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Innovation through instructional renovation: an applied research study on building capacity of mathematics teachers in bark county schools' excel department

LaShonda Quina Ross-Ivory

INNOVATION THROUGH INSTRUCTIONAL RENOVATION: AN APPLIED RESEARCH STUDY ON BUILDING CAPACITY OF MATHEMATICS TEACHERS IN BARK COUNTY SCHOOLS' EXCEL DEPARTMENT

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LaShonda Q. Ross-Ivory

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ABSTRACT

The purpose of this applied research study was to build the capacity of middle school mathematics teachers to increase student achievement. The need to build the capacity of middle school mathematics teachers arose from the trend of low content and pedagogical knowledge exhibited by teachers throughout the department. This applied research study uses four elements, individual, collective and collaborative professional development as well as student achievement, to build the capacity of middle school mathematics teachers and measure student achievement growth. A national screener, surveys, learning walk/focus group and interviews were used in the study. Using of the aforementioned elements and the involvement of various stakeholders, findings support building the capacity of individual mathematics teachers and the mathematics team can lead to increased student achievement in mathematics and shared organizational learning.

DEDICATION

I dedicate this dissertation to the memory of my great grandparents, Mr. and Mrs. Johnny Edwards, Jr., and grandparents, Mr. and Mrs. C.G. Ross, who encouraged me throughout my life to do my best, pursue education and whose words are of wisdom are echoed in my ethics and life decisions. This research is for them.

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Chapter I:

INTRODUCTION

Since the issuance of the No Child Left Behind Act (2002), many schools and school districts have been labeled as failing and subjected to the turnaround or transformation process. The main goal of the turnaround and transformation process is to produce change as well as increase and sustain a level of student achievement within schools labeled as failing. According to Mangin and Dunsmore's (2015) qualitative study, schools are continuously in pursuit of change in the areas of educational goals, practices, and learning outcomes.

Over the past decade, much information has been discovered and many recommendations made regarding the turnaround and transformation process. However, many schools have not succeeded in fully implementing the recommendations (Anfara & Mertens, 2012). Turnaround and transformation efforts in the past have been ineffective, in part, many educators lacked the knowledge of how to improve their situation or believed there was little or no room for improvement (Anfara & Mertens, 2012). The transformation and turnaround process is development promoted by providing support (Bennett & Bush, 2013) and the self-renewing process of building capacity (Giles, 2008) sustained over time. Transformation and turnaround process is not instant and often takes three to five years to effectively implement (Mayotte, Lamphier, & Doyle, 2013).

Description of the Problem

The central issue of concern for this applied research study was low pedagogical and content knowledge of mathematics teachers at Bulldog Middle School. Through engaging in this

organizational learning process, the stakeholders evaluated, developed a plan of action, implemented the plan and continuously monitored the plan in an attempt to build the capacity of teachers in the areas of pedagogy and content. Stakeholders had the opportunity to engage in activities to provide input and collaborate with other stakeholders to develop a plan of action for building the capacity of the school as well as individual teachers to increase student achievement.

During the 2016-2017 school year, instructional support advisors at Bulldog Middle School identified low content and pedagogical knowledge as an area of concern. The advisors identified three trends among middle school teachers. First, many teachers experienced difficulties when it came to determine the grade-level expectations of the standards. As a result, teachers were teaching inappropriate lessons that were not aligned with the standards. For example, one advisor observed a teacher presenting a lesson in the sixth grade on solving two-step equations. The problem set the teacher gave the students contained two-step equations with integers. The teacher aligned this lesson with a sixth-grade standard that specifically states to solve only one-step equations with nonnegative numbers.

The second trend identified among middle school math teachers was the usage of incorrect vocabulary. Teachers were observed using mathematical terms incorrectly on several occasions by advisors. For example, the majority of middle school mathematics teachers used the terms “minus” and “negative” interchangeably during lessons. Using incorrect vocabulary confuses students and leads to struggles with more advanced concepts in mathematics.

Lastly, instructional advisors also found many teachers often had difficulties teaching mathematical concepts. More than half of the lessons observed by advisors in the 2016-2017 school year were rooted in procedure.

