “warm and empathetic and establish a sense of community within the classroom where

they respects students and where students respect them and one another” (p. 23). Teacher enthusiasm helps maintain student attention (Callahan, 2011). Students succeed when a teacher is responsive to the needs of the student such as affirmation, accomplishment, affiliation, and shared responsibility (Tomlinson & McTighe, 2006). Tomlinson and McTighe (2006) listed six areas for student success in a positive learning environment

1. Attending to teacher–student relationships contributes to student energy for learning.
2. Attending to the learning environment builds a context for learning.
3. Attending to students’ backgrounds and needs builds bridges that connect learners and important content.
4. Attending to student readiness allows for academic growth.
5. Attending to student interest enlists student motivation.
6. Attending to student learning profiles enables efficiency of learning. (pp. 18-19)

A positive learning environment is for the student to know where they are going, what are they learning, and how they can apply what they learn to their world. “A basic framework of expectations and guidelines” are important for students to know what to expect (Callahan, 2011, p. 2). Callahan (2011) suggested clearly stating course learning objectives and goals, what you expect of the students, and how they can be successful. Students can see connections between what they are doing and what they should be learning when objectives are clearly defined (Marzano & Dean, 2012).

Incorporating problem-based learning, various technologies, and collaborative learning all with quick feedback also increases student motivation resulting in engagement (Callahan, 2011). According to Marzano and Dean (2012), students who

knew their learning targets, could self-monitor their progress, were provided *results* feedback, and were able to successfully move forward (Marzano & Dean, 2012).

Another aspect of the learning environment is having a varied repertoire of assessments for the varied learners. Students have diverse needs and varied learning styles which require various types of formative assessments (Tomlinson & McTighe, 2006). “Just as students differ in their preferred ways of taking in and processing information, so do they vary in the manner by which they best show what they have learned” (Tomlinson & McTighe, 2006, p. 73). “Effective differentiation guides educators in thinking effectively about whom they teach, where they teach, and how they teach in order to ensure that what they teach provides each student with maximum power as a learner” (Tomlinson & McTighe, 2006, p. 10).

The North Carolina teacher evaluation tool standard 4 states a teacher promotes a positive, student-centered learning environment. The goals of the evaluation tool are to Encourage students to ask questions, think creatively, develop and test innovative ideas, synthesize knowledge and draw conclusions; and help students exercise and communicate sound reasoning; understand connections; make complex choices; and frame, analyze, and solve problems. Teachers teach the importance of cooperation and collaboration. They organize learning teams in order to help students define roles, strengthen social ties, improve communication and collaborative skills, interact with people from different cultures and backgrounds, and develop leadership qualities. (North Carolina Teacher Evaluation Process, 2012, pp. 6-7)

The learning environment provides a culture “in which teachers and students are partners in learning” (McManus, 2011, p. 5). For students to be successful and be partners in their

learning process, the classroom should be characterized “by a sense of trust between and among students and their teachers; by norms of respect, transparency, and appreciation of differences; and by a non-threatening environment” (McManus, 2011, p. 5). The environment provides a medium for successful learning.

North Carolina Evaluation System

North Carolina has taken formative assessment into the teacher evaluation system. North Carolina teachers are evaluated on six standards with two of the standards directly relating to formative assessments and how formative assessments affect student learning. One of the new visions of the new teacher evaluation tool is “Teachers are reflective about their practice and include assessments that are authentic and structured and demonstrate student understanding” (North Carolina Teacher Evaluation Process, 2012, p. 7). Standard 4 states that teachers facilitate learning for their students by

- Using a variety of data sources for short-and long-range planning.
- Reflecting and understanding how students learn.
- Engaging students in the learning process.
- Constantly monitoring and modifying instructional plans to enhance learning.
- Using a variety of instructional methods.
- Choosing the methods and techniques that are most effective in meeting the needs of their students as they strive to eliminate achievement gaps. Teachers employ a wide range of techniques including information and communication technology, learning styles, and differentiated instruction.
- Choosing methods and materials as they strive to eliminate achievement gaps.

(North Carolina Teacher Evaluation Process, 2012, p. 7)

Standard 6 states that teachers contribute to the academic success of students. A further description states, “the work of the teachers results in acceptable, measurable progress for students based on established performance expectations using appropriate data to demonstrate growth (North Carolina Teacher Evaluation Process, 2012, p. 12). Standard 6 is determined by a student growth value and is a measureable number. This standard builds on a 3-year rotation demonstrating the teacher effectiveness (North Carolina Teacher Evaluation Process, 2012).

Student Learning – Constructivism Theory

In looking at the goals of DDDM, formative assessment, differentiated instruction, and the learning environment, education revolves around the student; more specifically, how can the student gain the knowledge needed to be successful in the 21st century. The specific goals reviewed in the Literature Review addressed what the teacher needs to know and do to adequately prepare the student and to properly disseminate what the student needs on the student level and in a way the student can understand. Educators take what a student has already learned – prior knowledge and prior experience – and builds on that knowledge and experience to meet the various educational goals for that student for that particular school year (Walker et al., 2002). John Dewey stated that education was an internal process. Dewey stated that student learning was internal and was a social endeavor (Walker et al., 2002).

Lev Vygotsky discussed the *zone of proximal development*, which is the gap between what the student has already mastered and what the student can achieve through education (Coffey, n.d.). Jean Piaget stated that learning is a process, not a “static body of information” (Walker et al., 2002, p. 29). Teachers ask questions, scaffold instruction, differentiate instruction, and enhance the learning environment to be conducive to

collaborative work to enhance the developmental status of the learner.

In reviewing the goals of the Literature Review and the works of various theorists such as Vygotsky, Piaget, and Dewey, the constructivist theory comes to light. The constructivist theory is a theory about how we learn, not memorization and repeating back what was memorized but about in-depth understanding (Marlowe & Page, 2005). All students bring different experiences, beliefs, cultural histories, etc. into the process of learning; all of which influence how we interact with and interpret new material. Constructivism encourages using these individual traits to strength and promote each student's own learning (Walker et al., 2002).

Constructivism can be distinguished by looking at the principles found in the book *The Constructivist Leader*. These principles are

1. Knowledge and beliefs are formed within the learner.
2. Learners personally imbue experiences with meaning.
3. Learning activities should cause learners to gain access to their experiences, knowledge, and beliefs.
4. Culture, race, and economic status affect student learning individually and collectively.
5. Learning is a social activity that is enhanced by shared inquiry.
6. Reflection and metacognition are essential aspects of constructing knowledge and meaning.
7. Learners play a critical role in assessing their own learning.

The outcomes of the learning process are varied and often unpredictable (Walker et al., 2002).

MAP Data

In 1997, NWEA began designing an adaptive, computerized test used in the MAP testing (NWEA: Our History, 2013). NWEA refined their computerized adaptive test and renamed the testing system to MAP and has given over 24 million assessments (NWEA: Our History, 2013). NWEA's goal is to deliver reliable and accurate assessment data to school districts to assist in student proficiency improvement and to support instructional decisions (Xiang & Durant, 2010).

MAP testing provides teachers information on which concepts a student has mastered and which areas need focus. Teachers can get reports by growth and proficiency arming the teacher with needed information to quickly diagnose student needs and to make quick, effective instructional decisions. This information is provided by student and by classroom for multiple classroom strategies (NWEA: Classroom Reports, 2013).

NWEA continues to work toward student success. NWEA is partnering with education software companies to aid in providing *customized learning paths* for students. Two of these companies are Study Island (NWEA and Study Island Partner to Provide Individualized Learning Paths for Student Growth, 2013) and Compass Learning (NWEA and Compass Learning Alliance Expands to Deliver Personalized Learning Paths for Student, 2011).

For this study, Elementary School A was used. Elementary School A used MAP testing for 5 previous years. Teachers were well-versed in the reports and usage of MAP data.

Chapter 3: Methodology

Problem

The gap between successfully completing high school and becoming a contributing member of society and failing to complete high school and becoming a burden to society is wider now than in the 1960s (Murphy, 2010). This gap is called the achievement gap, and closing this gap is critical in making the United States economically competitive and increasing productiveness (Murphy, 2010). Society recognizes two types of achievement gaps that are interrelated and widening. The first type of achievement gap exists in different socioeconomic groups and ethnicities. Groups of people living in poverty typically perform lower in all academic areas than groups not living in poverty. The second type of achievement gap exists between where a student is currently in their learning and where the student should be with regard to their learning (Roskos & Neuman, 2012). Data are available to assist teachers in making data-driven decisions regarding the classroom (Supovitz & Klein, 2003). The use of formative assessment as a tool to monitor student progress and readjust teaching is becoming a common push by many states including North Carolina (Public Schools of North Carolina, n.d. b, p. 1).

Formative assessments provide the teachers with current data as to what the students have most recently learned and what the students are still lacking in the learned objective. This quick assessment provides the teacher with information to make immediate adjustments to their teaching to reteach the objective to the student resulting in successful learning for the student. This redirection and reteaching helps bring the student to the appropriate level of learning, providing the student successful learning. This successful learning reduces the learning achievement gap providing success for the

student (Stiggins, 2005; Tomlinson & McTighe, 2006; Volante et al., 2010). Formative assessment provides “windows into the students’ cognitive processes” to see specifically where the students are in their learning (Pinchok & Brandt, 2009). Determining where the students are in their learning and readjusting the teaching to meet the learning deficit enhances student learning growth, therefore reducing the learning achievement gap (McManus, 2011).

In trying to provide teachers with the needed tools to assess students and determine specific areas of learning which need to be addressed, School District A purchased a license to begin MAP testing all students in kindergarten through eighth grade. These assessments have occurred at specific intervals throughout the school year to provide the teacher with a detailed description of student strengths and weaknesses by specific strand. This provided teachers with the data to personalize student instruction to meet specific weaknesses by individual student and by classroom.

Research Questions

The purpose of this study was to determine the impact of formative assessment through MAP testing at an elementary school in western North Carolina and to show how the formative assessments impacted teacher planning and instruction. The implementation of MAP testing may have had a positive influence on student growth. The teachers at Elementary School A have been MAP testing for 5 full school years (Confidential personal communication, 2010). Although MAP testing had been a school district mandate, each teacher’s use of the formative assessment data from MAP testing was dependent upon his/her own level of utilization.

The following research questions guided this case study.

1. To what extent did MAP reading and math data drive lesson planning?

2. To what extent did MAP reading and math data impact differentiation?
3. To what extent did the impact of the utilization of MAP have on the learning environment of the classroom?

Study Design

In order to complete this research, a case study with a mixed-methods research design composed of qualitative and quantitative measurements was used. Case study research is “research that provides detailed account and analysis of one or more cases” (Johnson & Christensen, 2004, p. 376). Mixed-methods research is formally defined as “the class of research where the researcher mixes or combines quantitative and qualitative research techniques, methods, approaches, concepts or language into a single study” (Johnson & Onwuegbuzie, 2004, p. 17). Qualitative research alone can have personal bias and a lack of personal interpretations. Quantitative research alone can show the results but can leave out the description of the *why* in the data. By using both qualitative and quantitative data, the researcher was able to show results mathematically and identify factors in qualitative data such as opinions, personal interpretations, and user involvement (Madrigal & McClain, 2012). Mixed-methods methodology also allowed one data type to be transformed into the other data type to allow for statistical analysis of both data types together (Caracelli & Greene, 1993). Mixed methods allowed for data to be collected at multiple levels such as the student view and the teacher view therefore “enhancing, elaborating or complimenting” data from each source (Creswell, 2008, p. 554). By using the mixed-methods methodology, the strengths of both quantitative and qualitative data were incorporated (Johnson & Onwuegbuzie, 2004).

In a mixed-methods design, triangulation occurred due to using both quantitative and qualitative data, merging the data, looking for corroboration, and using the results to

better understand the research problem (Creswell, 2002). Triangulation allows researchers to “improve their inquiries by collecting and converging different kinds of data bearing on the same phenomenon” (Creswell, 2008, p. 553). Using both quantitative and qualitative data and then comparing the results of both data to either support or contradict each other provides triangulation, which can substantially strengthen the results (Creswell, 2002). Triangulation can “substantially increase the credibility or likelihood of the correctness of a research finding” (Johnson & Christensen, 2004, p. 424). Triangulation provided a measure to increase validity (Fitzpatrick, Sanders, & Worthen, 2003). Triangulation allowed the researcher to substantiate and unite the results of the data, increasing the validity.

The researcher collected quantitative data through the surveys by scaling the surveys using ordinal measures which determined the level of agreement. This level of agreement from the survey questions was correlated to the research questions. Descriptive statistics were then used to summarize the variability or inconsistency of the data. From the surveys, questions were devised for the focus groups. The focus group interviews produced themes which could be analyzed. Finally, three individual teacher interviews were conducted to add further clarification and to triangulate the findings.

Sample and Population

The school selected for this study was a rural elementary school in western North Carolina, referred to as Elementary School A. Elementary School A received its first students in the fall of 1999, combining two existing elementary schools that were closed. At the time of this study, Elementary School A had kindergarten through fifth grades with an enrollment of 300 students and 13 subgroups. Elementary School A had 47% of its teachers with 10 years of experience or more, and 40% of the teachers had 4-10 years

of experience. Also, four of the teachers were National Board Certified (NC School Report Card, 2012). Third through fifth grades in Elementary School A in 2011-2012, had a student body composed of 157 students with 85.4% White, 8.3% Black, 4.5% two or more races, 1.9% other, 18.5% with disabilities, and 67.5% were economically disadvantaged. Attendance for students was at 95% or higher for all demographics. The student survey population consisted of 141 student surveys (Appendix A). The teacher survey population consisted of 11 teacher surveys (Appendix B). There was a third-grade focus group, a fourth-grade focus group, and a fifth-grade focus group with each group comprised of six to 10 students. The teacher focus group consisted of seven teachers.

Instruments

In order to gain data to answer the research questions, the following data collection tools were used: student surveys, teacher surveys, teacher focus group, student focus groups, and three individual teacher interviews. Cross-sectional design surveys were used for all teachers who performed MAP testing and for third- through fifth-grade students. Cross-sectional design surveys are used to collect data that “reflect current attitudes, opinions, or beliefs” (Creswell, 2002, p. 397). Survey questions were generated from the research questions and were coded to link directly back to research questions to help generate themes. The data were collected at “one point in time which measures current attitudes” (Creswell, 2002, p. 398). Survey questions were generated from research questions and based on formative assessment and lesson planning, learning environment, and differentiated learning. Surveys were administered to all third- through fifth-grade students so as to include the entire third- through fifth-grade population of Elementary School A. Surveys were administered to all MAP testing teachers which included teachers from kindergarten through fifth grade. All MAP testing teachers were

asked to take the teacher survey, but data were disaggregated by teachers with summative EOG tests and nonsummative EOG teachers. These surveys were conducted after the first MAP testing window.

A focus group was used with teachers from third through fifth grade, consisting of seven teachers. Richard Krueger (2002), in his article *Designing and Conducting Focus group Interviews*, recommended five to 10 *similar type* people per group. The focus group in this study fits this criterion, as the groups consisted of teachers from the same school using the same formative assessment tool (Krueger). For the student focus groups, each teacher was encouraged to select a representation from his/her class. Each focus group was formed by grade level with five to 10 students per focus group per grade level. Students were more likely to involve themselves within the group and assist one another if they shared similar characteristics (Krueger). Each student focus group consisted of students who conversed with their peers and shared insight as to their views of their classroom. Each grade focus group consisted of five to 10 students.

Student Surveys and Focus Groups

Surveys were completed during classroom time by the classroom teacher. Once the surveys were completed and the data were coded, themes emerged from the data which related to the research questions. From these themes, open-ended questions were formed to be used with the focus groups. Focus groups were conducted for each grade: third, fourth, and fifth. Third grade had three classrooms which was a combined focus group. Fourth and fifth grades had two classrooms which were combined by grade as two separate focus groups. Six to eight students from each class were identified and permission requests were sent home. This resulted in 15-18 potential students from third grade, and fourth and fifth grade classrooms had 10-12 potential students. Each grade

provided six to eight students for the focus groups. The goal of the focus groups was to provide an additional level of data to the study. This additional level of data allowed for data triangulation. The researcher used the constant comparison approach to analyze the data. The constant comparison approach compared the focus group data to the survey data to look at emerging themes. The student focus group questions were generated from the surveys to allow students to express their views of how the data have changed their classroom environment by how lessons are implemented.

Teacher Surveys and Focus Group

The teacher surveys were distributed to all MAP testing teachers in kindergarten through fifth grade. Once the surveys were completed and the data were coded, themes emerged from the data which related to the research questions. From these themes, open-ended questions were formed to be used with the focus group. One focus group was formed with all teachers in third, fourth, and fifth grades. The goal of the focus group was to provide an additional level of data to the study. This additional level of data allowed for data triangulation. The researcher used the constant comparison approach to analyze the data. The constant comparison approach compared the focus group data to the survey data to look at emerging themes. Teacher interviews were conducted to clarify any theme needed from the focus group.

The teacher focus group questions were generated from the surveys to assess how the teachers use the formative assessment data to drive lesson plans and in diversifying classroom instruction.

Procedures

To begin this project, the researcher gained permission from Elementary School A principal (Appendix C) and School District A superintendent (Appendix D). Every

kindergarten through fifth-grade student in Elementary School A was MAP tested three times per year. Surveys were conducted for all third- through fifth-grade students to assess their perceptions toward formative assessment and MAP testing. If a student was absent on the day of the survey, the student was not surveyed. Survey questions were aligned with each of the research questions for correlation purposes (Table 6). Student survey questions were validated by another elementary school's instructional facilitator and a fifth-grade teacher from another elementary school in School District A prior to distributing the surveys. Both of these individuals were impartial to the teachers and students at Elementary School A but were experienced elementary teachers and routinely train others in the usage of MAP formative assessment data. Having experienced elementary teachers enhanced the validity of the survey to assure the survey had appropriate wording, content, and reading level for elementary school students. The validating teachers reworded some of the survey questions and suggested the surveys be read aloud by the classroom teacher. These recommendations were accommodated.

Table 6

Student Survey Questions as Related to Research Questions

Research Question 1: To what extent is MAP reading and math data being used to drive lesson planning?