This applied action research was conducted in Bark County Schools. Bark County Schools is located in Bark County, Tennessee with its district office located in the city of Iris. Bark County Schools became the largest district in the state of Tennessee as a result of Iris City Schools relinquishing its charter in 2011 resulting in a merger of the two districts. There are approximately 207 schools in the Bark County School District. Of those schools, there are 81 elementary schools, 26 middle schools, 13 K-8 schools, and 27 high schools. Eight alternative schools, four career and technical schools, two special school and one virtual school are also included in the 207 schools in Bark County School District.

Bark County Schools employs more than 11,500 employees of which 6,800 are teachers. More than 61% of the teachers employed in Bark County Schools are African American with the remaining 39% mostly comprised of Caucasians. These employees work to service more than 111,500 students. Of those students served, 75.7% are African American. The remaining 24.3% is comprised of Hispanic, Caucasian, and Asian students.

Although the research was conducted in the Bark County Schools district, it was not conducted at the district level. Instead the research was conducted in the Excel segment of the district. The Excel department included 23 turnaround and transformation schools in the bottom five percent based on state assessments and had been designated as priority schools. The Excel schools were provided with a variety of resources and support to facilitate creativity through the incorporation of central components such as principal autonomy, high performing teachers, extended learning time and district level support.

Bulldog Middle School had been designated an Excel school and was the focus school for this applied research study. Bulldog Middle School is a sixth through eighth grade school located in the Blue Bay Community of Crowder, Tennessee. According to 2015-2016 school year data

provided by the Tennessee Department of Education, the school served approximately 913 students of which 90.6% were African American and remaining 9.4% Hispanic/Latino. Approximately 79.4% of the student population was considered to be economically disadvantaged.

Bulldog Middle School had a faculty and staff of three administrators (one lead principal and two assistant principals), two counselors, two professional learning coaches, 54 teachers, eight teacher assistants, three secretaries, one plant manager and six cafeteria workers. Each assistant principal was assigned to lead a grade level in the school. Bulldog Middle School was also assigned a district instructional support advisor for each content area. The instructional support advisor served as liaison between the district office and the school. The advisor worked with the administrative content lead at the school to build the capacity of teachers. The advisor gathered data through observations, conducted planning sessions, and provided resources and other materials needed for the development and implementation of lessons. Each grade level operated on a two-team rotation schedule where there were two teachers per subject per grade level for a total of 29 school wide. There were 12 sections of classes at each grade level and each teacher instructs approximately six classes per day. The classes had on average a total of 20 students.

Justification of the Problem

The Excel department of Bark County Schools emphasized providing support to the faculty and staff identified priority schools with scores in the bottom five percent on the state assessment. The goal of the Excel department was to move schools from the bottom five percent to the top twenty-five percent in the state. To achieve this goal, the Excel department strived to place the highest performing teachers with the lowest performing students. By implementing this

practice, the Excel hoped to provide the lower performing students with the best possible teachers who use the most effective strategies. Although placing the highest performing teachers in priority schools seems the best option for increasing student achievement, the central issue of concern was many teachers lacked the necessary content and pedagogical knowledge to teach students effectively.

The Excel department preferred to hire teachers who score a three or better on the Teacher Evaluation Model (TEM) and Teacher Value-Added Assessment System (TVAAS). A three or better TEM or TVAAS score was an indicator of the teacher's ability to grow students at a consistent rate. However, due to the shortage of teachers in mathematics, teachers were sometimes hired without meeting the qualifying evaluation scores. Many teachers were new to Tennessee or the profession of teaching and did not have TEM or TVASS scores. Novice teachers and teachers new to the state of Tennessee were selected at the discretion of the principal. Therefore, some teachers in Excel schools lacked the mathematical pedagogy needed to effectively increase student learning, and subsequently, achievement.

Due to the low level of content and pedagogical knowledge of teachers, principals feared students were at risk of receiving a mathematical experience that provided little or no opportunities for growth. In an effort to combat this problem, the Excel department implemented a coaching program designed to build the capacity of teachers. The primary function of the department was to build the capacity of the math instructional staff within the Excel department by using research-based instructional practices to yield conceptual understanding. The mathematics coaches provided opportunities for mathematics teachers to engage in individualized job-embedded professional development to increase their content and pedagogical knowledge. Teachers who had the potential to become instructional content leaders in their

school were placed on the cycle of support which was an intensive job-embedded professional development program implemented over a period of four weeks.