- Does your teacher ask you during class if you understand what they are teaching?
 - Does your teacher give you smaller quizzes before a big test?
 - Does your teacher slow down the lesson if you are having difficulty with a subject?
 - Does your teacher ask you to show them your class work?
 - Does your teacher ask you to show off your work to other students?
 - Does your teacher help you build on things you already know?
 - Do you feel like you are ready for my quizzes and test because of how your teacher asks you questions while they are teaching me?
 - Does your teacher put as much emphasis on the classroom tests as she does for the EOG test?
 - Does your teacher walk around your classroom looking at your work.
-

Research Question 2: To what extent is MAP reading and math data impacting differentiation?

- Does your teacher tell you what you are going to learn and why you are learning it?
 - Does your teacher ask you what they can do to help you better understand what they are teaching?
 - Does your teacher show you what a finished assignment is supposed to look like?
 - Does your teacher allow you time to reflect in a journal about the things you learned in class?
 - Does your teacher give you time to grade your own assignments during class?
 - Does your teacher celebrate when you complete an assignment the correct way?
 - Does your teacher ask you to show her your work during class?
 - Does your teacher write notes on your work to let you know how you did and what you can do to improve?
 - Does your teacher allow the students to ask questions while they are teaching?
 - Do you think you can learn from your mistakes?
 - Do you think you should be able to make corrections on assessments once you've realized your mistakes?
 - If you are asked to learn new things, even if it is difficult, do you think you can do it?
-

Research Question 3: To what extent did the impact of the utilization of MAP have on the learning environment of the classroom?

- Does your teacher encourage you to help other students during class?
 - Does your teacher ask you how they can make the class more interesting?
 - Does your teacher usually catch your mistakes before you get frustrated trying to figure a problem out?
 - Does your teacher allow the students to set up some of the rules for the class?
 - Does your teacher want the students to work together to learn?
 - Do you know if you are making progress in school?
-

Student surveys included 141 students from third to fifth grade. Since testing was

anonymous and included all students in Grades 3-5 present on the day of the survey administration, permission forms were not needed due to surveys being anonymous and no identifying information being used. Grade, gender, and race/ethnicity were asked but were only used for research description. Surveys were conducted for all kindergarten through fifth-grade homeroom teachers using MAP testing data with 11 responding. Teacher survey questions were aligned with each of the research questions for correlation purposes (Table 7). Although third through fifth grade was the focus, survey data from teachers who do not have EOC testing provided information for how all teachers, regardless of summative testing requirements, use MAP testing results and formative assessment. The surveys assessed the perceptions of the students and teachers toward MAP and how the results are used in the classroom. Education level, years of experience, years of service at present school, and grade level were the only identifying information for the teacher survey.

Table 7

Teacher Survey Questions as Related to Research Questions

Research Question 1: To what extent is MAP reading and math data being used to drive lesson planning?
I use formative assessment in my classroom.
I use Measures of Academic Progress (MAP) as a method of formative assessment in my classroom.
I use formative assessment, in conjunction with the MAP program in my lesson planning.
I tell my students what they are expected to learn and why they are learning the material.
I use probing questions to diagnose the extent of the students' learning.
I analyze completed work to comprehend why a student has or has not achieved success.
I analyze completed work to comprehend why a student has or has not achieved success.
I strive to catch student misconceptions about subject matter before they occur.
How often do you use the data generated by MAP to change your instruction?
I regularly use school data to identify content to re-teach.
I regularly use school data to form flexible student groups with other teachers during the school day.
I regularly use school data to set performance goals for students.
I regularly use school data to communicate with students about their progress towards learning standards.
I use formative assessment to monitor the progress of students by sub-group in my classroom.
Research Question 2: To what extent is MAP reading and math data impacting differentiation?
I ask students to demonstrate their work so I can analyze their thinking.
I encourage my students to demonstrate their thinking/work to the class.
I encourage students to suggest ways that their learning can be improved.
I tell students what they have or have not achieved with specific references to their learning.
I write feedback on students' work that is specifically designed for the assignment and individual students.
Formative assessment, in conjunction with the MAP program, has an impact on how I implement instruction.
Formative assessment, in conjunction with the MAP program, impacts how I assess my students.
I allow my students to communicate with me during instruction so I can ensure my instruction is meeting their needs.
I assist students in negotiating a route to improve their learning.
How often do you analyze the data generated by MAP.
How often do you discuss the results from MAP with individual students?
I regularly use school data to modify my instructional strategies (e.g., differentiate my instruction).
(continued)

Research Question 3: To what extent did the impact of the utilization of MAP on the learning environment of the classroom?

Formative assessment, in conjunction with the MAP program, allows the learning environment of my classroom to be improved.

I invite and build on my students' contributions to the class.

I encourage students through my specific and focused feedback about their performance in my classroom.

I encourage students to help one another.

I show students some examples of their peers' work for the purpose of guiding and learning.

I provide opportunities for students to assess their own work and each other's work and give feedback.

I express approval to both students and their parents when students meet objectives on assignments.

I strive to make my students the center of my classroom practices.

I provide time for students to reflect and talk about their learning with me. (Conferences)

How often do you take group instructional time for the use of MAP results?

I help students to understand their achievements and know what they need to do next to make progress.

I allow the students to participate in the decision making process for my classroom. I encourage my students to work in learning teams to allow relationships to be fostered in my classroom.

I show students a range of other students' work to model (or exemplify) criteria for assignments.

Once surveying for teachers and students was completed, permission forms were sent to the parents of the student focus groups (Appendix E). Due to the possibility that parents may not sign the permission forms, 15-18 students per grade were chosen. Parents had the opportunity to decline focus group participation without consequences at any time during the research study. From the granted permission forms, six to eight students per grade were chosen for the focus groups. While waiting for parental approval, permission forms were distributed to third- through fifth-grade teachers (Appendix F). The focus groups were asked specific, open-ended questions that were generated from the survey responses. Each focus group's comments were transcribed with descriptions such as Teacher A, Teacher B, third-grade student A, fourth-grade student A, so each person would maintain anonymity. Individual interviews were used to follow-up on unclear themes and to provide more depth and further triangulation.

Each item was summarized using descriptive statistic information such as category response rates, item-total correlations, average response, and Cronbach's alpha. The category response rate was the percentage of completion with regard to completed surveys, focus group attendance, and interview participation. According to Creswell (2008), "researchers seek high response rates from participants in a study so that they can have confidence in generalizing the results to the population under study" (p. 402). Item-total correlation was the internal consistency. High item-total correlation implied the respondent was typically consistent with their opinions. Item scores on each section of the survey were summed to create subscale scores. Descriptive measures such as mean, median, variance, standard deviation, and correlation of the subscales were also provided. Correlation among the subscales provided information on how the different scales were related. For instance, a significant, positive correlation between items on RQ1 and RQ2 would indicate that as scores on RQ1 go up, scores on RQ2 also tend to increase. Cronbach's alpha was another measure of internal consistency, otherwise known as reliability. Reliability was an indicator of how much measurement error exists in a survey. The higher the reliability, the lower the measurement error.

One popular measurement framework used in the design, construction, and evaluation of surveys and assessments is IRT. IRT has been readily adopted because of its numerous advantages. One such benefit was IRT attempted to model student ability and attitudes using item-level performance instead of a combined test-level or survey-level performance. By not combining the information to the test or survey level, a richer body of evidence was gathered regarding student abilities. Further, instead of assuming all items contribute equally to the understanding of a student's abilities and attitudes, IRT provided a more pronounced view of the information each item provided about a student.

The IRT showed the strength of the students' attitudes with regard to formative assessment (Royal, 2010).

For instance, many educational assessments employ scales (e.g., low, medium, high) to represent a rated task. These items are polytomous and have three or more response categories. Polytomous models are applicable to the survey Likert scale that has three categories: always, sometimes, and never. The surveys determined the attitudes about formative assessment as the trait of interest. Respondents chose one of three response categories: never, sometimes, or always. The response items never, sometimes, or always were chosen to accommodate the young ages of the students. Teachers who frequently used formative assessment most likely saw student responses in the always category as close to one while teachers who did not frequently use formative assessment would most likely see student responses in the never category and the probability of responses in category never would be close to zero.

IRT was used in this study to gain a deeper understanding of the use of formative assessment and MAP by examining item-level difficulty values. The Partial Credit Model (PCM) was used to analyze the student surveys due to the polytomous nature of the survey (Liang & Wells, 2009). The PCM provided finer grain detail because the researcher dealt with one survey question at a time. Using the proper IRT model such as the PCM was checked to ensure that valid inferences were drawn. The item-fit statistic $S-X^2$ was used to assess the fit. Item-fit statistics were used as a way to identify items that need further examination (Chon, Lee, & Ansley, 2007).

Data Collection

MAP testing windows were set for School District A. All testing windows were determined between School District A Testing Director and NWEA. The fall testing

window was September through November with Elementary School A making the final scheduling decision as to when the school would MAP test. After the MAP testing was complete, surveys were administered to third- through fifth-grade students and teachers who MAP tested. The survey questions were grouped into themes related to the research questions. The surveys used the Likert scale. Fitzpatrick et al. (2003) stated, “items consist of sentences that reflect an attitude on the construct of interest. Responses are made on a ‘strongly agree-strongly disagree’ continuum” (Fitzpatrick et al., p. 343). According to Johnson and Christensen (2004), the Likert scale “provides more reliable, consistent and stable scores and they produce more variability, which helps the researcher to make finer distinctions among the respondents” (p. 175). One of the characteristics of the Likert scale is that the scale is summated, which means that items are combined or summed. This combination or summation was used to represent a particular trait making the survey easier to identify trends. According to Paul Spector (1992) at the University of South Florida, there are four characteristics that make a scale a summated rating scale.

1. The scale must contain multiple items which will be combined or summed.
2. Each individual item must measure something that has an underlying, quantitative measurement continuum. In other words, it measures a property of something that can vary quantitatively rather than qualitatively.
3. Each item has no "right" answer, which makes the summated rating scale different from a multiple-choice test. Thus summated rating scales cannot be used to test for knowledge or ability.
4. Each item in a scale is a statement, and respondents are asked to give ratings about each statement. This involves asking subjects to indicate which of several response choices. (Spector, 1992, p. 1)

The Likert scale is a multi-item summative rating scale providing more validity and reliability as compared to a yes/no survey. Spector (1992) cited three reasons for using the multi-item summative rating scale: first, “single items do not produce responses by people that are consistent over time”; second, “they restrict measurement to only two levels”; and third, “some issues are complex, and several items will be necessary to assess them” (p. 4). The surveys consisted of three possible responses; never, sometimes, and always. Sometimes and always counted as positive responses, never counted as a negative response, and no opinion was not counted. Once the responses from both sets of surveys were calculated, the researcher was able to see how the respondents viewed the use of MAP formative assessment.

Limitations of Study

Throughout the research process, some limitations were observed. MAP testing can be performed three or four times each school year with three times per school year as the recommendation from NWEA. School District A chose the three testing windows: fall, winter, and spring. The testing windows were predetermined times lasting 4-6 weeks for each window. Each school can choose the time within this 4-6 week period in which they wish to test. These testing windows were normally in September within the first month of school, the 2 weeks in December before the Christmas break and the first 2 weeks of coming back to school after the Christmas break, and the third window being in April. School District A purchased the MAP license in 2007-2008 school year with the second (winter) testing window being the first testing opportunity. Although School District A did test in the second (winter) and third (spring) testing window, teacher training progressed throughout the year and into the summer to get all teachers trained and able to understand how to interpret and apply the data to individualized instruction.

Although attendance at Elementary School A was above 95%, student absenteeism during the testing window could have limited results. Students absent on scheduled testing days were tested on scheduled make-up days during the testing window. If the student was out both scheduled times, no test was administered. This resulted in a missed test during the testing window. Student transfers also provided limited data. If the student attended any school in School District A and was tested, data could be transferred if the student was present for the assessment. Schools were allowed to choose their individual testing time within the district testing window. Students who transferred from an outside School District A would likely remain untested. Attitude, wellness of student, and testing environment on the days of testing could affect the results.

Delimitations of Study

Only Elementary School A was used in this study. This study surveyed all third-through fifth-grade students, and focus groups were chosen from each grade. This study also surveyed all teachers who MAP test. Teacher focus groups were formed using all teachers from third through fifth grades. The findings in this study are applicable to Elementary School A, but this study could be repeated in other elementary schools and survey questions could be edited for additional understanding of MAP data usage. Other schools could find the results of interest.

Teachers use many forms of formative assessment. The focus in this study was how the MAP formative assessment data were used in lesson planning and differentiated instruction and what impact, if any, they had on classroom environment.

The 2013-2014 school year began without a Testing and Accountability Director as the current director had resigned. A new director will be named in the near future.

MAP testing has been scheduled without the director position being filled.

Summary

The purpose of this study was to determine how teachers used MAP formative assessment data in lesson planning and diversifying instruction and what impact, if any, MAP utilization had on the classroom learning environment. Surveys of both teachers and students were conducted first and themes were identified; focus group interviews were then conducted for all third- through fifth-grade teachers and students by grade.

Chapter 4: Data Analysis and Explanation of Results

Introduction

Formative assessment is a fundamental strategy to move students to the next level of learning by providing informed instruction (Greenstein, 2010). Growth occurs as teachers understand where their students' weaknesses are in relation to the classroom goals, objectives, and standards (Greenstein, 2010). Laura Greenstein (2010) stated,

Formative assessment encompasses a variety of strategies for revealing students' understanding, allowing teachers to pinpoint and address any impediments to a student's progress. The process is much like a coach setting short exercises to assess a runner's stride, speed, and equipment and then making appropriate adjustments so that the runner can improve. Teachers use formative data to decide how much and what kind of learning, support, and practice a student needs to reach the goal. When formative assessment is employed before, during, and after instruction, both teachers and students have a measure of progress. (p. 2)

The purpose of this study was to determine the impact of formative assessment while using MAP testing data in a rural elementary school in North Carolina and how formative assessments impacted student learning, lesson planning, and the classroom environment.

School District A began using MAP testing in the winter of 2008. The first two testing windows set a testing baseline while allowing time for teachers to be trained on how to interpret the data. Beginning in the 2009-2010 school year, students were MAP tested the recommended three times and all teachers were trained. Therefore, MAP testing has been occurring in School District A for 5 years.

In order to gain sufficient knowledge to make conclusions from the data, a mixed

methodology was chosen. The researcher used triangulation between the teacher and the student surveys and the teacher and student focus groups to ensure the data had a sufficient amount of validity. Triangulation allows researchers to “improve their inquiries by collecting and converging different kinds of data bearing on the same phenomenon” (Creswell, 2008, p. 553). Furthermore, triangulation can “substantially increase the credibility or likelihood of the correctness of a research finding” (Johnson & Christensen, 2004, p. 424).

Research Questions

The following research questions guided this case study:

1. To what extent did MAP reading and math data drive lesson planning?
2. To what extent did MAP reading and math data impact differentiation?
3. To what extent did the impact of the utilization of MAP have on the learning environment of the classroom?

Procedures

The teacher and student surveys were completed first. After the results from the surveys were analyzed, the questions for the focus groups were generated to enrich and further define the findings of the survey questions. Four focus groups were conducted: eight students from third grade, six students from fourth grade, seven students from fifth grade, and seven third- through fifth-grade teachers were included. The students were randomly selected from the student body based on the returned parental permission forms. The data from the focus groups were transcribed, examined, and coded into themes. After comparing the themes from the surveys and the focus groups, the researcher was able to determine how MAP data were implemented in the classroom and to what extent formative assessment impacts lesson planning, differentiation and the

learning environment.

Description of the Sample

Teacher Surveys

The teacher sample consisted of 11 participants, all of whom were Caucasian females. All MAP testing teachers were invited to participate in the survey. Table 8 breaks down the age of the teachers.

Table 8

Breakdown of Teacher Age

Age	Number of Teachers	Category Percent
20-30	3	27.3%
31-40	4	36.4%
41-50	3	27.3%
51-60	1	9.1%
Total	11	100%

The majority of teachers surveyed had less than 10 years of experience (72.8%), whereas 63.6% of participants had been in their current position for less than 5 years. Four of the teachers (36.4%) had earned a master's degree.

Student Surveys

The student sample consisted of 141 students with 51.1% of the students being female, 45.5% being male, and 3.4% chose not to answer. Table 9 shows the breakdown of survey participants by grade.

Table 9

Breakdown of Student Population Surveyed

Grade	Frequency	Percent
3rd	48	34.0%
4 th	44	31.2%
5 th	46	32.6%
Total Responses	138	97.9%
Missing (No response)	3	2.1%
Total	141	100.0%

Table 10 shows the ethnic breakdown of the student population.

Table 10

Breakdown of Student Ethnicity/Race

Race	Frequency	Percent
White/Caucasian	112	79.4%
Black/African American	12	8.5%
Native American	3	2.1%
Asian	2	1.4%
Mixed Race (2 or more races)	8	5.7%
Total Responses	137	97.2
Missing (No response)	4*	2.8%
Total	141	100.0%

Note. *Three students were absent and one student failed to mark Ethnicity/Race.

Survey Data Analysis

In order to determine how reliable the survey questions were for students and teachers, Cronbach's alpha was used to analyze the survey. Cronbach's alpha measures the internal reliability of the survey questions. Cronbach's alpha for the overall teacher survey was .896. George and Mallery (2003) provided a general guideline measurement of .8 or greater being a good internal consistency. Cronbach's alpha for the student survey was .656. George and Mallery noted that .6 or less may be questionable with

relationship to internal reliability. The researcher did discover challenges while working with the student focus groups and new tools the teachers are using. Both of these are discussed in the teacher and student focus group analysis.

Teacher Survey Analysis

The survey utilized the following response categories: always, sometimes, and never. Item-total correlation was used to determine if any question was inconsistent with the averaged behavior of the other items. The closer the number is to 1, the more consistent the question (George & Mallery, 2003). In Table 11, the column titled “Cronbach’s Alpha if this Question was Deleted” shows what Cronbach’s alpha for the entire survey would have been if that individual question was removed from the survey list.

In the teacher’s survey, three questions were not consistent which indicates a lack of capturing the purpose of the question. This could be due to question wording, presentation format, or possibly capturing more than one characteristic. The characteristics being looked at related directly to the research questions and are formative assessment, MAP usage, lesson planning, and classroom environment. These questions were question 3 (I use formative assessment in conjunction with the MAP program in my lesson planning), question 14 (I use formative assessment to monitor the progress of students by subgroup in my classroom), and question 29 (I encourage students to help one another). The following table is the breakdown of corrected item-total correlation and Cronbach’s alpha if this question was deleted per survey question.

Table 11

Descriptive by Individual Question on Teacher Survey

Question	Corrected Item-Total Correlation	Cronbach's Alpha if this Question was Deleted
I use formative assessment in my classroom.	.062	.899
I use Measures of Academic Progress (MAP) as a method of formative assessment in my classroom.	.281	.896
I use formative assessment in conjunction with the MAP program in my lesson planning.	-.273	.903
I tell my students what they are expected to learn and why they are learning the material.	.737	.889
I use probing questions to diagnose the extent of the students' learning.	.767	.889
I analyze completed work to comprehend why a student has or has not achieved success.	.505	.893
I analyze completed work to comprehend why a student has or has not achieved success.	.506	.892
I strive to catch student misconceptions about subject matter before they occur.	.711	.891
How often do you use the data generated by MAP to change your instruction?	.567	.891
I regularly use school data to form flexible student groups with other teachers during the school day.	.737	.889
I regularly use school data to form flexible student groups with other teachers during the school day.	.281	.896
I regularly use school data to set performance goals for students.	.313	.895
I regularly use school data to communicate with students about their progress towards learning standards.	.292	.896
I use formative assessment to monitor the progress of students by sub-group in my classroom.	-.205	.907
I ask students to demonstrate their work so I can analyze their thinking.	.505	.893
I encourage my students to demonstrate their thinking/work to the class.	.703	.889

(continued)

Question	Corrected Item-Total Correlation	Cronbach's Alpha if this Question was Deleted
I encourage students to suggest ways that their learning can be improved.	.691	.888
I tell students what they have or have not achieved with specific references to their learning.	.807	.886
I write feedback on students' work that is specifically designed for the assignment and individual students.	.319	.897
Formative assessment, in conjunction with the MAP program, has an impact on how I implement instruction.	.421	.894
Formative assessment, in conjunction with the MAP program, impacts how I assess my students.	.062	.900
I assist students in negotiating a route to improve their learning.	.737	.889
Do you analyze the data generated by MAP?	.288	.896
How often do you discuss the results from MAP with individual students?	.198	.897
I regularly use school data to modify my instructional strategies (e.g., differentiate my instruction).	.286	.896
Formative assessment, in conjunction with the MAP program, allows the learning environment of my classroom to be improved.	.186	.897
I invite and build on my students' contributions to the class.	.534	.892
I encourage students through my specific and focused feedback about their performance in my classroom.	.506	.892
I encourage students to help one another.	-.125	.902
I show students some examples of their peers' work for the purpose of guiding and learning.	.602	.890
I provide opportunities for students to assess their own work and each other's work and give feedback.	.593	.891
I provide time for students to reflect and talk about their learning with me. (Conferences)	.452	.893
How often do you take group instructional time for the use of MAP results?	.445	.893
I help students to understand their achievements and know what they need to do next to make progress.	.909	.883

(continued)

Question	Corrected Item-Total Correlation	Cronbach's Alpha if this Question was Deleted
I allow the students to participate in the decision making process for my classroom. I encourage my students to work in learning teams to allow relationships to be fostered in my classroom.	.344	.895
I show students a range of other students' work to model (or exemplify) criteria for assignments.	.531	.892

In working with the teacher focus group, information was found which could help explain several of the lower corrected item-total correlations. Most questions with lower corrected item-total correlations were related to MAP testing and the use of the MAP data. In the teacher focus group, evidence was brought to light of new tools which have been implemented in the 2013-2014 school year and how MAP is no longer the only formative assessment tool available to teachers. Teacher A commented,

First we compare MAP to our end-of-grade test. We also use MAP for determining our flex groups and did use it for RTI but it has become second for RTI, AIMSweb has become primary. MAP does provide the skills that we cover in the flex groups but AIMSweb is used to determine if the strategies are working in the flex groups. (Teacher Focus Group, 2013)

Flex time is two 30-minute segments in the afternoon, Monday through Friday, that have been used to differentiate instruction and provide intense teaching on very specific strategies with students needing work in those specific strategy areas. The groups are broken down into 30 minutes of reading instruction and 30 minutes of math instruction each day. Flex groups are broken down into three tiers with tier three being primarily skills-based and tier one being projects. Reading and math groups are independent of each other and based on

skills needed only.

An example is in question 3 which had corrected item-total correlations of $-.273$. There were three traits possible for this item: use of formative assessment, use of MAP, and lesson planning procedures. MAP was used to determine the various flex groups and what lessons and strategies are provided in each flex group. MAP was used as the only formative assessment tool for evaluating flex time effectiveness and if flex time instruction was effective. With the introduction of other tools such as AIMSweb and RTI, MAP was no longer the only formative assessment tool. The knowledge teachers had of additional tools could have distorted and confused responses.

Table 12 represents the descriptive statistics for each teacher survey question. A total of 11 teachers participated in the survey. The participants were any teacher who MAP tested regardless of EOG summative testing requirements. The first column represents the mean on the original Likert-type scale which ranged from one to three. The closer to three the number is, the more likely the teachers answered in the categories of always and sometimes. The lower the number, the more likely the teacher answered in the category of never. The second column is the standard deviation. The standard deviation informs the researcher of the consistency of the questions. The lower the standard deviation, the more consistent the answers. The standard deviation in Table 12 demonstrated the possible concern of the teachers with the new tools being implemented. Columns 3, 4, and 5 showed the percentage of teachers who chose the never, sometimes, and always categories. The last column shows the percentage of no responses.

Table 12

Descriptives by Survey Question on Teacher Surveys

	Mean	Std. Dev.	Survey Responses			
			Never	Some- times	Always	No Response
I use formative assessment in my classroom.	2.82	.405	0%	18.2%	81.8%	0%
I use Measures of Academic Progress (MAP) as a method of formative assessment in my classroom.	2.82	.405	0%	18.2%	81.8%	0%
I use formative assessment, in conjunction with the MAP program in my lesson planning.	2.73	.467	0%	27.3%	72.7%	0%
I tell my students what they are expected to learn and why they are learning the material.	2.73	.467	0%	27.3%	72.7%	0%
I use probing questions to diagnose the extent of the students' learning.	2.82	.405	0%	18.2%	81.8%	0%
I analyze completed work to comprehend why a student has or has not achieved success.	2.82	.405	0%	18.2%	81.8%	0%
I analyze completed work to comprehend why a student has or has not achieved success.	2.70	.483	0%	27.3%	63.6%	9.1%
I strive to catch student misconceptions about subject matter before they occur.	2.82	.405	0%	18.2%	81.8%	0%
How often do you use the data generated by MAP to change your instruction?	2.55	.522	0%	45.5%	54.5%	0%
I regularly use school data to form flexible student groups with other teachers during the school day.	2.73	.467	0%	27.3%	72.7%	0%
I regularly use school data to form flexible student groups with other teachers during the school day.	2.82	.405	0%	18.2%	72.7%	9.1%
I regularly use school data to set performance goals for students.	2.80	.422	0%	54.5%	36.4%	9.1%
I regularly use school data to communicate with students about their progress towards learning standards.	2.40	.516	9.1%	18.2%	63.6%	9.1%

(continued)

	Mean	Std. Dev.	Survey Responses Never	Some- times	Always	No Response
I use formative assessment to monitor the progress of students by sub-group in my classroom.	2.60	.699	0%	18.2%	81.8%	0%
I ask students to demonstrate their work so I can analyze their thinking.	2.82	.405	0%	18.2%	81.8%	0%
I encourage my students to demonstrate their thinking/work to the class.	2.64	.505	0%	36.4%	63.6%	0%
I encourage students to suggest ways that their learning can be improved.	2.45	.688	9.1%	36.4%	54.5%	0%
I tell students what they have or have not achieved with specific references to their learning.	2.70	.675	9.1%	9.1%	72.7%	9.1%
I write feedback on students' work that is specifically designed for the assignment and individual students.	2.18	.751	18.2%	45.5%	36.4%	0%
Formative assessment, in conjunction with the MAP program, has an impact on how I implement instruction.	2.73	.467	0%	27.3%	72.7%	0%
Formative assessment, in conjunction with the MAP program, impacts how I assess my students.	2.55	.522	0%	45.5%	54.5%	0%
I allow my students to communicate with me during instruction so I can ensure my instruction is meeting their needs.	3.00	0	0%	0%	100%	0%
I assist students in negotiating a route to improve their learning.	2.70	.483	0%	27.3%	63.6%	9.1%
How often do you analyze the data generated by MAP?	2.50	.527	0%	45.5%	45.5%	9.1%
How often do you discuss the results from MAP with individual students?	1.70	.483	27.3%	63.6%	0%	9.1%
I regularly use school data to modify my instructional strategies (e.g., differentiate my instruction).	2.82	.405	0%	18.2%	81.8%	0%
Formative assessment, in conjunction with the MAP program, allows the learning environment of my classroom to be improved.	2.80	.422	0%	18.2%	72.7%	9.1%

(continued)

	Mean	Std. Dev.	Survey Responses Never	Some- times	Always	No Response
I invite and build on my students' contributions to the class.	2.73	.467	0%	27.3%	72.7%	0%
I encourage students through my specific and focused feedback about their performance in my classroom.	2.73	.467	0%	27.3%	72.7%	0%
I encourage students to help one another.	2.70	.483	0%	27.3%	63.6%	9.1%
I show students some examples of their peers' work for the purpose of guiding and learning.	2.10	.568	9.1%	63.6%	18.2%	9.1%
I provide opportunities for students to assess their own work and each other's work and give feedback.	1.90	.568	18.2%	63.6%	9.1%	9.1%
I express approval to both students and their parents when students meet objectives on assignments.	3.00	0	0%	0%	90.9%	9.1%
I strive to make my students the center of my classroom practices.	3.00	0	0%	0%	90.9%	9.1%
I provide time for students to reflect and talk about their learning with me. (Conferences)	2.00	.471	9.1%	72.7%	9.1%	9.1%
How often do you take group instructional time for the use of MAP results?	1.90	.568	18.2%	63.6%	9.1%	9.1%
I help students to understand their achievements and know what they need to do next to make progress.	2.40	.699	9.1%	36.4%	45.5%	9.1%
I allow the students to participate in the decision making process for my classroom. I encourage my students to work in learning teams to allow relationships to be fostered in my classroom.	2.40	.516	0%	54.5%	36.4%	9.1%
I show students a range of other students' work to model (or exemplify) criteria for assignments.	2.20	.422	0%	72.7%	18.2%	9.1%

Table 13 shows the Pearson correlations between the research questions. The Pearson correlation range is from -1.0 to +1.0. A high correlation is considered 0.5 to 1.0

or -0.5 to -1.0, a medium correlation is considered 0.3 to 0.5 or -0.3 to -0.5, and a low correlation is considered 0.3 to -0.3 (Cronk, 2008). The correlations shown in Table 13 are significantly and positively correlated. This implied that if a teacher scored high on one subscale, they tended to score high on the other two subscales as well. The relationship is strong across the three research questions.

Table 13

Pearson's Correlation by Research Question on Teacher Surveys

	Extent of MAP reading and math data being used to drive lesson planning (RQ1)	Extent MAP reading and math data is impacting differentiation (RQ2)	Impact of the utilization of MAP on the learning environment in the classroom (RQ3)
Extent of MAP reading and math data being used to drive lesson planning (RQ1)	1	.838	.853
Extent MAP reading and math data is impacting differentiation (RQ2)	.838	1	.858
Impact of the utilization of MAP on the learning environment in the classroom (RQ3)	.853	.858	1

Student Survey Analysis

A total of 141 students were surveyed. Cronbach's alpha for the student survey was .656 for 18 survey questions. When evaluating Cronbach's alpha, the closer the value is to 1, the stronger the reliability of the survey. Low or negative item-total correlations indicate the item is problematic. The survey utilized the following responses: always, sometimes, and never. Table 14 shows the breakdown of the

corrected item-total correlation and Cronbach's alpha per survey question. Cronbach's alpha above .8 is considered a reasonable goal, .6 and above is considered questionable, with .5 being poor (Cronk, 2008).

Table 14

Descriptive by Individual Question on Student Survey

Question	Corrected item-total correlation	Cronbach's alpha if this question was deleted
Does your teacher tell you what you are going to learn and why you are learning it?	.146	.654
Does your teacher ask you what they can do to help you better understand what they are teaching?	.203	.649
Does your teacher show you what a finished assignment is supposed to look like?	.233	.645
Does your teacher allow you time to reflect in a journal about the things you learned in class?	.230	.648
Does your teacher give you time to grade your own assignments during class?	.324	.633
Does your teacher celebrate when you complete an assignment the correct way?	.459	.613
Does your teacher ask you to show her your work during class?	.351	.631
Does your teacher write notes on your work to let you know how you did and what you can do to improve?	.222	.647
Does your teacher allow the students to ask questions while they are teaching?	.199	.649
Do you think you can learn from your mistakes?	.310	.637
Do you think you should be able to make corrections on assessments once you've realized your mistakes?	-.054	.681
If you are asked to learn new things, even if it is difficult, do you think you can do it?	.121	.656

(continued)

Question	Corrected item-total correlation	Cronbach's alpha if this question was deleted
Does your teacher encourage you to help other students during class?	.371	.627
Does your teacher ask you how they can make the class more interesting?	.354	.630
Does your teacher usually catch your mistakes before you get frustrated trying to figure a problem out?	.277	.640
Does your teacher allow the students to set up some of the rules for the class?	.077	.666
Does your teacher want the students to work together to learn?	.352	.634
Do you know if you are making progress in school?	.354	.631

Table 15 shows that all items were in the low range for item-total correlations. Various reasons could cause this, such as item wording, presentation format of the item, participant attention and motivation, or participant understanding. Although each teacher was asked to read the survey aloud, the teacher was asked to make no interpretation to the students as to what the question was asking. This part of the study design was intended to help with consistency across multiple survey administrations. Two elementary school teachers were asked to validate the student surveys. Surveys were altered per their recommendations. In speaking with the validating teachers, there was concern with the age group and their ability to interpret the questions, but both validators felt the teacher reading the question may help. Validation occurs when the researcher has come to an opinion that the survey is measuring what is was designed to measure (George & Mallery, 2003). As of a result of a validation process, questions were revised and each

classroom teacher read survey questions aloud.

The researcher realized in the focus groups that questions needed an example for the students to answer or more detail was needed before the students could formulate an answer. This was especially true for third- and fourth-grade students. For example, the researcher asked the first focus group (third-grade), “does your teacher allow you to ask questions during instruction?” Student F responded with “the practice EOG test and the real one, we are only allowed to ask questions before we start the test.” The researcher had to provide more detail such as “when the teacher is writing on the board showing you how to do a problem, can you ask questions?” This provided evidence that the student survey questions may not have provided enough detail for students to correctly interpret. The researcher adjusted questions in the focus groups by providing details and examples, allowing the students to better interpret the questions. The student survey was noted as a limitation in the research.

Table 15 is the breakdown by student survey question. For most questions, students responded positively but for other questions, students may have been confused as to what the question was asking; for example, in survey question 4, “Does your teacher give you time to grade your own assignments during class?” In all three focus groups, students talked about being able to redo problems that they missed while the teacher reviewed them. Some students talked about the teachers asking them why they did the work a specific way. This is an example of how the student may not have understood the question when the question was read with no illustrations.

Table 15

Descriptives by Survey Question on Student Surveys

	M	SD	N	S	A	NR
Does your teacher tell you what you are going to learn and why you are learning it?	2.4	0.537	2.1%	55.3%	40.4%	2.1%
Does your teacher ask you what they can do to help you better understand what they are teaching?	2.63	0.585	5.0%	24.8%	68.1%	2.1%
Does your teacher show you what a finished assignment is supposed to look like?	2.17	0.624	12.8%	56.7%	28.4%	2.1%
Does your teacher allow you time to reflect in a journal about the things you learned in class?	1.91	0.824	38.3%	30.5%	29.1%	2.1%
Does your teacher give you time to grade your own assignments during class?	1.92	0.731	31.2%	44.7%	21.3%	2.8%
Does your teacher celebrate when you complete an assignment the correct way?	1.74	0.727	41.8%	40.4%	15.6%	2.1%
Does your teacher ask you to show her your work during class?	2.26	0.638	9.9%	51.1%	35.5%	3.5%
Does your teacher write notes on your work to let you know how you did and what you can do to improve?	2.37	0.659	9.2%	43.3%	44.7%	2.8%
Does your teacher allow the students to ask questions while they are teaching?	2.61	0.639	10.6%	22.7%	64.5%	2.1%
Do you think you can learn from your mistakes?	2.67	0.546	3.5%	24.8%	69.5%	2.1%
Do you think you should be able to make corrections on assessments once you've realized your mistakes?	2.38	0.671	9.9%	39.7%	47.5%	2.8%
If you are asked to learn new things, even if it is difficult, do you think you can do it?	2.58	0.511	0.7%	39.0%	58.2%	2.1%

(continued)

	M	SD	N	S	A	NR
Does your teacher encourage you to help other students during class?	2.15	0.693	17.0%	48.2%	32.6%	2.1%
Does your teacher ask you how they can make the class more interesting?	1.49	0.648	58.2%	31.9%	7.8%	2.1%
Does your teacher usually catch your mistakes before you get frustrated trying to figure a problem out?	2.18	0.603	9.9%	58.9%	29.1%	2.1%
Does your teacher allow the students to set up some of the rules for the class?	1.42	0.7	67.4%	17.7%	12.1%	2.8%
Does your teacher want the students to work together to learn?	2.39	0.521	1.4%	54.6%	41.1%	2.8%
Do you know if you are making progress in school?	2.48	0.624	6.4%	37.6%	53.9%	2.1%

Table 16 shows the Pearson correlations between the research questions. The Pearson correlation range is from -1.0 to +1.0. In this study, high correlation is 0.5 to 1.0 or -0.5 to -1.0, a medium correlation is 0.3 to 0.5 or -0.3 to -0.5, and a low correlation is 0.1 to 0.3 or -0.1 to -0.3 (Cronk, 2008). Subscales 1 and 2 are positively correlated, as are subscales 1 and 3. That is, as a student scores higher on one subscale, they would tend to score highly on the other subscales. However, subscales 2 and 3 are not significantly correlated. This could be due to differentiation being part of the flex group and not the regular classroom. Positive correlation means as one variable increases, the other value increases also. A negative correlation means as one variable increases, the other variable decreases. The closer the association is to 1 or -1, the less the variation of variables; the closer the variation is to 0, the greater the variation of variables. The variables are lesson planning, differentiation, and learning environment.