In the last year, principals and district administrators had challenged the structure of the coaching program. The work of the coaches had been construed as subjective because all data was collected and evaluated by the coach to determine the level of coaching each teacher receives. Many stakeholders had been extremely candid in expressing coaches were not building the capacity of the math department. Stakeholders reasoned coaches spent the majority of their time assisting teachers who had been noted as effective teachers which leaves those teachers with most need to fend for themselves. Northwest Evaluation Association (NWEA)/Measures of Academic Progress (MAP) school data supported these claims as students of teachers who receive intensive coaching continued to thrive consistently when compared to those students of teachers who do not receive coaching services.

Principals argued teachers who had been identified as lower level teachers continued to struggle and provide mediocre instruction to students which lead to little or no student growth unless they were provided the proper training. In an effort to increase the instructional capacity of those lower level teachers, this applied research study aspired to build the capacity of mathematics teachers at Bulldog Middle School. The applied research study focused on providing those teachers exhibiting the lower performance levels with the most intensive coaching experience to increase their capacity. Through focusing on building the capacity of Excel mathematics teachers, this research aimed to increase the effectiveness and efficiency of instruction with a goal to improve the level of student achievement.

Purpose Statement

The intent of this applied research study was to increase the capacity of middle school mathematics teachers at Bulldog Middle School. The research process stems from a high number of teachers in Excel schools such as Bulldog Middle School who lacked the content and pedagogical knowledge to provide effective instruction to increase the achievement of students. Through a collaborative process with stakeholders, such as administrators, PLC coaches and Content Leads, the central phenomenon was examined through a review of research on building capacity, effective mathematics instruction, and professional development combined with surveys, NWEA/MAP scores and observations to develop an action plan to address the issue. The goals of the action plan were used to develop a set of quantitative and qualitative questions designed to support a formative evaluation of the action plan. Initial implementation of the action plan took place from January of 2018 to December of 2018. The evaluation supported improvements through a continuous cycle of monitoring and adjustment.

The central phenomenon of this applied research study was the lack of content and pedagogical knowledge of teachers in the area of middle school mathematics. Several types of quantitative data including screeners, progress monitoring and evaluation scores were collected and analyzed for the evaluation to determine both teacher and student growth. In addition, qualitative surveys and observations were used to determine the areas of professional development to identify coaching strategies to be implemented. In conclusion, the purpose of this applied research study on building capacity was to increase the content and pedagogical knowledge of teachers to facilitate improvement in student achievement and build the capacity of Bulldog Middle School through organizational learning.

Research Questions

This applied research study were guided by two sets of questions used in different points in the process. An initial set of preliminary questions were used to develop the action plan. The purpose of these questions was to provide the information necessary for the collaborative development of a comprehensive action plan designed to address the problem of low student achievement in the area of mathematics and teacher capacity. The first question examined the reasons why the evaluation scores of teachers were low in pedagogy. The second question sought to identify and summarize existing and relevant research on building the capacity of mathematics teachers and effective mathematics instruction. The final preliminary question focused on shared values and desires within the organization to develop a set of goals to be achieved through the research process consistent with the organizational mission.

Collaborative analysis of the data collected in response to these questions was used to develop the action plan presented in Chapter Three. The goals of the action plan sought to develop an increased level of capacity of teachers while increasing student achievement. As a result, it was important for this research project to assess the implementation process to identify areas of strength and weakness. Based on these needs, the following set of research questions were used to evaluate the results of the collaborative action plan:

1. Did the action plan result in 75% of students reaching their NWEA/MAP target score in mathematics?
2. Was the coaching/professional development plan implemented correctly?
3. What successes were identified as a result of the implementation process?
4. What, if any, are the negative outcomes created by the program implementation?

5. To what extent, if any, did the implementation of the action plan lead to increased organizational capacity?

The focus of this research study was to build the capacity of middle school mathematics teachers. The action plan presented in Chapter Three was used to increase both pedagogical and content knowledge to build teacher capacity as well as organizational capacity. These research questions were used to evaluate the results of the action plan presented.

Definition of Terms

Table 1 provides the definition of terminology and acronyms used throughout this dissertation.

Table 1

Definition of Terms

Term	Definition
Collective Professional Development	Learning opportunities that involve teachers who teach the same grade level and subject across the Excel department.
Content Knowledge	Concepts and facts specific to particular subject or academic course.
Cycles of Professional Learning	Continuous professional learning which involves teachers engaging collaborative activities
Instructional Leadership Director (ILD)	A central office administrator who serves as a mentor to building level principals.
Instructional Leadership Team (ILT)	A school level leadership team comprised of administrators, selected teachers, coaches and other members of the faculty. The team assists in the making instructional decisions.
Instructional Practice Guide (IPG)	A coaching tool that includes the instructional Shifts of three Core Actions (Achieve the

	Core, 2016).
Northwest Evaluation Association/ Measures of Academic Progress (NWEA/MAP)	A non-profit organization that creates assessments to measure the growth and proficiency of students in reading, language, math, and science throughout the school year.
Pedagogical Knowledge	The knowledge of how to deliver instruction in a particular subject effectively.
Professional Learning Communities (PLC)	A group of teachers who teach the same grade level and subject area working together to address problems that affect their grade level and/or subject matter.

Summary

Chapter One introduces the research and justification for the program implementation. As Chapter One advanced, a thorough analysis of the problem, statement of the purpose, and research questions were presented to provide the focus of the research on building teacher capacity. The literature presented in Chapter Two provides a segue for the questions presented as well as provides a supportive structure for this research study through a presentation of relevant research. The literature focuses on effective math instruction and student achievement, building organizational capacity, and instructional coaching, thus creating a framework for the action plan presented in Chapter Three which describes the development, implementation, and evaluation of the action plan. The results of the research study are presented in Chapter Four. This includes an analysis of the evaluation of the action plan to answer the research questions presented in Chapter One. Finally, in Chapter Five, the results of the research study are discussed in relation to the literature provided in Chapter Two as well as limitations and implications for future research.

Chapter II:

LITERATURE REVIEW

Introduction

In recent years, low-test scores have led to many schools being classified as failing. As a result, the schools are required to engage in turnaround process which promotes organizational capacity building. Schools involved in this process often have ineffective teachers and as a result, low performing students. Many instructional leaders have struggled with the task of building the capacity of their school and have had little or no success. Bulldog Middle School of Bark County Schools is currently involved in the turnaround process. Bulldog Middle has chosen to focus on building the capacity of its faculty in the areas of content and pedagogy to increase student achievement in mathematics.

The target of this literature review is to examine the research about capacity building, instructional coaching, and effective mathematics instruction. The first section of this chapter provides a summary of the literature on capacity building and its relevance with regard to the transformation/turnaround process. The second section of this chapter develops the theory of instructional coaching as tool to build capacity. The final section of this chapter explores how effective mathematics instruction increases student achievement. There is a significant amount of research on these topics that may help to develop the instructional capacity of mathematics teachers at Bulldog Middle School. Literature on building capacity reveals capacity building is essential to having a successful school turnaround. Although numerous avenues have been linked

to mathematical improvements, the literature provided in this chapter supports this study through the presentation of a clear representation of how coaching can be used as a vehicle to improve mathematical instructional practices.

The stakeholders used the literature presented in this chapter to inform the development of the action plan. The research on the instructional capacity of teachers presented and supported the overarching idea of implementing a coaching program. Other research studies of mathematical instruction and student achievement supported the means and the purpose of the action plan. The literature contained within this chapter addressing coaching and its use to improve mathematical instructional practice provides the basis for the coaching model employed in this study.

Building Capacity

Capacity building is a crucial component of the educational transformation/turnaround process. Jaquith (2013) describes capacity as an assortment of tools and the ability to use those tools to facilitate increased student learning. In recent years, research indicates attaining change requires building capacity for change (Mangin & Dunsmore, 2015). Increasing a school's capacity helps in the development of successful turnaround strategies as well as increases student achievement by providing tangible evidence of needed or possible improvement (Anfara & Mertens, 2012). Capacity building usually rests within the three common categories of teacher, group, and vision. Capacity building often requires nurturing internally through effective instruction and quality school leadership, as well as externally through district leadership and support (Giles, 2008). Mayotte et al. (2013) contends effective instruction and strong leadership are the central components of positive student outcomes and therefore, building capacity in these

areas is extremely important because it weighs heavily on the ability of schools to meet goals (Stosich, 2016).