Table 16

Pearson's Correlation by Research Question on Student Surveys

	Extent of MAP reading and math data being used to drive lesson planning (RQ1)	Extent MAP reading and math data is impacting differentiation (RQ2)	Impact of the utilization of MAP on the learning environment in the classroom (RQ3)
Extent of MAP reading and math data being used to drive lesson planning (RQ1)	1	.421	.458
Extent MAP reading and math data is impacting differentiation (RQ2)	.421	1	.157
Impact of the utilization of MAP on the learning environment in the classroom (RQ3)	.458	.157	1

Table 17 provided information from the IRT. The specific IRT model used was the PCM. The PCM was chosen to accommodate the polytomous nature of the items (Chon et al., 2007).

The item center indicates overall where the item is located along the variable being measured. Negative values indicate a variable is generally low on the trait, and positive values indicate the variable is measuring those generally high on the trait. Lower values mean it is easier for persons being surveyed to make the transition from one trait to another trait; higher values indicate it is more difficult to make the transition. If the participant is measuring lower on the item, it means the participant can easily move from one item to another; if the participant is measuring higher on the item, the participant would need a strong opinion to move from one item to another.

Table 17

Item Response Theory for Student Survey

Item	<i>Item Center</i>	<i>b1</i>	<i>b2</i>	<i>Misfit</i>
Does your teacher tell you what you are going to learn and why you are learning it?	-1.64	-3.64	0.36	*
Does your teacher ask you what they can do to help you better understand what they are teaching?	-1.58	-2.09	-1.07	
Does your teacher show you what a finished assignment is supposed to look like?	-0.47	-1.77	0.83	*
Does your teacher allow you time to reflect in a journal about the things you learned in class?	0.17	0.06	0.28	
Does your teacher give you time to grade your own assignments during class?	0.23	-0.53	0.99	
Does your teacher celebrate when you complete an assignment the correct way?	0.60	-0.07	1.27	
Does your teacher ask you to show her your work during class?	-0.74	-1.95	0.47	
Does your teacher write notes on your work to let you know how you did and what you can do to improve?	-0.95	-1.91	0.01	
Does your teacher allow the students to ask questions while they are teaching?	-1.13	-1.19	-1.07	*
Do you think you can learn from your mistakes?	-1.78	-2.45	-1.11	
Do you think you should be able to make corrections on assessments once you've realized your mistakes?	-0.94	-1.75	-0.13	*

(continued)

Item	<i>Item Center</i>	<i>b1</i>	<i>b2</i>	<i>Misfit</i>
If you are asked to learn new things, even if it is difficult, do you think you can do it?	-2.46	-4.48	-0.44	*
Does your teacher encourage you to help other students during class?	-0.39	-1.31	0.53	
Does your teacher ask you how they can make the class more interesting?	1.23	0.61	1.85	
Does your teacher usually catch your mistakes before you get frustrated trying to figure a problem out?	-0.62	-2.08	0.84	
Does your teacher allow the students to set up some of the rules for the class?	1.10	1.37	0.83	*
Does your teacher want the students to work together to learn?	-1.86	-4.04	0.32	
Do you know if you are making progress in school?	-1.27	-2.18	-0.36	

Figures 1-18 below provide a graphical representation of Table 17. Survey questions 1, 3, 9, 11, 12, and 16 are considered misfits and are discussed below each figure. A significant misfit indicates that the responses to a survey question are not consistent with other responses (Chon et al., 2007). This could be due to poor wording, lack of understanding, or student interpretation. These misfitting items tend to correspond to other items with poor measurement qualities such as low to negative item-total correlations found in Table 17.

To help interpret Table 17 and Figures 1-18, an example is provided. Consider item 1 (Q1: Does your teacher tell you what you are going to learn and why you are learning it?), which has an item center of -1.64. This would indicate the item generally

measures low on the trait of interest which is awareness of formative assessment. The columns b_1 and b_2 are indicators of where category transitions are likely to occur. For instance, moving from category never to category sometimes occurs at -3.64 on the trait continuum, which is quite low. Moving from category sometimes to category always occurs at 0.36, which is approximately in the center of the trait continuum. Figure 1 shows the transitions for the item response curves for student survey question 1. The intersection of curve 0 (never) and curve 1 (sometimes) is b_1 and the intersection of curve 1 (sometimes) and curve 2 (always) is b_2 .

Ideally, the IRT model curves should be well-spaced and transitions not in the same locations for the items to be adequately capturing the trait (Chon et al., 2007). Survey question 1 is considered a misfit indicating the question is not consistent with the other responses. The column *Misfit* indicates whether the PCM is a good fit of the item. Those items marked with * indicate the item is a poor fit to the data. In the chart, the 0 line denotes the never response, the 1 line denoted the sometimes response, and the 2 line denoted the always response.

In Figure 1, the student survey question “Does your teacher tell you what you are going to learn and why you are learning it?” was a misfit within the PCM. In addressing this question in the focus groups, the researcher found the question was tough for students to understand, which could be one source of item misfit. Students gave examples of what the teacher actually does to start the lesson. For example, student B from the third-grade focus group stated, “when we start a new lesson, she goes over vocabulary words then goes to problems.” When the researcher redirected the question with an example such as does the teacher provide a pretest for the unit, student A from the third-grade focus group responded, “yes, she goes over a review and all questions

before our test and if you are paying attention, you get all of them right. Then on the test the next day, you get a good grade” (third-grade focus groups). In the fourth-grade focus group when asking how the teacher starts a new unit, student C talked about the procedures for the day. Student B stated, “when she starts a new lesson, we go to the carpet to listen then we get to ask questions when she finishes. Then we do pass the pen and after all questions then we go back to our table and work problems” (fourth-grade focus groups). This question did appear to be a misfit in both the survey and in focus groups.

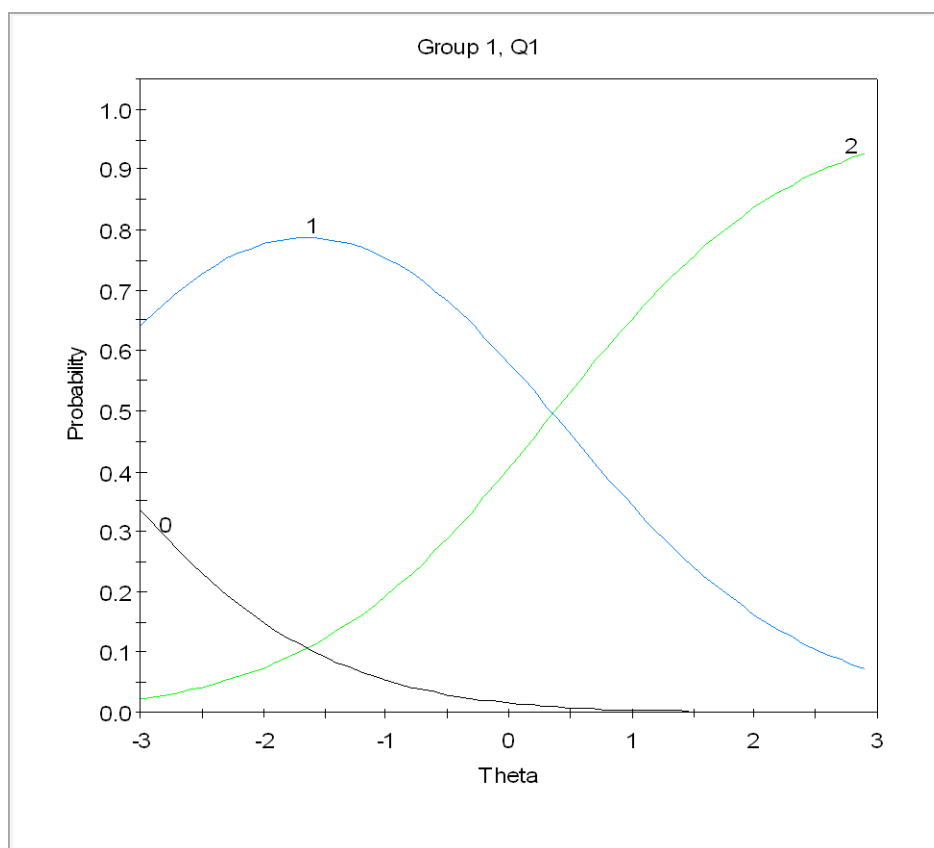


Figure 1. Transitions from Student Survey Question 1: Does your teacher tell you what you are going to learn and why you are learning it?

In Figure 2, survey question “Does your teacher ask you what they can do to help

you better understand what they are teaching?” fit into the overall data. The item center was -1.58, b_1 was -2.09, and b_2 was -1.07. The standard deviation and mean from Table 17 indicate that students tended to respond in the higher categories and with reasonable variability between the responses. All focus groups related to this question by referring to the teacher answering questions. Student C in the third-grade focus group stated, “if there is a lot of people struggling, she goes back all over it again until there are no more questions.” Student A in the fifth-grade focus group stated, “If we don’t understand something, she does her best to help us.” Student C in the same focus group answered how the teacher helps the student build on what they are learning:

If we have only done one problem with a new lesson that we started and we say we are confused, she will said ‘hold one a minute, we still need to do more problems’ then she keeps doing problems until we all understand.

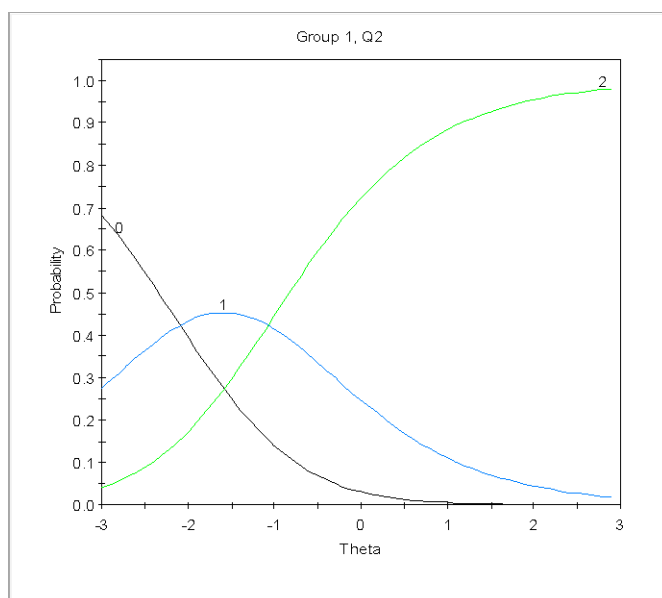


Figure 2. Transitions from Student Survey Question 2: Does your teacher ask you what they can do to help you better understand what they are teaching?

Question 3 in Figure 3 was considered a misfit in the PCM. The item center was -0.47, b_1 was -1.77, and b_2 was 0.83. Although the standard deviation was .624, in the lower grade focus groups, this was evident that the wording was not appropriate and there was a possible lack of understanding. As this question was asked to the third-grade focus group, a different than expected response occurred. After this question was asked to the third-grade focus group, the students began providing examples of things the teacher did in class. Student D explained,

Yes, when we were reading this book “A Drop Around the World,” she put a drop of food coloring in it to show how if she don’t move it, it don’t spread. Then she let each one of us do it. (third-grade focus group)

When this question was asked in the fifth-grade focus group, an immediate response came from student E: “Yes, she gives us a rubric.” Student B responded, “sometimes she tells you to read over it and then she will read over it and tell us what is required for an A.” Student B assisted, “and what is required for a B and a C. She also asks us to set a goal for what we can do.” Student A stated, “we also have a goal of when it is due. If you miss the due date, a letter grade drops” (fifth-grade focus group).

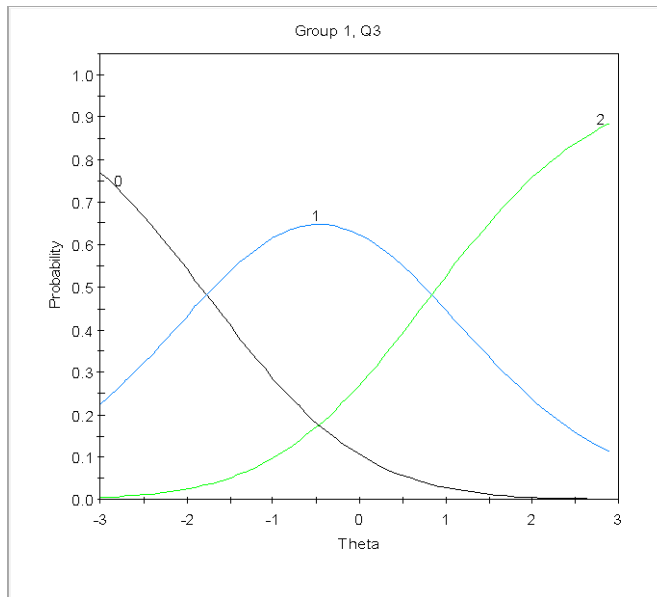


Figure 3. Transitions from Student Survey Question 3: Does your teacher show you what a finished assignment is supposed to look like?

Question 4 in Figure 4 was not directly asked during any of the focus groups although students provided examples of how they reflected on things learned in class by providing examples of how units were concluded. The item center was 0.17, b_1 was 0.06, and b_2 was 0.28. For example, in the fourth-grade focus group, students spoke of exit tickets which had questions on it to summarize the lesson. In the fifth-grade focus group, student C said, “we turn-and-talk about what we learned.”

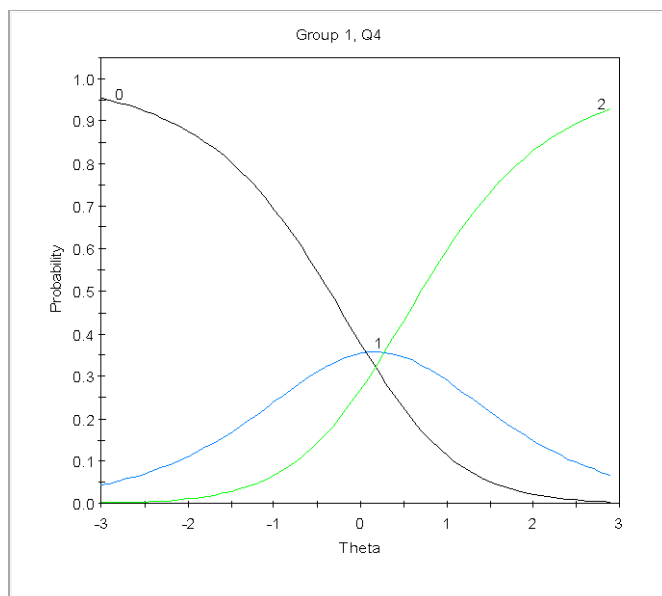


Figure 4. Transitions from Student Survey Question 4: Does your teacher allow you time to reflect in a journal about the things you learned in class?

The item center for Question 5 in Figure 5 was 0.23, b_1 was -0.53, and b_2 was 0.99. Many examples for this question were provided in the focus groups. The students from the third-grade focus group said, “we take crayons and work the problems we missed the correct way.” Student A stated, “we always do the summary together so everyone has the right answers.” Student D said, “if we missed the problem, we have to circle it and then we can write the right answer down.” Student A stated, “If you say ‘why did I get that one wrong’ the teacher will explain what I did wrong” (third-grade focus group). Student D in the fourth-grade focus group said, “yeah, she will do it on the board and you get to see where you went wrong. She will let you write down what you did wrong.” Student B stated,

she goes over the whole paper on the board and we can look at our paper and see where we messed up. Like this morning she had us take out colored pencils and write down the correct answer but we still missed the problem. (fourth-grade

focus group)

In the fifth-grade focus group, student B stated, “sometimes it is our homework that she lets you grade. You still have to count the problem wrong but you can work it out to help you understand.” Student D said, “if most students miss the same problem, we have to do more like that” (fifth-grade focus group).

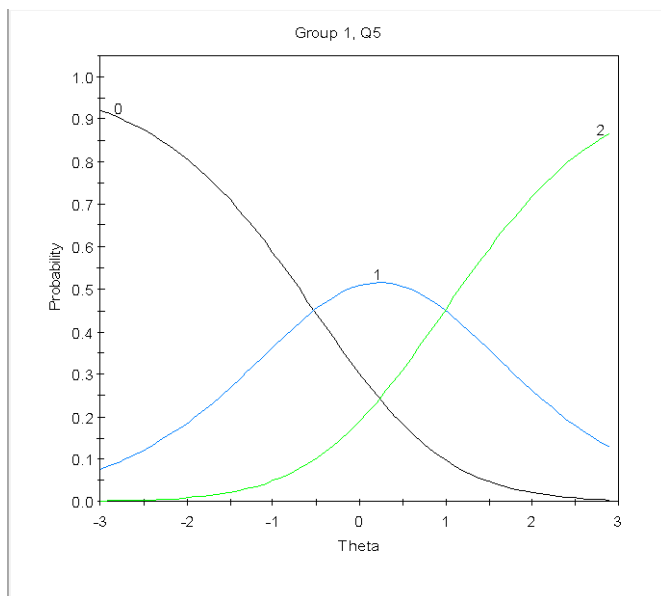


Figure 5. Transitions from Student Survey Question 5: Does your teacher give you time to grade your own assignments during class?

The item center for Question 6 in Figure 6 was 0.60, b_1 was -0.07, and b_2 was 1.27. This question was not directly asked in the focus group but student B in the third-grade focus group stated, “our teacher tells us when we do good on an assignments, we get to clap 5 times and then do a whoo-who and clap 5 times again.” Student A said, “sometimes our teacher claps for us when we finally get something.” Student B also said, “our teacher brags on us to other teachers” (third-grade focus group).