Building capacity involves creating structures, conditions, expectations, teams, and a focus on student learning (Anfara &Mertens, 2012; Jaquith, 2013). By implementing these aspects of building capacity, the instructional leaders of the schools ensure there is a collaborative school environment with the tools and resources needed to implement organized and aligned programs that facilitate quality instruction with well-defined learning goals.

School success is dependent upon the ability to build capacity of faculty and staff both individually and collectively (Mangin &Dunsmore, 2015). Anfara & Mertens (2012) identified effective instruction as one of the five major components of capacity building; consequently, teachers' knowledge, skills, and dispositions are vital to the educational success of students (King & Bouchard, 2011). Educational leaders have been grappling with the issue of how to improve instruction since the publication of *A Nation at Risk* (1984). Many of those leaders have issued mandates in the hopes of improving instruction: however, research indicates mandates have no effect in changing teachers' instruction. Teachers need professional development that provides the proper resources and support to increase their capacity for instructional change (Mangin & Dunsmore, 2015).

Over the years, the views on professional development have shifted from the initial intent to initiate change in student learning outcomes as well as teachers' practices, beliefs, and attitudes (Rush & Young, 2011). In recent years, the concept of professional development creates a divide in the educational realm. Many educators view professional development as an essential element in teacher development. Others suggest professional development has little or no effect on student learning or teacher practices (Rush & Young, 2011) due to lack of transfer of teacher

learning to practice in the classroom (Keller, 2007). However, more recent research has found professional development to be an investment in the growth potential of teachers (Johnson, 2012), as well as a powerful change agent because of its ability to increase the collective power of schools when strategically approached and provided long term (Mayotte et al., 2013).

According to Wilcox and Angelis (2012), professional development has the potential to accrue benefits which in turn strengthens the school's capacity. When implemented effectively, professional development produces a change domino effect by transforming teacher practices. Transforming teacher practices increases student learning outcomes thereby, facilitating a change in teachers' beliefs and attitudes (Rush & Young, 2011). In order to be effective, professional development should not focus on receiving knowledge (Taton, 2015) and should not be delivered in isolated instances (Mayotte et al., 2013), or selected by a teacher from a list of professional development listings (Mangin &Dunsmore, 2015). Instead, professional development must be provided according to evidence-based need, focused on creating knowledge (Taton, 2015), and individualized to meet the identified needs of the teacher.

Stosich (2016) utilized a qualitative comparative case study approach to investigate the responses of teachers and principals of high poverty schools to professional development within their schools' contexts. The researcher found job-embedded support from experts, such as coaches and principals, were instrumental in converting learning from professional development into collaboration and changes in instructional practices. Stosich (2016) also found collaborative planning and inquiry improved instruction and professional community.

Thoonen, Sleegers, Oort, Peetsma, and Geijsel (2011) researched the relative influence of various elements on teaching practices. The elements studied included transformational leadership, teacher learning, organizational conditions of the school, and teacher motivational

factors. As a result, experimenting and reflection were identified as professional learning activities that were strong predictors of teacher practices. The researchers surveyed 502 teachers from 32 elementary schools and conducted observations. A within-school covariance matrix and chi-square were conducted to test the structural model and the non-independence of observations. Thoonen et al. (2011) also found transformational leadership practices enhance school organizational conditions as well as teachers' learning and motivation.

King and Bouchard (2011) investigated the scarcity of information on how to build capacity through outlining the key dimensions of school organizational capacity. King and Bouchard (2011) also examined the synthesis of major mechanisms of policies and programs to guide and support a school's organizational development. In this case study of one elementary school, the researchers chronicled the work of a coach and their efforts to impact various aspects of capacity. The findings of the study indicate differentiated support is needed to develop and build the capacity of teachers and policies must be flexible to accommodate the variation between schools.

Instructional Coaching as Tool for Building Capacity

One way to provide evidence-based professional development to meet the teachers' targeted learning needs is through instructional coaching. Educators often view instructional coaching (or coaching) as a tool for professional development (Rush & Young, 2011) and method of systematic and individual reform (Mangin & Dunsmore, 2015). Coaching is also a catalyst for transformation in performance and development (Bennett &Bush, 2013).

In recent years, many research studies have been conducted on instructional coaching. Research indicates several advantages to using instructional coaching as a professional development tool. Some of the advantages of instructional coaching include cost effectiveness

and increases in teacher efficacy. Instructional coaching offers more than six times the instructional gains of other educational factors such as reduced classroom size. Instructional coaching gains include opportunities for teachers to learn as well as observe and practice new strategies in their own classroom. Feedback and systematic reflection are also positive outcomes associated with instructional coaching (Keller, 2007; Rush & Young, 2011; Shidler, 2008).

Bengo (2016) examined components of mathematics coaching that impact the practices of teachers. Bengo (2016) conducted an explanatory case study to ascertain the connection between mathematical coaching and the use of new instructional strategies. The researcher uses purposive sampling to select two coaches and four teachers to participate in the study. Surveys, observations, interviews and archival data were collected and disaggregated. The researcher found various aspects of mathematical coaching such as time, coaching background courage and trust may be indicative of effective coaching. Bengo (2016) also found resources and differentiation were required to facilitate effective coaching and coaching enhanced instruction.

According to Snyder, Hemmeter, and Fox (2015), instructional coaching is a cyclical process of differentiated support provided by a specialist who closely works with teachers to identify and implement research-based instructional practices. Coaching is practiced within the context of a teacher's work to support high caliber teaching practices and provide opportunities for reflection (Snyder et al., 2015). Coaching is used to build the capacity of teachers to understand and respond to various elements of instruction (Huguet, Marsh, & Farrell, 2014). Many educators view coaching as collaborative partnerships because teachers and coaches work in unison to progress through the coaching cycle. During the cycle of support, the coach focuses on developing the conceptual knowledge and skills of teachers through planning, observation, modeling /practice, reflection and feedback (Snyder et al., 2015).

Huguet, Marsh, and Farrell (2014) analyzed data from a study that compared case studies from approximately four middle schools to examine various elements of coaching that build teachers' skills and knowledge to guide instructional decisions. According to Huguet et al. (2014), strong coaches employed various methods to meet the individual needs of the teachers they served. The findings also indicated strong coaches addressed norms co-constructively which initiated a buy-in from the teachers. Finally, artifacts were utilized as teaching tools by stronger coaches. The coaches used scaffolding which enabled teachers to gain access to tools on their own and apply the skills learned in future practice.

Instructional coaching provides the opportunities for teachers to reflect and engage in meaningful job-embedded professional development that will lead to the development and implementation of effective instructional practices. According to the National Council of Teachers of Mathematics (2014), providing students with effective mathematics instruction leads to more meaningful learning experience.

Mathematics Instruction and Student Achievement

> The National Council of Teachers of Mathematics (2014) states:
>
> The teaching of mathematics is complex. It requires teachers to have a deep understanding of the mathematical knowledge that they are expected to teach (Ball, Thames, and Phelps 2008) and a clear view of how student learning of that mathematics develops and progresses across grades (Daro, Mosher, and Corcoran 2011; Sztajn et al. 2012). It also requires teachers to be skilled at teaching in ways that are effective in developing mathematics learning for all students. (The National Council of Teachers of Mathematics, 2014, p. 7)

Ottmar, Rimm-Kaufman, Larsen, and Berry's (2015) article states only 40% of fourth-grade students in America reach math proficiency. Due to deficits in student proficiency, attention has been focused on the effectiveness of mathematics teachers and their roles in poor student performance. Research supports the theory that instructional practices, along with interactions and opportunities provided by teachers, weigh heavily upon student achievement. Upon further investigation of poor student achievement in America, research indicates teachers often have considerable deficits in content and pedagogical knowledge (Ottmar et al., 2015).

Ottmar et al (2015) conducted an analysis of quantitative research on the effectiveness of the Responsive Classroom in changing the relationship between mathematics teachers, classroom inputs, and student mathematics achievement. The analyzed study was a random controlled trial which consisted of 88 third grade teachers and 1,533 of their students from twenty-four schools. Thirteen schools received the intervention, and 11 schools were in the control group. The authors found increased use of standards-based practices resulted in extensive advancement in mathematics achievement. The study also revealed how providing classroom supports to build teachers' capacity, socially and emotionally, aids teachers in providing stronger mathematical practices. This research is important to this study because increased mathematics achievement begins with sound standards-based practices grounded in the effective mathematics teaching practices.