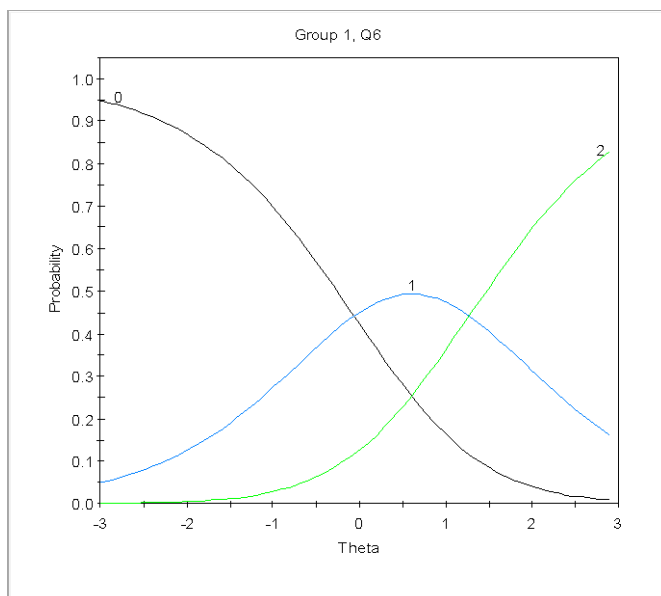


Figure 6. Transitions from Student Survey Question 6: Does your teacher celebrate when you complete an assignment the correct way?

Question 7 in Figure 7 was asked during the focus groups and several students cited examples of how the teacher asks for work to be shown. The item center was -0.74, b_1 was -1.95, and b_2 was 0.47. Student A from the third-grade focus group gave an example: “sometimes the teacher tells table 1 to do problem 1, then table 2 problem 2, and table 3 problem 3. Then we get to work the problem for the other tables to see.” Student B stated, “sometimes the teacher will ask you to go to the board to show how you did the problem” (third-grade focus group). Student E in the fourth-grade focus group said, “the teacher always tells us to underline the text clues before we come up so she knows we tried and she can see what we were doing” (fourth-grade focus group).

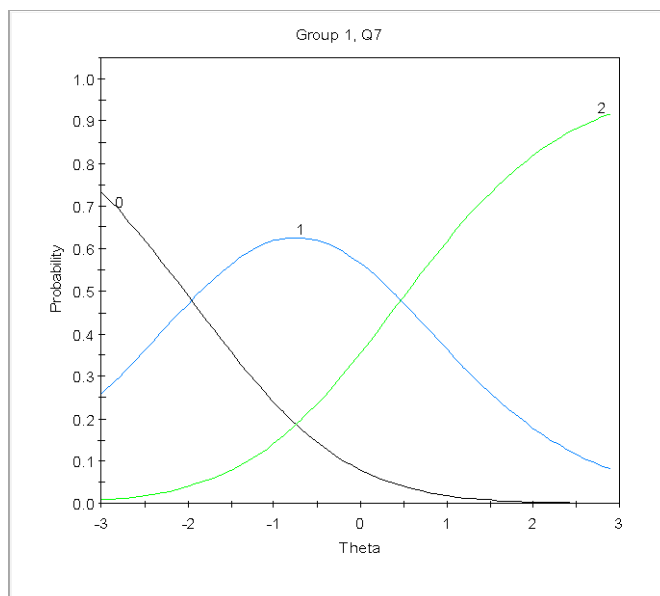


Figure 7. Transitions from Student Survey Question 7: Does your teacher ask you to show her your work during class?

Question 8 in Figure 8 prompted lots of examples of what the teacher writes on their papers. The item center was -0.95, b_1 was -1.91, and b_2 was 0.01. In the third-grade focus group, student A stated,

she does write stuff on our work. Like we had to write a paper about a book we read. If you did the title wrong, she showed you how to do it or if you misspelled a word, she circled it and fixed it.

Student B stated, “she wants you to write in complete sentences so she marks it wrong but puts the correct way” (third-grade focus group). In the fourth-grade focus groups, several students said yes, then student C stated, “sometimes she writes what we missed.” Student D gave an example of “we read a book in class and took an AR test on it. My teacher took each one of us and conferenced with them to talk about what they missed and how they could improve on our reading.” Student B gave an example of reading something and not knowing a word: “the teacher asked us what the text clues were to

help us figure it out. She would not let us look it up until we decided from our text clues.” Student A gave an example: “my teacher does not just tell me it was wrong, she tells me why it was wrong” (fourth-grade focus group).

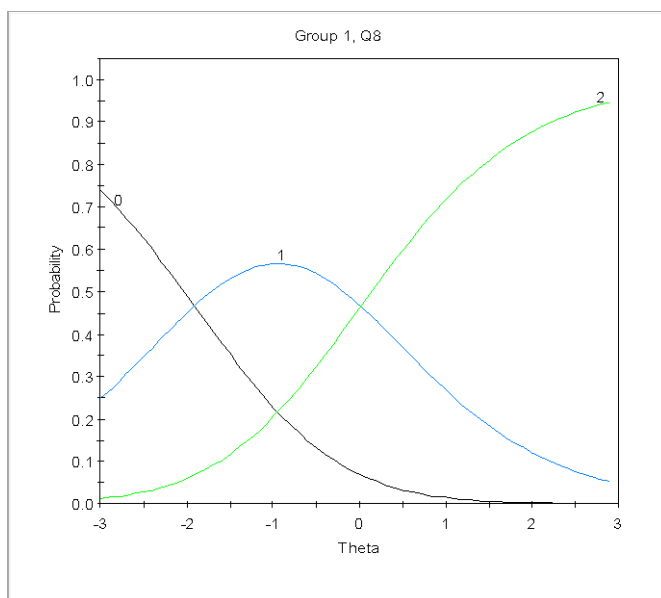


Figure 8. Transitions from Student Survey Question 8: Does your teacher write notes on your work to let you know how you did and what you can do to improve?

The item center for Question 9 in Figure 9 was -1.13, b_1 was -1.19, and b_2 was -1.07. Question 9 was a misfit in the PCM. Although several students in each focus group provided examples of how the teachers answer questions until all questions are answered, third- and fourth-grade students always added that questions were not accepted until the teacher had completed the lesson. Student A from the third-grade focus group stated, “my teacher will let us ask questions and she keeps teaching until everyone has finished their questions.” Student E in the third-grade focus group stated, “if you don’t know why you missed it, she will go over it and you know why you got it wrong.” Student B said, “we can ask questions but if we ask before she is finished, she will tell us ‘we’ve only done a couple of problems, hold your questions’” (third-grade focus group).

Student C from the fifth-grade focus group stated, “if just one person has a question, she will go over it until everyone gets it so we all can work on the same thing and no one be behind.” Student D said, “When we are doing math, she will put the problems on the board so we all are doing them the same ones and then we go over” (fifth-grade focus group).

In a personal interview with a third-grade teacher, the teacher explained that the students sometimes got eager so she had a rule in place that the students could not ask a question until she had worked so many math problems or came to stopping place in the lesson. She would ask if there were any questions and then would answer questions until all questions were answered. In this question, the wording could have been an area of confusion. The term *while teaching* would have prompted a negative answer since the teacher expected the students to hold questions until a specific point in the lesson, yet the teacher allowed questions after she covered the pertinent information (Personal interview, 2013).

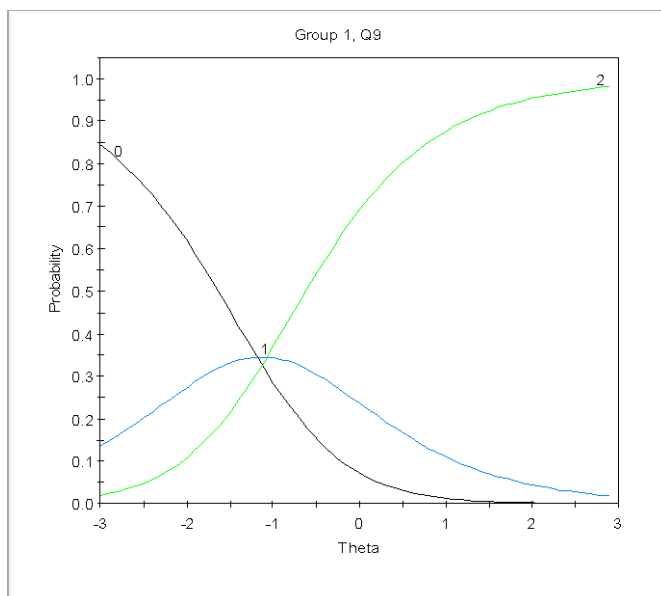


Figure 9. Transitions from Student Survey Question 9: Does your teacher allow the students to ask questions while they are teaching?

The item center for Question 10 in Figure 10 was -1.78, b_1 was -2.45, and b_2 was -1.11. This survey question was not directly asked in any of the focus groups but students did provide some insight as to how they felt about their mistakes. Students provided many examples of how they were allowed to rework problems to see their mistake although the question was still counted as wrong. In the third-grade focus group, student B said, “if you are really learning, you are going to learn from your mistakes” (third-grade focus group). In the fourth-grade focus group, student B said, “our teacher lets us use colored pencils to work out the problem we missed” (fourth-grade focus group).

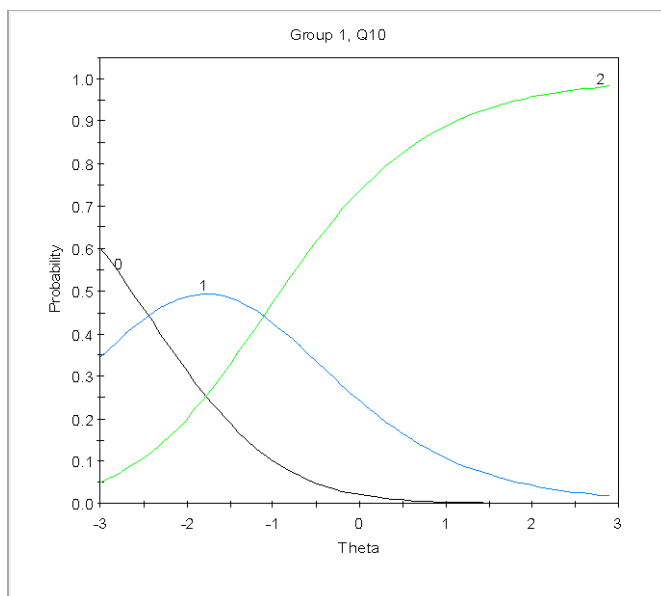


Figure 10. Transitions from Student Survey Questions 10: Do you think you can learn from your mistakes?

The item center for Question 11 in Figure 11 was -0.94, b_1 was -1.75, and b_2 was -0.13. This survey question was not directly asked in any of the focus groups.

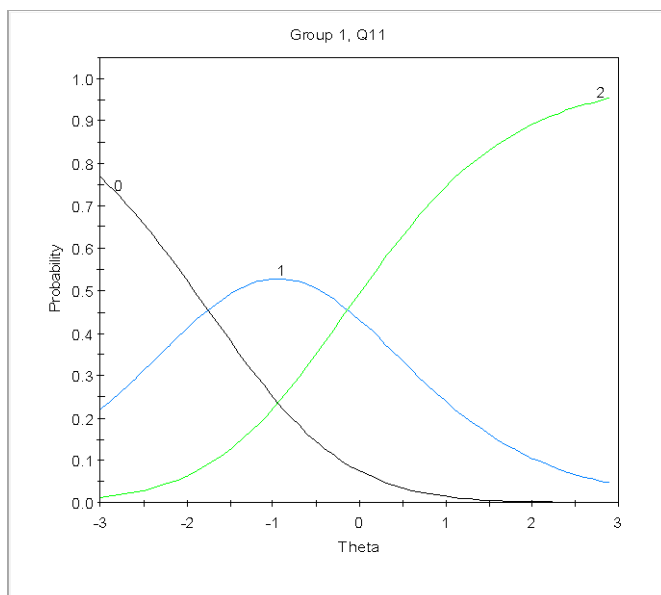


Figure 11. Transitions from Student Survey Questions 11: Do you think you should be able to make corrections on assessments once you've realized your mistakes?

Question 12 in Figure 12 was also considered a misfit in the PCM. The item center was -2.46, b_1 was -4.48, and b_2 was -0.44. In the third-grade focus groups, there were no solid examples provided. In the fourth-grade focus group, student C mentioned, “my teacher will keep showing you how to do it until you are not confused anymore and you can do it without her.” Student B mentioned, “my teacher says ‘does anyone have questions?’ then ‘who wants me to go over another problem?’ and she keeps on until everyone says okay.” Then student D said, “even if one person does not understand, she keeps going over it” (fourth-grade focus group).

In the fifth-grade focus group, student B stated, “our teacher answers anything until everyone is through with questions so we do a lot of stuff.” Student D said, “when we do something hard, our teacher will say ‘hold on a minute we are going to do more’ and she keeps on until we can do it” (fifth-grade focus group). This question may have been hard to interpret for the lower grades because there were no real responses from the third grade.

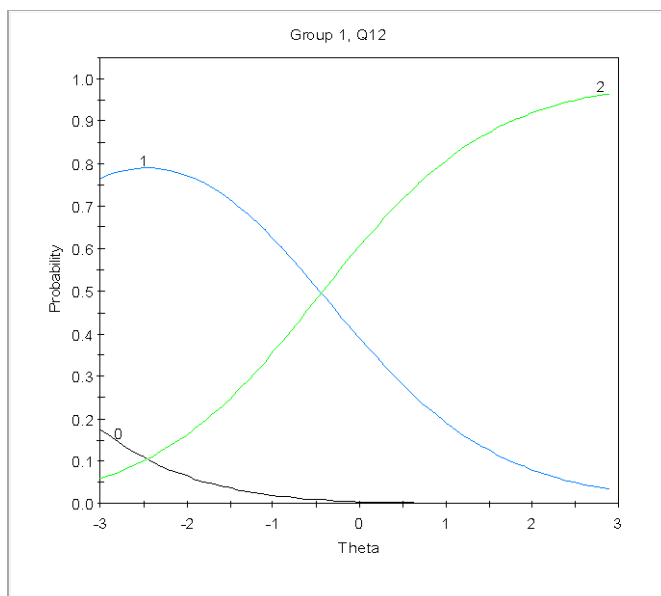


Figure 12. Transitions from Student Survey Questions 12: If you are asked to learn new things, even if it is difficult, do you think you can do it?

The item center for Question 13 in Figure 13 was -0.39, b_1 was -1.31, and b_2 was 0.53. This survey question prompted a lot of response. In the third-grade focus group, student B stated, “sometimes she has us talk with the people in our group and she tells us to come back and asks one person to tell what the group decided.” Student D said, “sometimes when a student gets called out, she will pick a person to help the person called out to get caught up. It makes me feel excited to help someone.” Student A said, “sometimes if we cannot agree on an answer at the table, we call our teacher and she gives us hints.” Student A also stated, “we get to help each other get ready for an AR test. You have to be responsible to do this” (third-grade focus group).

Student B in the fourth-grade focus group stated, “if you are on track, you get to conference with a student who needs help but you have to be on track to help others.” Student C said, “when working with a partner and you talk about the problem, something may click and you understand it.” Student D said, “when you work with a partner, they

may know something you don't and they can tell you" (fourth-grade focus group).

In the fifth-grade focus group, student B said, "sometimes she give us a problem and you can work with a partner to see how to work it out. It helps me because I get confused a lot." Student C talked about turn-and-talk: "we turn-and-talk a lot and it helps to understand things better." Student C said, "when we have homework, I call my friend and we talk about it until we come up with an answer we agree on" (fifth-grade focus group).

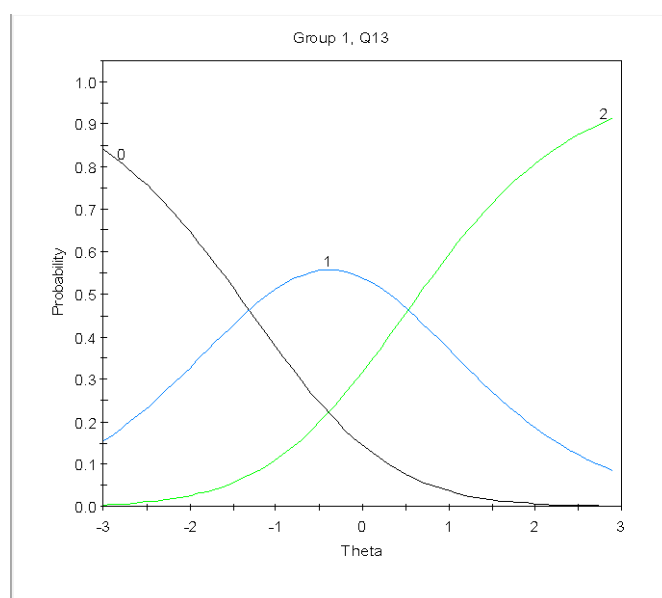


Figure 13. Transitions from Student Survey Questions 13: Does your teacher encourage you to help other students during class?

The item center for Question 14 in Figure 14 was 1.23, b_1 was 0.61, and b_2 was 1.85. This question was not directly asked in the focus group, although the students provided examples of being comfortable in class by sitting where they wanted to study or read, snacking when hungry, or having a throw to cover their legs when the room was cooler.

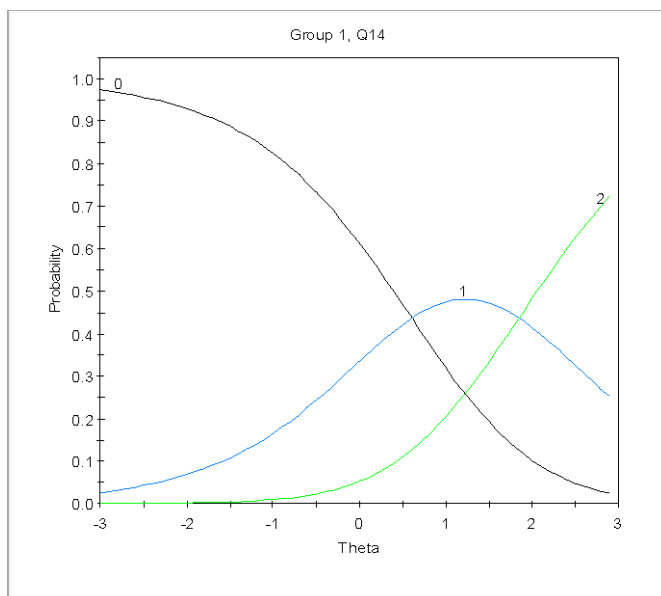


Figure 14. Transitions from Student Survey Questions 14: Does your teacher ask you how they can make the class more interesting?