Harkness and Noblitt (2017) researched the question of "How does a teacher play the believing game in mathematics classroom?" (p. 63). The qualitative study focused on two mathematics college courses for elementary and middle school mathematics teachers. The classes chosen for the study were based on convenience of observation for the researchers. Field notes, interviews, and videotape were used to collect data. The findings of the study indicate

"reserved believing and doubting" (p. 63) leads to enhanced mathematical discourse and mathematical understanding of the educator.

Wong (2007) conducted a qualitative research study to examine the views of teachers with regard to effective mathematics teaching. Wong used face to face semi-structured interviews of twelve Hong Kong teachers with various years of experience teaching. Teachers years of experience varied from five to twenty-five years in the field of mathematics education. Findings of Wong's (2017) research support "abstract thinking" (p. 301) as the intent of mathematics learning where students should advance their learning from concrete concepts to more abstract concepts. Wong (2017) also found trends among teachers to support teaching for understanding, usage of good preparation, fundamental teaching skills and student-teacher relationships as a necessity for an effective mathematics lesson.

Paul and Vaidya (2014) conducted research to determine what strategies are useful in increasing mathematics achievement and sustaining it. In this qualitative research study, Paul and Vaidya employed a three-phase case study to examine the mathematics achievement of a K-8 urban charter school over a three-year period. The three phases of the study included an examination of the school's preexisting program, discussion of the content and interventions implemented, and follow-up on the sustainability of the program. A mixed method design was employed to collect both qualitative and quantitative data. Findings indicate a turnaround of the school's mathematics achievement was possible with "strategic components" (Paul & Vaidya, 2014, p. 1254) in place and knowledge of how to optimize existing resources. Data collected suggests students' achievement increased and various components of the program were still active.

According to Koellner, Jacobs, and Borko (2013), common and specialized content knowledge, pedagogical knowledge and knowledge of students are essential characteristics needed to effectively teach mathematics. Research indicates that the essential characteristics coupled with the ability to translate mathematical content knowledge into effective teaching practices will increase student learning. Possession of these combined elements will also enable a teacher to make connections among mathematical ideas and progressively teach those ideas in a logical manner, both mathematically and developmentally (Ferrini-Mundy, Burrill, & Schmidt, 2007).

Mayotte et al (2013) conducted a qualitative study to examine three aspects of capacity. The researchers analyzed and coded data from one open-ended item on a survey conducted during a summer workshop in 2010 and 2011. The data were coded into three subcategories of capacity: group, teacher and vision. Approximately 222 teachers and administrators participated in the study during 2010. In 2011, 141 teachers and administrators participated in the study. The researchers sought to find the degree to which knowledge and skills, collaboration, and continuous improvement are achieved through the Alliance for Catholic Education (ACE) collaborative model. Findings from the study indicate teachers found enhancing group collaboration as well as knowledge and skills were most helpful.

Mundy, Burrill, and Schmidt (2007) conducted qualitative research in which they chronicle the implementation of a project based at the university with the purpose of building the capacity of mathematics teachers. Three hundred seventy-six Kindergarten through eighth grade schools participated in the study. The authors tested students in grades three through 12 to establish a baseline of student performance. Teachers and administrators completed surveys; they also completed mathematical tasks and engaged in discussions around those tasks. Specifically,

the researchers wanted to build the capacity of mathematics teachers to teach a coherent and significant curriculum. This research found teachers with a narrow sense of curriculum, disjointed lessons, and a focus on mastering procedures had not been exposed to experiences that would help them see the bigger picture of mathematics.

According to Koellner et al. (2013), teachers who have the ability to provide effective mathematical instruction possess the "Mathematical Knowledge for Teaching "or MKT. Teachers with MKT teach concepts in more depth, select more suitable instructional materials and challenging tasks, provide more distinct explanations of concepts and positively effect student concepts. In comparison, teachers without MKT often teach concepts incorrectly and focus on procedural methods rather than concepts (Ottmar et al., 2015).