The item center for Question 15 in Figure 15 was -0.62, b_1 was -2.08, and b_2 was 0.84. This question was discussed in the focus groups as the teacher observing the classroom as they worked. In the fourth-grade focus group, student B stated, “if several students are having trouble, she sometimes takes the students to her table and teaches them in a little group.” Student A stated,

she brings us to the carpet and teaches a lesson, she then sends us to our table and tells us if we are having trouble, to talk with a partner and then if we still have trouble, come to her.

Student D said, “my teacher comes to my table so she can show all of us” (fourth-grade focus group).

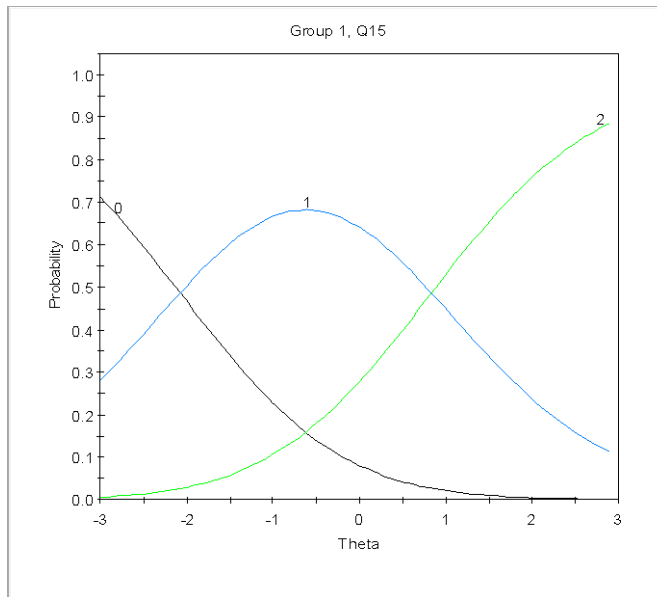


Figure 15. Transitions from Student Survey Questions 15: Does your teacher usually catch your mistakes before you get frustrated trying to figure a problem out?

The item center for Question 16 in Figure 16 was 1.10, b_1 was 1.37, and b_2 was 0.83. This question was considered a misfit and was not discussed in any of the focus groups.

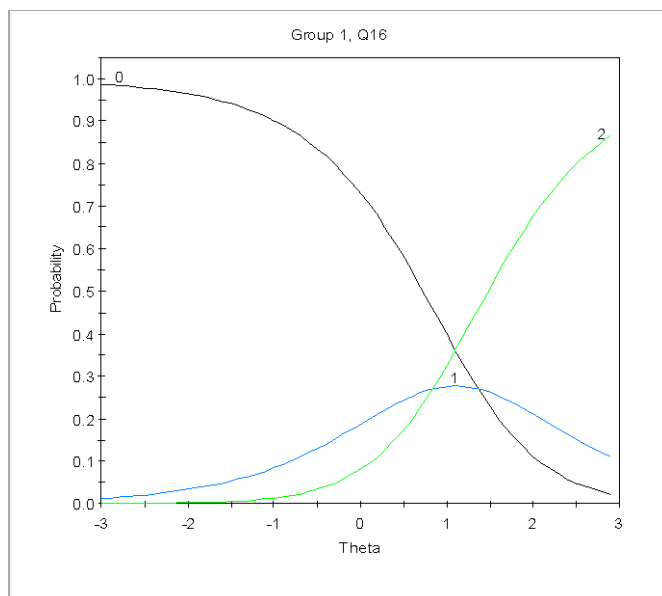


Figure 16. Transitions from Student Survey Questions 16: Does your teacher allow the students to set up some of the rules for the class?

Question 17 in Figure 17 had many examples in the focus groups. The item center was -1.86, b_1 was -4.04, and b_2 was 0.32. In the fourth-grade focus group, student B said,

when we do our reading lesson, we will read some and we have questions, she will have on the Promethean board the questions but the answer choices are covered up. She will say read and skim and scan and underline the text clues.

Everyone will get to raise their hands to talk about the text clues and answers and then she will show us the choices and we can choose the correct answer.

Student A in the fourth-grade focus group said,

we have literacy circles which are 5 copies of books and we can sit with a group and read. The group has to be at that level or real close but we can take turns reading and talk about the book.

Student E said, “we can only work with someone who is responsible.” Student F said,

“sometimes I conference with students who are not responsible to try to show them how to be responsible” (fourth-grade focus group).

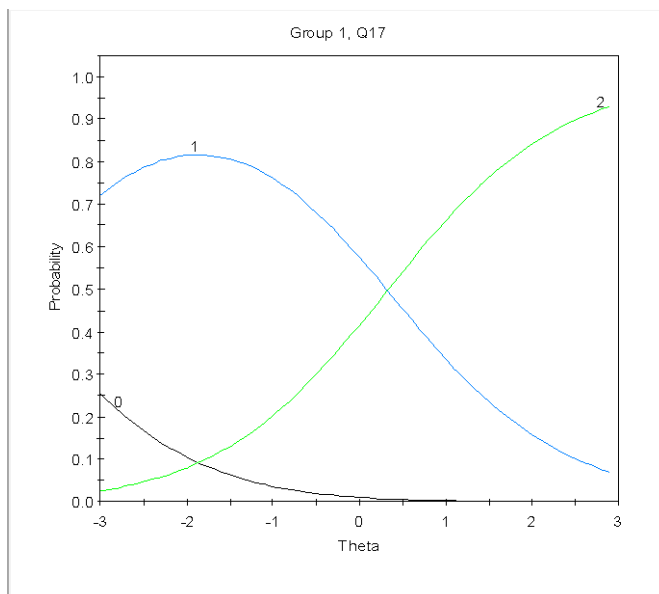


Figure 17. Transitions from Student Survey Questions 17: Does your teacher want the students to work together to learn?

The item center for Question 18 in Figure 18 was -1.27, b_1 was -2.18, and b_2 was -0.36. This question was not directly asked in the focus groups but some examples were worth mentioning. In the third-grade focus group, student B stated, “our teacher takes time to talk to each student. She tells us where we are at and sometimes she changes our goal” (third-grade focus group). In the fourth-grade focus group, student B stated, “she sets goals for us sometimes for the class, sometimes for just each person.” Student C stated, “sometimes she sets goals to pass the test, sometimes goals of what we should learn.” Student D commented, “my teacher wants us to show growth.” Student E said, “I am really good at math and my teacher set a goal for my math and I cannot go below it.” Student C from the fourth-grade focus group stated, “my teacher conferences with us and

tells us where we are at with our goals. If we are not on track, she helps us see what we need to do” (fourth-grade focus group).

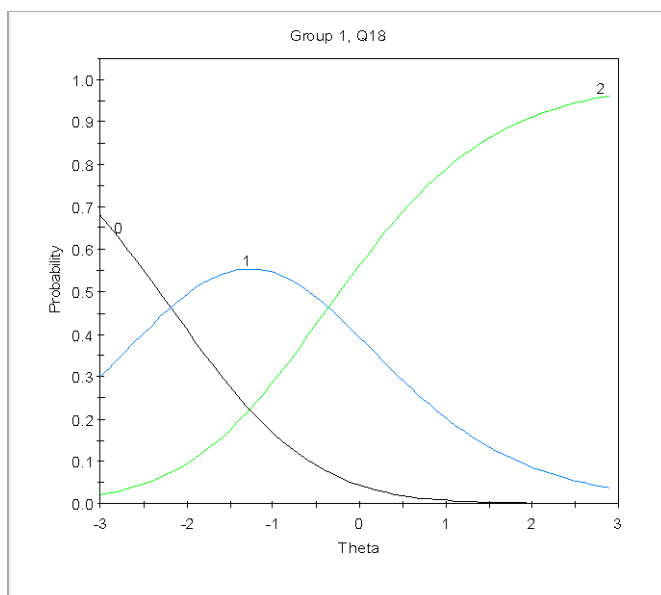


Figure 18. Transitions from Student Survey Questions 18: Do you know if you are making progress in school?

Although the student survey showed a low Cronbach's alpha, the student focus groups brought many examples forward that demonstrated the survey items may have caused confusion to elementary school age students in the interpretation of the questions.

Analysis of Student versus Teacher Survey Data

It is important to note the questions on the student survey and teacher survey were different although both sets of questions were tied directly back to the research questions. Student survey questions were reworded and simplified due to recommendations from teacher validators. Also, the number of actual questions was lower for students than teachers. Two teachers outside of Elementary School A validated the student survey questions in an attempt to make the wording easier to interpret for elementary-age students. The validating teachers suggested the classroom teachers read the survey

questions. There was some concern from the validating teachers in doing a survey, but the validating teachers thought the classroom teachers administering the survey and reading the items aloud would help. The researcher directed the classroom teachers to read the questions but to provide no examples or interpretations for the student.

Table 18

Comparison of Research Questions between Teacher and Students

	Role	N	% Positive Responses
RQ 1 – To what extent is MAP reading and math data being used to drive lesson planning?	Teacher	11	96.75%
	Student	139	78.86%
RQ 2 – To what extent is MAP reading and math data impacting differentiation?	Teacher	11	91.68%
	Student	138	85.21%
RQ 3 – To what extent is the impact of the utilization of MAP on the learning environment of the classroom?	Teacher	11	90.90%
	Student	139	70.92%

Table 18 displays the percent of positive responses per research question between teachers and students.

Teacher and Student Focus Group Analysis

Coding of themes. The survey questions were tied directly to the research questions. As the researcher was analyzing the data and coding the themes as to areas needing validation, the relationship between the emerging themes and the ideas presented in the literature review were investigated. The following themes emerged after the analysis of data from the teacher focus group and student focus groups.

Lesson Planning

DDDM. MAP testing occurred three times a year: fall, winter, and spring.

Participants in the teacher focus group discussed how the MAP testing is compared to the EOG tests, used to determine flex groups, used to direct Race to Instruction (RTI) and with AIMSweb. Flex time is two 30-minute segments in the afternoon that have been used to differentiate instruction and provide intense teaching on very specific strategies with students needing work in those specific strategy areas. The groups are broken down into 30 minutes for reading instruction and 30 minutes of math instruction each day. Flex groups are broken down into three tiers with tier three being primarily skills-based and tier one being projects. Each teacher works on specific strands with the students placed in that strand group. Flex group participants may be different for each area: math and reading. These groups were formed from the MAP testing data. MAP provided detailed strands in the curriculum and specific threads in each strand. After a student was MAP tested, detailed reports were produced showing each student's level and each strand broken down by exactly what was needed for that student to master that strand. From this data, each grade level determined the flex time groups, who was in each group, and exactly what was to be taught in that flex time. Flex time began after the first MAP test and continues through the year until EOG testing. Teacher A stated,

MAP is broken into strands and we use this data to narrow down the weak areas per student. We use the data to not only determine who was in what flex group but we used the MAP data to determine what was covered in the flex groups; the skills that were taught in the flex group. Up until this year, all flex time strands and student placement was based solely on MAP testing. This school year, several new tools have been added. (Teacher Focus Group, 2013)

In individual interviews with teacher A (fifth grade), teacher E (fourth grade), and teacher F (third grade), the teachers talked about how this was a grade-level effort with all teachers' input to make sure all strands were covered, and all students were properly placed. Up until this school year, students stayed in the same flex groups until the next testing window, but this year new tools were implemented with one of the tools called AIMSweb. AIMSweb is a formative assessment tool used for progress monitoring. AIMSweb is used to see if the strategies determined from the MAP data and implemented in flex time are working. Aimsweb is used more often but is dependent upon where the children are in their levels. In determining how often a child is AIMSweb tested, teacher B stated,

It depends on the child. If a child is struggling based on MAP, they are AIMSweb tested more often because their interventions are supposed to be more intense.

We need them to progress quickly so we test more often to see how we can make it more intense. (Teacher Focus Group, 2013)

Teacher D stated,

For instance, on RTI level one, we would test every 30 days, for level two is every 20 days, and level three is every 10 days. So the higher the level, the more intense their needs are. Exceptional children are also in the tier three group. (Teacher Focus Group, 2013)

Up until this year, MAP was the primary testing tool, but RTI and AIMSweb have been added to work with MAP testing. Teacher A stated,

We are using the fall, winter, and spring benchmarks to make our tier decisions but if we have a student who all of a sudden things start clicking, we can go ahead and move that student based on Aimsweb when we feel comfortable they have

mastered the skills in that tier. (Teacher Focus Group, 2013)

Teacher B commented on how MAP and RTI have helped with the upper-level students.

The MAP scores have really shown us the skills in the higher level students and what they need to grow. This way we can really look at what they need and since they are the hardest to grow, we can look at each of those strands and see what we need to work on. (Teacher Focus Group, 2013)

From these discussions, it is evident that MAP and other assessment tools are being used to place students in proper flex time groups to strengthen areas of weakness. Students confirmed this by discussing how flex time helps them. One student talked about learning different ways to do her assignments from the flex time. Another student stated that having another teacher show them how to do a problem gave them more help. Another student said it reinforces what they are learning in the classroom (Student Focus groups, 2013).

Formative assessment. Formative assessment is key to gauging student learning. Teachers at Elementary School A appeared to understand the importance of this. Not only did the teachers use the tools provided by the county, such as MAP, AIMSweb, RTI, and other tools, their classrooms were open to ensuring student mastery of the material. The teachers were using all the tools at their disposal to make sure students were successful. Teacher B commented, “Flex time is beneficial to the students because they get specialized instruction. They learn different strategies and get to practice those strategies” (Teacher Focus Group, 2013).

Students provided many examples of their teachers answering questions, showing them again how to do a strategy or problem, and having them work with other students to

learn. One student said, “after our teacher teaches a lesson, she asks if we understand it, then she answers our questions” (third-grade focus group). Another student stated, “the teacher always answers questions until everyone understands it.” Another student stated, “the teacher will walk around and when she sees you having trouble, she will show you what to do.” The student continued by stating, “if a lot of students are confused, she will go back to the board to show another problem” (fifth-grade focus group). One fourth-grade student said her teacher will tell them to look at their notes. Another student said, “if a lot of students are struggling, the teacher will go back to the board and do another problem” (fifth-grade focus group). Another student stated, “a lot of time, she would give a different problem to each table and that table had to work out the problem each, decide which is right and then show the other students.” This student said, “whoever went to the board, had to explain how and why they did the problem their way.” The student said it helped them think about the way they did their problem (fourth-grade focus group). Another student said his teacher asked questions that made them think about what they did wrong (fifth-grade focus group).

A third-grade student said, “when my teacher goes over homework, if we miss the problem, we put an ‘x’ and then fix the problem until they understood how to do it” (third-grade focus group). The students said it helped them to correct the problem. Another third grader said, “after each problem, their teacher asked who missed it and if they see what they did wrong.” Another student said, “the teacher would ask what the student did wrong and discuss what the error was” (third-grade focus group).

Goal setting. Goal setting is an integral part of formative assessment. To summarize what teachers said, goals are continually set, met, and then changed. Examples of goal setting were Accelerated Reading (AR) point accumulation, learning

multiplication facts, mastering specific strategies, etc. In talking with the student focus groups, goal setting helped the students know where they should be heading. Students talked about how their AR goal setting helped them plan how many books they should read and when they should be finished. One third-grade student stated, “we gave goals for when each multiplication fact was to be completed. That helps me because my mom helps me study and be prepared” (third-grade focus group). Students cited several examples of how they were rewarded for achieving goals, both individual goals and school-wide goals. A fifth-grade student stated, “we got to have a Duck Dynasty day for our AR points.” Another fifth grader said, “you should have seen our teacher for the 70s day reward party. She went all out” (fifth-grade focus group).

Students also mentioned how the teacher explained to them what was expected once a goal was set. One fifth-grade student stated,

our teachers provide a rubric for all projects. She has the students read over the rubric independently first, then she reads over the rubric stopping and asking us to turn-and-talk to provide examples to each other, then one person from the table would summarize how the table understood the rubric. (fifth-grade focus group)

One student from the fifth-grade focus group stated, “it is hard to mess up after going over the rubric.”

Learning styles. Addressing the various learning styles in a classroom is important because each individual learns in a different way. This can be due to the diversity in our country or the preferred way to learn by the learner (Kennedy, 2002). Teacher B commented,

Addressing learning styles was so easy in core because you know your kids so well, you know the inside and out because you spend so much time with them. In

flex, you do introduce strategies differently but it is more difficult because the students are in and out in 30 minutes and some of them are not your own children. You also have a very strict set of things to cover so it is hard to differentiate. Flex time is more skill based.

Teacher E said they do things differently in flex time to try to cover the different skills, but it moves so fast and you have so much to cover (Teacher Focus Group, 2013).

Students gave examples of how they could read independently or in literacy groups. One student stated,

we have sets of books in our classroom; like five or six copies so multiple students could read the same books and discuss. Sometimes the group would agree on how many pages to read for homework and come back and discuss the next day. (fourth-grade focus group)

Another student stated, “sometimes we work math problems alone and then talk about the problem with our group. If we got different answers, we talk about what each person did and which way is right. We compare answers in our group” (fourth-grade focus group).

Student E from the fifth-grade focus group commented, “I never like to read with other people and my teacher usually lets me read alone as long as I kept up my work” (fifth-grade focus group).

Differentiation

Differentiation at Elementary School A occurred primarily in the flex group setting but teachers did differentiate in the core classroom as well. Instruction in the classroom was teaching the grade material. Teacher C explained,

Flex time offers differentiation because students are grouped together by strand areas of weakness. MAP testing determines weakness by strand and flex time is

developed to specifically target those particular strands. Students are moved after each MAP testing window to accommodate different areas of weakness.

AIMSweb is used to verify that flex time target strands are working. Typically students stay with their flex time group but if a student does begin mastering the specific skills, their flex group can change before the official MAP evaluations.

Strands are split between the teachers so the teacher may have their own students and other students as well. (Teacher Focus Group, 2013)

Although most differentiation was done through the flex groups, teachers still differentiated in their classroom. The teachers exposed the student to the grade material which was covered for the entire class; but when the student went back to do independent work, the actual material used may have been different, especially in reading. Teacher A stated,

We are expected to expose the students to the level they are supposed to be in but when they go to independent study, we have to differentiate. For example, in the summary response, the students have to put down something they learned that day and how they feel about it. It may be first grade level using fifth grade text.

(Teacher Focus Group, 2013)

Teacher C stated,

A lesson may be introduced with a specific skill or standard in mind. Every student is exposed to the high-level text but they try that same skill with a text that they are able to read. So some kids may receive a text that is just as hard as the text introduced, some may receive an easier text but they are to practice that particular skill or standard. (Teacher Focus Group, 2013)

Students also stated that the teacher continued working on problems until

everyone in the class understood and there were no more questions. They also verified how the flex time consisted of students from their class plus students from the other classes. Students made comments about how it sometimes helped to have a different teacher show them different ways to do things. From the flex time, students stated they learned different strategies to do assignments. The students also verified that the same students were not necessarily in the same flex groups. Students also stated that learning different strategies helped their grades go up (student focus group, 2013).

Learning Environment

Conferencing. The classes appeared to work as a community. The teachers commented on how students were allowed to ask questions during instruction and when they were working on independent work. Several teachers stated that students knew when they have a question, the teachers will work with the student until all students understand. This was evident by a fifth-grade student commenting, “no matter how many times the teacher went over things, she would continue going over it until everyone in the class understood” (fifth-grade focus group). The teacher would work on the problem or strategy until all questions were answered. Students stated this made them feel important and that their understanding was important to the teachers.

Teachers talked about allowing the students to ask them questions and to work with each other. Teacher E commented,

I take great pains to make sure conferencing is done in private. I focus only on that student. Students cannot ask questions when I am conferencing; they know to ask the others at their table if they get stuck. When I am finished, if they still have a question, I will work with them. (Teacher Focus Group, 2013)

Students verified this by stating that one teacher had a piece of tape on the floor

and when their teacher was conferencing, they were not allowed to cross the tape. One student stated, “I feel important because my teacher will not talk to anyone else except me when we are conferencing” (fifth-grade focus group). Another student stated, “sometimes I don’t want other people to hear what I am being conferenced about” (fourth-grade focus group).

Teachers commented that students were expected to help each other. One teacher cited research, stating,

Kids learn from each other. This is evident in their student conferencing. If there are several students who have a question, I may ask for a few students to go around the room to see if they could help or the student needing help may ask for the student to ask others at their table. Student teaching uses higher order thinking skills to listen to the problem, analyze, and provide assistance. (Teacher Focus Group, 2013)

Students worked with other students to help each other. Many students used the word “responsible.” One third-grade student stated, “to be able to conference with other students, you have to be on track and responsible.” The same student commented that he sometimes worked with students to show them how to be responsible (third-grade focus group).

Teacher C stated,

I am finding that students are celebrating the success of each other. When students conferenced each other, the student who was being prepared many times came back to say thank you and to tell the student how they did. This made the teaching student proud that they helped another student accomplish a goal.

(Teacher Focus Group, 2013)

Teachers also commented on how working together allowed students to celebrate each other's accomplishments. Students were not required to share their grades, but many students would because they would be thanking someone for their help. This help would assist in making a higher grade. Students verified this by talking about how students were allowed to clap three times when they succeeded or doing a whoo-whoop upon an accomplishment.

Conferencing was used by students too. Students commented that they were allowed to conference with other students to help them. Help included asking another student questions in preparing for an AR test or in helping each other with a problem. Teacher A cited research that shows that coming up with questions to ask others and organizing their thoughts brought in higher-order thinking skills. Teacher C confirmed, "When a student conferences another student, they are using higher order thinking skills to go through skim and scan and create questions for the other student. It also creates a sense of community" (Teacher Focus Group, 2013).

Many students stated only responsible students were allowed to conference. One student stated it was "serious" helping prepare another student for a test (fourth-grade focus group).

Room environment. Teachers commented that letting the students move around in class provided better opportunities for learning from each other and provided different working groups. Another teacher talked about the turn-and-talk strategy which is a toolkit strategy. This strategy talks about how important it is for children to talk about concepts. Teacher A commented when talking about the turn-and-talk strategy, "it is unbelievable the conversations the students have. They talk about things they do not want to mention" (Teacher Focus Group, 2013).

Students commented on being comfortable in class. Many of the students mentioned the chair, couches, beanbags, and rugs they had in their classroom so they could be comfortable while studying or working with groups. Students mentioned being able to snack while they worked, stating that the teacher said being hungry was not a good studying environment. Students talked about being able to bring little throws to cover their legs.

Feedback. Teachers stated that student feedback was important to student understanding. The teachers talked about going over a strategy or set of problems until all questions were answered from the students. Then the students were allowed to work independently. Although the work was independent, they could ask others at their table for help. The teacher also marked student papers with comments to help the student. Teachers also commented that when they went over homework or other assignments, although the problem may be counted as wrong, the students were allowed to correct the problem.

One fourth-grade student provided an example: “like when we come to a word we don’t know, she will say look at your text clues. She also tells us why a problem is wrong not just that it is wrong” (fourth-grade focus group). Third-grade students gave several examples of how the teacher would mark their papers with feedback. Some examples were complete sentences, titles, and several other examples. If several people had the same error, the teacher would talk to the class and go over examples again. Students said the teacher keeps on going over assignments until the whole class understands. Students said they were allowed to ask other students before asking the teacher. Sometimes they work in groups and pass the pen. This lets us show what we were thinking when we did the problem.

The goal for teachers working to make an optimal and inviting learning environment is helping the student master the goals and knowledge needed to move to the next grade and successfully complete the EOG tests. MAP testing drives this because it provides the foundation for what each and every student needs and then confirms during each testing period what the students are achieving and where achievement gaps still exist.

Concerns

Teachers stated that for this school year, many new tools were introduced. They had used MAP exclusively for so long, it was hard implementing the new strategies.

Teacher A commented,

We were disappointed when they were expected to use AIMSweb, RTI, New York Engage, and the toolkit strategies as well as MAP. MAP had been our number one indicator and it has been hard to change our thinking. We are trying to mesh all the programs together but we have not been putting as much importance on MAP. (Teacher Focus Group, 2013)

Teacher B commented, “a concern with MAP in that the questions were not formulated like the end-of-grade test which caused concern but up until this year, it was what we went with.” (Teacher Focus Group, 2013) Another stated,

Our goal is to see if the student is meeting our standards and the EOG tells us if we are meeting those standards. MAP isn’t setup to tell us if they are meeting those standards. It is as if we have to prepare them to be prepared to meet two different standards. The standards do not measure the same thing. (Teacher Focus Group, 2013)

Teacher C stated that

MAP showed tremendous growth for her students but they did not show that growth on the end-of-grade test. We had begun to question if MAP aligned with our end-of-grade test. I had a student who scored in the 90 percentile in testing and made a two on the end-of-grade test. These tests are covering things that are not covered in the standards for that grade. (Teacher Focus Group, 2013)

One thing that AIMSweb and other programs have brought to light was that the teachers felt like the EOG test lexile scores for reading were much higher than what MAP projected, and that was correct. The teachers have moved to lexile scoring for student reading, not AR points. They do keep up with AR points for rewarding, but students are expected to read on their lexile level. The concern is since this is the first year students are reading on lexile levels, the library does not have books to meet most fifth-grade levels, resulting in a problem obtaining books. The fifth-grade focus group spoke of having to go to the public library to get books.

Summary

Although the student survey results were not as correlated to the teacher survey and student and teacher focus groups, triangulation still occurred. During the qualitative data collection, the researcher was able to gain further insight of the formative assessment processes from the student and teacher perspectives. Teachers were very responsive to new tools to enhance their ability to assess their students and to move them forward to reduce the achievement gaps, to meet the grade objectives, and to adequately prepare the students for standardized assessments.

Chapter 5: Conclusions, Discussions, and Recommendations

Introduction

In this chapter, information from the other chapters was assembled in order to summarize the results of the study, to generate conclusions from the data, to provide recommendations for improvement, and to make suggestions for future research on MAP and formative assessment. Formative assessment is a tool that classroom teachers must embrace to continually readjust instruction to fill in the gaps of student learning (Roskos & Neuman, 2012). This case study was completed in a rural elementary school in western North Carolina. Although only one school was utilized in this study, the interpretations gained from the study may be applicable to other educational settings that utilize MAP testing. All elementary and middle schools in School District A MAP test and test within the specified testing windows as directed by the Director of Accountability and Testing.

Restatement of the Problem

Formative assessments and MAP provide teachers with current data as to what the students have most recently learned and what the students are still lacking in the learned objectives. These quick, informal, and ungraded assessments are intended to give the teacher information to make immediate adjustments in their teaching to reteach the objective to the student resulting in successful learning for the student (Greenstein, 2010). Redirection and reteaching help bring the student to the appropriate level of learning, providing the student successful learning. This successful learning reduces the learning achievement gap, providing success for the student (Stiggins, 2005; Tomlinson & McTighe, 2006; Volante et al., 2010). Formative assessment provides “windows into the students’ cognitive processes” to see specifically where the students are in their learning

(Pinchok & Brandt, 2009, p. 2). Determining where the student is in his/her learning and readjusting the teaching to meet the learning deficit enhances student learning growth therefore reducing the learning achievement gap (McManus, 2011).

In trying to provide teachers with the needed tools to assess students and determine specific areas of learning which need to be addressed, School District A purchased a license to begin MAP testing all students kindergarten through eighth grade. These assessments have occurred at specific intervals throughout the school year to provide the teacher with a detailed description of student strengths and weaknesses by specific strand. This provided teachers with the data to personalize student instruction to meet specific weaknesses by individual student and by classroom.

Teachers have to plan for formative assessment and incorporate it purposely into their lesson plans (Greenstein, 2010). The problem is teachers are not adequately prepared to conduct formative assessments in their classrooms and can be overburdened with data without the expertise to interpret the data and apply it to their individual classrooms. North Carolina has attempted to address the concern with classroom formative assessment by creating an online professional development tool for their teachers (Public Schools of North Carolina, n.d. b). All teachers completed the training, and new teachers are expected to complete the training. Teachers who can make data-driven decisions regarding their students' strengths and weaknesses can target weak areas and provide instruction to make each student successful, regardless of the other factors the student may be facing (Olson, 2005). Teachers must use formative assessment to close the achievement gaps "between where students are and where they need to go" (Roskos & Neuman, 2012, p. 535).

Overview of Study

The purpose of this study was to evaluate the impact of formative assessment on student learning while using the MAP testing tool. This study examined DDDM, differentiated instruction, teacher planning, and learning environment. Three research questions guided this case study. The research questions were as follows:

1. To what extent is MAP reading and math data being used to drive lesson planning?
2. To what extent is MAP reading and math data impacting differentiation?
3. To what extent is the impact of the utilization of MAP on the learning environment of the classroom?

The elementary school used for this case study was located in western North Carolina. The school has had MAP testing capabilities since the 2008-2009 school year. According to the surveys, the majority of the teachers have taught at this school less than 10 years.

The literature review revealed how formative assessment has proven to improve student learning thus reducing the learning achievement gap. After reviewing the data received from student and teacher surveys and from student and teacher focus groups, the researcher concluded formative assessments provide students with timely and effective feedback, differentiation based on learning needs and goals, effective learning environment, and the ability to use data to effectively make decisions as to what the student needs to enhance their learning. This conclusion further solidifies the principles set forth by Laura Greenstein (2010). Greenstein provided many examples of classrooms using formative assessment and the results the teachers received. Sarah McManus (2011), in her position with NC Department of Public instruction, stated how formative

assessment provides teachers with opportunities to see the cognitive process within the student learning. Frey and Fisher (2011) laid out a formative assessment system to help prepare a working layout of how to implement formative assessment. Frey and Fisher also laid out a framework for the gradual release of responsibility to move students to self-assessing and responsibility for their own learning. The literature review stressed the importance of making formative assessment a part of the day-to-day instruction (Perie et al., 2007). Through the surveys and focus-group discussions, themes were defined within these discussions.

Conclusions of Study

For this mixed-methods case study, student and teacher surveys, student and teacher focus groups, and individual interviews were used to allow for triangulation of the data. Triangulation allowed researchers to “improve their inquiries by collecting and converging different kinds of data bearing on the same phenomenon” (Creswell, 2008, p. 553).

After analyzing the data for both the teacher and student surveys, results were obtained. Student surveys were validated by two elementary school teachers in a different school district. Recommendations from the validating teachers were implemented. These implementations included question rewording and reading the survey aloud. Although all recommendations were implemented into the survey, the validating teachers were still concerned with question interpretation at this age level. This was apparent as student survey results were compared to student focus groups.

The teacher surveys showed a Cronbach’s alpha of .896 for 36 items and the student survey showed a Cronbach’s alpha of 0.656 for 18 items. The Cronbach’s alpha in these two studies showed a very different level of reliability; the teacher survey being

very reliable and the student survey being questionable in the reliability. This difference in reliability raises a concern in that the student survey results are opposite of the teacher results. The teacher surveys suggest correlation between formative assessment and MAP data and lesson planning, classroom environment, and differentiation. The student surveys suggest no correlation between formative assessment and MAP data and lesson planning, classroom environment, and differentiation.

As the researcher began the next phase of the study with grade-level focus groups, it became evident that the students may not have understood what was being asked. When the researcher asked the first focus group (third-grade focus group) “does your teacher allow you to ask questions during instruction,” student F responded with “the practice EOG test and the real one, we are only allowed to ask questions before we start the test.” The researcher had to provide more detail. The researcher restated the question as “when the teacher is writing on the board showing you how to do a problem, can you ask questions?” The students were able to provide examples from this question. Also, as the students heard each other’s examples, more examples were provided. Another question provided to the third-grade focus group was “does your teacher allow you to rework problems you have missed?” This resulted in a simultaneous “No”; but when the researcher restated the question as “when you go over your homework and you miss a problem, can you do the problem again to see what you did wrong,” examples were provided, such as using colored pencils to work the problem out correctly, etc. This provided evidence that the student survey questions may not have provided enough detail for students to correctly interpret. As the researcher proceeded, questions were adjusted in the focus groups by providing detail allowing the students to support each other. Although the student survey did not validate the teacher surveys and teacher focus

groups, the student focus groups did validate the data.

Conclusions regarding lesson planning. After studying the findings, the research concluded that teachers at Elementary School A used formative assessment and MAP data to direct lesson planning. This was done both in core classes and in the flex-group interventions. Teachers stated MAP testing data were used to determine where students are placed in the flex-groups and what strategies and concepts each teacher will cover in each flex group. Students indicated some advantages to the flex groups were more intense work on weak areas, working with different teachers to learn different strategies, and breaking down skills that are weak. Now with the additional tools such as AIMSweb, RTI, and other tools available this school year, assessments are occurring much more often, resulting in the students being evaluated more often, resulting in more intense training and more adjustments in lesson planning. Teachers explained that each student was placed in a tier based on their MAP testing with tier three being more skills-based and intense and tier one being more project-based. Tier three is more intense and works on skills resulting in reassessment every 10 days. This allowed the teacher to continually take the data and verify that interventions were working. Tier two assessments occur every 20 days, and tier one students are assessed every 30 days. Tier one students work on project-based skills. The continual testing of tier one allows the teachers to verify interventions are working and to adequately adjust instruction for that particular set of skills as needed. This provides data to inform the teacher of what is needed. The AIMSweb and MAP are both computer-based, resulting in a 24-hour turnaround of data which allows for maximization of the results.

In a constructivist classroom, assessment is a tool to enhance the student's learning and to help the teacher understand the student's progress (Walker et al., 2002).

Elementary School A was using formative assessment as a tool to determine what student learning needed to occur and how the teachers could have reduced the achievement gap for each student.

Having a dedicated flex group time, teachers were able to expose their students to grade-level material. Although for some students grade-level material may be above their level of ability, being able to go to the flex group worked on skills needed to help the student meet their grade-level goals. Both teachers and students provided many examples of how the flex groups were working to help them master their goals.

Conclusions regarding differentiation. Findings indicate that MAP was used to determine what skills and/or strategies were to be taught in each flex group. Each teacher has specific skills in math and reading in which they prepare lessons. MAP strands are broken down and divided to each teacher for that particular MAP testing window. After students are MAP tested, the students are assigned to a specific flex group. The groups may be different for math and reading. Students may have their own teacher or another grade-level teacher.

For the classroom during core teaching time, the teachers covered the class material for the entire class. Differentiation occurred when independent work was performed. For example, if a new reading strategy was taught, the entire class looked at the same text as the teacher went over, demonstrated, and explained it. The teacher typically taught the lesson and then asked for questions, going over different examples until all questions were answered. Then, depending on the student level, different independent work assignments were distributed. The skill taught was the same for all students but the reading level of the text might have been different. This allowed for all students to master the skill on their level.

In the constructivist theory, learning is interactive and builds on what the student already knows and students work in groups (Constructivism as a Paradigm for Teaching and Learning, 2004). Elementary School A promoted tremendous group activity such as examples provided by the teachers and students. Examples included turn-and-talk, working out problems as a group to discuss the correct procedure, literacy groups for reading, etc.

Conclusions regarding learning environment. Findings indicated that students and teachers use formative assessments with MAP assessments to positively influence the classroom learning environment. Teachers and students indicated conferencing was a tremendous benefit to the student regardless of whether it was a teacher-student conference or a student-student conference. Teacher-student conferences provided students with time alone with the teacher to answer questions, promote progress, and set goals. How the teacher handled the conference by making the conference private and working only with the student being conferenced added to the morale of the student in making the student feel important to the teacher. Student-student conferencing worked on higher-order thinking skills for the teaching student and provided the learning student time to become better prepared.

Students and teachers commented multiple times on how the teacher allowed for questions once a lesson had been presented. Teachers moved about the room to look at student work and to answer questions. Students commented that if several students were having trouble on similar problems, the teacher would reteach the problem. All students were expected to watch, helping students who were struggling and reinforcing the learning for students who understood. Students commented that they “took the pen” and worked the problem out on the board so as to see where the error was made (fourth-grade

focus group). Students commented how students were allowed to work with each other in comparing answers and coming up with a single solution which built community, learning and success.

In the constructivist classroom, the student questions, student dialogue, group work, and student point of view were all important. The process of learning was as important as the result (Constructivism as a Paradigm for Teaching and Learning, 2004). This is evidenced in the way the teacher asks why the student did something the way they did and to show the student work to the classroom. All individuals in the classroom were being set up for success.

Limitations of Study

The researcher had worked with MAP testing data at a middle school in the same county for 3 years. The researcher's involvement in MAP was providing the testing environment because the classroom the researcher occupied was a computer lab. The researcher also ran all the reports for the teachers, although the researcher never used any of the reports in teaching. The researcher was familiar with some of the needed reports the teachers indicated as potentially beneficial. Although the researcher was familiar with MAP, data were triangulated from various sources. Another limitation was the data in this case study was for only one school. Similar studies need to be performed in other elementary schools in the county to add validity to this study.

The student survey was an area of weakness in the collection of data. Although the student survey was validated and changes were made prior to administration of survey, further validation should have been provided possibly with the school psychologist or outside entity who regularly provides material to elementary school students. Another option would have been to field test the student survey with a small

group so that verbal feedback regarding student comprehension could have been obtained. This process would have better informed the final student survey questions. Regardless, the current student survey proved to be invalid, although through having the extra dimension of grade-level focus groups, validation did occur. The teacher survey, teacher focus group, and student focus groups provided evidence that MAP data are being used and the data usage is impacting lesson planning, student learning and differentiation, and the classroom environment.

Connection to Theory

The results of this study fall under the constructivist theory. According to Jacqueline Brooks and Martin Brooks (1999) “Constructivist teaching practices help learners to internalize and reshape, or transform, new information. Transformation occurs through the creation of new understandings that result from the emergence of new cognitive structures” (p. 15). Walker et al. (2002), stated,

Constructivism has become a theory of learning that has merged from a theory of knowing. . . . The theory of learning states as an individual encounters new experiences and events and seeks to assimilate these into existing cognitive structures or to adjust the structures to accommodate the new information. . . .

This means that learning evolves as individuals interpret, understand, and come to know. . . . The theory of knowing is influenced and shaped by reflection, mediation, and social interactions. (p. 7)

Marlowe and Page (2005) stated,

Learning in constructivist terms is the process and the result of questioning, interpreting, and analyzing information, using information and thinking process to develop, build, and alter our meaning and understanding of concepts and ideas;

and integrating current experiences with our past experiences and what we already know about a given subject. (p. 7)

The constructivist theory maintains that individuals create their own understanding and knowledge through the interaction and activities in which they come in contact with guided by the teacher as the facilitator. Students learn by trying to make sense of it themselves (Teaching with the Constructivist Learning Theory, 2013). According to the student focus groups, students were interpreting, understanding, and meeting objectives. This was evident by the student descriptions of self-assessing, goal-setting, peer-conferencing, turn-and-talk, and group work. The student learning was not directed just from the teacher but from each other. Peer learning promoted the learning environment causing it to be more conducive to learning and captivating to the learner. Students in Elementary School A expected to be able to discuss ideas with each other; students repeatedly talked about working with their group to come up with a solution; teachers spoke of listening to the conversations the students had and being amazed. The learning environment promoted student learning by enabling the students to learn from each other.

According to Brooks and Brooks (1999), 12 descriptors highlight teacher practices that help students understand on their own instead of just following what is taught.

1. Encourage and accept student autonomy and initiative.
2. Use raw data and primary sources, along with manipulative, interactive, and physical materials.
3. Use cognitive terminology such as “classify,” “analyze,” “predict,” and “create” when framing tasks.
4. Allow student responses to drive lessons, shift instructional strategies, and

alter content.

5. Inquire about students' understandings of concepts before sharing their own understandings of those concepts.
6. Encourage students to engage in dialogue, both with the teacher and with one another.
7. Encourage student inquiry by asking thoughtful, open-ended questions and encouraging students to ask questions of each other.
8. Seek elaboration of students' initial responses.
9. Engage students in experiences that might engender contradictions to their initial hypotheses and then encourage discussion.
10. Allow wait time after posing questions.
11. Provide time for students to construct relationships and create metaphors.
12. Nurture students' natural curiosity through frequent use of the learning cycle model. (Brooks & Brooks, 1999, pp. 2-12)

Teachers at Elementary School A used many of the descriptors for constructivist theory. Descriptor 1 encouraged and accepted student autonomy and initiative. All three focus group students spoke of conferencing other students. Students mentioned talking at their tables. Teachers spoke of turn-and-talk, which is when students turn and talk with whoever is near, and the great conversations the students had between each other. One teacher spoke of the students talking about things they might not want to ask about or mention in front of the class. Students had ownership in the classroom: ownership for their own learning and for the learning of others. Teachers used what was happening in the classroom to drive instruction both changing instruction to move further and to reteach an area as student needs directed.

Descriptor 4 talked of student responses driving lessons, instructional strategies, and altering content. This was done daily with the flex groups and in the core class. Students spoke of their teacher using her Mountain Dew bottle to talk of volume to help reinforce lessons. The Mountain Dew bottle was readily available and guided the instruction as students asked questions. Another student talked of the class reading a book and a question arose. The teacher immediately googled and projected on the promethean board so the class could discuss. Ownership and altering content as needed are common enhancements to student learning. Teachers allowed students to ask questions until everyone understood. Teachers allowed students to proceed with group work, learning from their peers working as a community reinforcing their learning and teaching each other at the same time.

Descriptor 5 inquired about student understanding before sharing the teacher's view. Students gave examples of how the teacher would ask them what they thought, why they thought that, what led them to think that, etc. Teachers used turn-and-talk to let students voice their opinions and concepts while hearing what their peers understood. Descriptors 6 and 7 discussed dialogue and questioning. Students and teachers gave multiple examples of turn-and-talk, conferencing with other students and teachers, etc. Dialogue was a crucial part of their day, every day. Descriptor 11 talked of relationships and metaphors. Students again provided examples of how the teacher demonstrated concepts to help in their understanding. Teachers used tools at their disposal to change the lesson to enhance understanding and allow for the direction to change to areas of weaknesses in student learning. All of these descriptors pointed to how teachers at Elementary School A were using data and formative assessment to differentiate student learning and to promote an engaging, thought-provoking, challenging classroom.

Recommendations for Improvement in MAP and Formative Assessment

1. Teachers commented there were several reports with specific data that would benefit them in student preparation. A representative should communicate with NWEA to see if there are additional reports to aid in curriculum alignment. This could also indicate that the various reports may need to be reviewed to see what other reports would assist teachers.

2. With so many formative assessment tools being introduced, teachers questioned the alignment of these tools with EOG testing questions. The teachers are adequately utilizing the tools provided, but the school needed someone to verify the tools are properly aligning with the EOG tests. This concern was validated after fifth-grade teachers had professional development in lexile reading scoring. The teachers determined their reading curriculum and materials being used in class were below the lexile reading scores of the EOG tests, potentially causing a discrepancy in what was being taught and what was being tested. This raised a concern of alignment.

3. Teachers are proficient at utilizing the data produced by the formative assessment tools and at utilizing formative assessment in their classroom. The teachers appear to be moving toward a constructivist classroom and recognize that students learning from students is a successful way to promote student learning. Professional development in more constructivist behaviors would benefit the teachers to utilize tools they have and continue to promote student growth.

4. Although the teachers at Elementary School A used many of the principles of constructivism, formal professional development in the constructivist theory would benefit the teachers. Teachers at Elementary School A work to help students master the goals and standards of their grade and, in doing this, are looking for the best ways in

which students learn. Formal professional development in the constructivist theory would provide them with more tools to meet this challenge.

5. NWEA provides training in using MAP testing and interpretation of the data. NWEA could also provide strategies to assist teachers in how to use the data and how to incorporate the data into their day-to-day instruction. Understanding the data is important, but understanding how to implement strategies to promote student learning would add to the value of MAP testing.

Summary

According to the findings in this study, the teachers at Elementary School A have an adequate understanding of formative assessment, how to use MAP data, and how to use it to direct student learning. The teachers use differentiation in an enlightening way, by actually dividing the students up daily to work on their specific skills in reading and math. This provided a unique setup for teachers to have students who are not normally their students, which provided an additional set of evaluators to promote student learning. This also enhanced the teachers' abilities to determine what the students need. It also allowed for more teacher conferencing among themselves, also known as professional learning communities. Although new tools have been added to the teachers' repertoire of resources, MAP is still an integral part of their overall plan. All teachers in this study perceived MAP and formative assessment as integral parts of their daily instruction. As these teachers become more proficient in the new programs added, the impact will become evident.

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Appendix A
Student Survey

Please circle what grade are you in?

3rd

4th

5th

Please circle your gender?

Male

Female

Please circle your race/ethnicity?

- White
- Black
- Native American
- Asian/Indian
- Pacific Islander
- Two or more races

		Never	Sometimes	Always
1.	Does your teacher tell you what you are going to learn and why you are learning it?			
2.	Does your teacher ask you what they can do to help you better understand what they are teaching?			
3.	Does your teacher show you what a finished assignment is supposed to look like?			
4.	Does your teacher allow you time to reflect in a journal about the things you learned in class?			
5.	Does your teacher give you time to grade your own assignments during class?			
6.	Does your teacher celebrate when you complete an assignment the correct way?			
7.	Does your teacher ask you to show her your work during class?			
8.	Does your teacher write notes on your work to let you know how you did and what you can do to improve?			

		Never	Sometimes	Always
9.	Does your teacher allow the students to ask questions while they are teaching?			
10.	Do you think you can learn from your mistakes?			
11.	Do you think you should be able to make corrections on assessments once you've realized your mistakes?			
12.	If you are asked to learn new things, even if it is difficult, do you think you can do it?			
13.	Does your teacher encourage you to help other students during class?			
14.	Does your teacher ask you how they can make the class more interesting?			
15.	Does your teacher usually catch your mistakes before you get frustrated trying to figure a problem out?			
16.	Does your teacher allow the students to set up some of the rules for the class?			
17.	Does your teacher want the students to work together to learn?			
18.	Do you know if you are making progress in school?			

Appendix B
Teacher Survey

Teacher Survey*Demographics*

What is your gender?

- Male
- Female

What is your age?

- 20-30
- 31-40
- 41-50
- 51-60
- 61 or above

What is the highest degree you hold?

- Bachelor
- Master
- Education Specialist
- Doctorate

How many years have you been teaching?

- 0-5
- 6-10
- 11-15
- 16-20
- 21-25
- 26-30
- more than 30

How many years have you been in your current position?

- 0-5
- 6-10
- 11-15
- 16-20
- 26-30
- more than 30

What is your race/ethnicity?

- White
- Black
- Native American
- Asian/Indian
- Pacific Islander
- Two or more races

		Never	Sometimes	Always
1.	I use formative assessment in my classroom.			
2.	I use Measures of Academic Progress (MAP) as a method of formative assessment in my classroom.			
3.	I use formative assessment, in conjunction with the MAP program in my lesson planning.			
4.	I tell my students what they are expected to learn and why they are learning the material.			
5.	I use probing questions to diagnose the extent of the students' learning.			
6.	I analyze completed work to comprehend why a student has or has not achieved success.			
7.	I analyze completed work to comprehend why a student has or has not achieved success.			
8.	I strive to catch student misconceptions about subject matter before they occur.			
9.	How often do you use the data generated by MAP to change your instruction?			
10.	I regularly use school data to identify content to re-teach.			
11.	I regularly use school data to form flexible student groups with other teachers during the school day.			
12.	I regularly use school data to set performance goals for students.			
13.	I regularly use school data to communicate with students about their progress towards learning standards.			
14.	I use formative assessment to monitor the progress of students by sub-group in my classroom.			

		Never	Sometimes	Always
15.	I ask students to demonstrate their work so I can analyze their thinking.			
16.	I encourage my students to demonstrate their thinking/work to the class.			
17.	I encourage students to suggest ways that their learning can be improved.			
18.	I tell students what they have or have not achieved with specific references to their learning.			
19.	I write feedback on students' work that is specifically designed for the assignment and individual students.			
20.	Formative assessment, in conjunction with the MAP program, has an impact on how I implement instruction.			
21.	Formative assessment, in conjunction with the MAP program, impacts how I assess my students.			
22.	I allow my students to communicate with me during instruction so I can ensure my instruction is meeting their needs.			
23.	I assist students in negotiating a route to improve their learning.			
24.	How often do you analyze the data generated by MAP?			
25.	How often do you discuss the results from MAP with individual students?			
26.	I regularly use school data to modify my instructional strategies (e.g., differentiate my instruction).			
27.	Formative assessment, in conjunction with the MAP program, allows the learning environment of my classroom to be improved.			
28.	I invite and build on my students' contributions to the class.			

		Never	Sometimes	Always
29.	I encourage students through my specific and focused feedback about their performance in my classroom.			
30.	I encourage students to help one another.			
31.	I show students some examples of their peers' work for the purpose of guiding and learning.			
32.	I provide opportunities for students to assess their own work and each other's work and give feedback.			
33.	I express approval to both students and their parents when students meet objectives on assignments.			
34.	I strive to make my students the center of my classroom practices.			
35.	I provide time for students to reflect and talk about their learning with me. (Conferences)			
36.	How often do you take group instructional time for the use of MAP results?			
37.	I help students to understand their achievements and know what they need to do next to make progress.			

Appendix C

Permission from School Principal

Dear Principal of Selected School for Study,

Thank you for your interest in my dissertation study entitled “A Study of Teacher’s Classroom Instructional Activities Based on NWEA “Measures of Academic Progress” (MAP).” I appreciate your help and support as I complete my doctorate degree in Curriculum and Instruction at Gardner-Webb University. As you and I discussed earlier, this dissertation study involves your students and teachers completing in a pre and post survey, participating in focus groups, and taking part in individual interviews.

I want to assure you that all information collected in the data collection phase will remain confidential and anonymous. Before students participate in focus groups or individual interviews, written permission will be obtained from their parents. Dr. Jason Parker, chair of my dissertation committee, is available to answer any questions you may have regarding the requirements of Gardner-Webb University. You may email him at jlparker@gardner-webb.edu. If you agree to allow this study to be completed in your school, please indicate by signing below.

Signature of Principal

Thank you for your time and consideration.

Rhonda Medford, MEd, NBCT

rmedford@rcsnc.org

Appendix D

Permission from School Superintendent

Dear Superintendent of Selected School District,

Thank you for your interest in my dissertation study entitled “A Study of Teacher’s Classroom Instructional Activities Based on NWEA “Measures of Academic Progress” (MAP).” I appreciate your help and support as I complete my doctorate degree in Curriculum and Instruction at Gardner-Webb University. The research project I am completing involves the following data collection instruments: surveys, a teacher focus group, a student focus group, individual teacher interviews, and individual student interviews.

I want to assure you that all information collected in the data collection phase will remain confidential and anonymous. Before students participate in focus groups or individual interviews, written permission will be obtained from their parents. Dr. Jason Parker, chair of my dissertation committee, is available to answer any questions you may have regarding the requirements of Gardner-Webb University. You may email him at jlparker@gardner-webb.edu. If you agree to allow this study being to be performed in our school district, please indicate by signing below.

Superintendent Signature

Thank you for your time and consideration.

Rhonda Medford

Teacher

rmedford@rcsnc.org

Appendix E
Permission from Parents

Consent Form: The Analysis of the Development of Instruction Based Upon MAP Data

Dear Parent or Guardian,

My name is Rhonda Medford and I am conducting research on the impact the MAP testing has on the development of instruction at an elementary school. I am investigating this because the research will help educators make informed decisions about their instruction based upon formative assessment data. If you decide to do this, your child will be asked to participate in focus groups discussing their experiences in with formative assessment and the MAP testing during the months of September and October. Students will generally participate in a focus group for only one session.

There are no risks to students in this study. All information is confidential, and no person or school will be identified in the study. All focus group sessions are with the research interviewer only, and no individual information shared in the sessions will be used for any reason beyond the research study, nor will it be shared with school personnel.

If your child takes part in this project, he or she will have the opportunity to give input about the future use the MAP testing. Taking part in this project is entirely up to you, and no one will hold it against your child if you decide not to do it. If your child does take part, he or she may stop at any time without penalty. In addition, you may ask to have your data withdrawn from the study after the research has been conducted.

If you want to know more about this research project, please contact me at 828-429-2230 or email me at rmedford@rcsnc.org. The Institutional Review Board at Gardner-Webb University has approved this project. Information on Gardner-Webb University's policy and procedure for research involving humans can be obtained from Dr. Jason Parker at Gardner-Webb University. You will get a copy of this consent form.

Sincerely,

Rhonda S. Medford
Ed.D. Candidate, Gardner-Webb University

Consent Statement

I agree to let my child take part in this project. I know what he or she will have to do and that he or she can stop at any time.

Signature

Date

Audio/Videotape Consent Addition

I agree to audio taping at Pinnacle Elementary School during the month of October, 2013.

Signature

Date

I have been told that I have the right to hear the audio tapes before they are used.

I have decided that I:

_____ want to hear the tapes

_____ do not want to hear the tapes

Rhonda Medford and other researchers approved by Gardner-Webb University may use the tapes made of my child. The original tapes or copies may be used for this research project, teacher education, and presentation at professional meetings.

Signature

Date

Address

Appendix F

Permission from Teachers

Dear Teacher:

My name is Rhonda Medford and I am a doctoral candidate at Gardner-Webb University. I am currently finishing the requirements for my degree by completing a dissertation researching how teachers use data from the MAP testing to drive their instruction. I have chosen to focus my research on one particular school. You have been selected to participate in this study as a teacher at this school.

As a research participant, you will be asked to complete a survey and take part in a focus group interview. You may also be asked to participate in an individual interview or be part of an observation during the school day. All information collected will be kept completely confidential. You may choose to leave the study at any time with no repercussions. No teacher names or information will be collected or used for this study other than to state permission. No teacher names or information will be used in the research report.

Please respond to this letter by selecting one of the following options.

_____ I agree to participate in the research study.

_____ I do not agree to participate in the research study.

Signature: _____

Thank you for your time. If you have any questions, you may contact me by email at rmedford@rcsnc.org or by phone at (828) 429-2230.

Sincerely,

Rhonda Medford
Doctoral Candidate, Gardner-Webb University