Koellner et al. (2015) studied 12 lead teachers and 54 teachers from eight middle schools in a large urban school district with a substantial minority population. The focus of this three-year, train-the-trainer model, study was to prepare lead teachers to implement quality mathematics instruction. The authors collected various quantitative and qualitative forms of data during the research such as videos, interviews, and pre/post mathematical knowledge assessments. The model emphasized cultivating professional learning communities (PLCs), increasing teachers MKT and adjusting professional learning to reinforce local goals and interests. Findings indicated a significant gain in MKT, as well as amplification of specialized content knowledge through solving tasks in multiple ways.

In Ball, Thames, and Phelps' (2008) qualitative research study, the authors examined the nature of mathematical content knowledge. The authors studied mathematics teaching and identified MKT through the examination of mathematical problems that emerged during teaching. Findings of this research indicate the emergence of three subtypes of pedagogical

content knowledge. Two empirical subtypes identified in the study are knowledge of content and students and knowledge of content and teaching. Another subtype, which the authors identify as distinctive only to the profession of teaching, is specialized content knowledge.

According to the National Council of Teachers of Mathematics (2014), there are eight mathematical teaching practices which incorporate the conceptual understanding, procedural fluency, strategic competence, adaptive reasoning and productive disposition needed to learn mathematics:

1. Establishing mathematic goals to focus learning
2. Implement tasks to promote reasoning and problem solving
3. Use and connect mathematical representations
4. Facilitate meaningful mathematical discourse
5. Pose purposeful questions
6. Build procedural fluency from conceptual understanding
7. Support productive struggle in learning mathematics
8. Elicit and use evidence of student thinking (The National Council of Teachers of Mathematics, 2014, p. 10)

Granberg (2016) conducted research which centered around the student struggles experienced in problem solving; specifically, activities which lead to productive struggle and knowledge obtained from those struggles. Approximately, twenty-four students between the ages sixteen and seventeen participated in the study. Students worked in pairs to solve mathematical problems on linear functions without assistance from teachers. Students used Geogebra software in solving the problems. Various forms of data were collected such as interviews, audio recordings of conversations, and work completed via the computer. Granberg (2016) used

Herbert and Grouws' framework for problem solving to analyze the data collected. The results of the study indicate most of the students were able to engage in productive struggle and flourish in remodeling their prior knowledge to assimilate new content knowledge or solve the problems presented during the study.

Russo and Hopkins (2016) conducted a qualitative research study to examine students' perceptions and experiences of mathematics lessons utilizing challenging tasks. The researchers found students generally welcomed struggle and remained engaged in mathematics lessons utilizing tasks. The research also indicated the majority of students preferred instruction prior to introduction of the task for the purpose of stimulating their prior knowledge. Other students indicated they preferred the introduction of the task first because of the challenging nature of the task.

The purpose of Clark and Roche's (2018) study was to explore characteristics of exemplary contextualized mathematics tasks and identify the constraints and affordances teachers face when using contextualized tasks. The study also examines the extent to which students differentiate between fundamental and pleasurable tasks. The participants of the study were involved in the Task Types in Mathematics Learning Project. Over the course of three years, around 30 middle school teachers engaged in the study. Various forms of data were collected such as student work, samples, observation data, surveys and focus groups. Findings of the study indicate students were able to discern between the fundamental learning and pleasurable tasks. Clark and Roche (2018) also found students were more persistent when allowed to explore and teachers used assessing and advancing prompts and/or questions to support their learning.

Perkins (2016) examined what occurs when high-level tasks are integrated into a mixed ability middle school mathematics class. Two seventh grade classes were observed during the action research study. Both classes were given a pretest and survey prior to implementation of the mathematics task. A posttest was given after the implementation of the task as well. The researcher sought to determine the students' thoughts regarding mathematics and their perceptions on how they learned best. The researcher found the mathematics was more challenging yet accessible to the students. Student survey results indicated students were more confident in their abilities. Perkins (2016) also found students became more open to sharing their solutions, developed new understanding of multiple solution pathways and unique ways of thinking of mathematics.

Ni et al. (2017) studied the relationship between student learning outcomes and cognitive characteristics of mathematical tasks. Ni et al. (2017) specifically examined instructional tasks with the characteristics of high cognitive demand, multiple representations and multiple solution paths. Over 1,700 Chinese fifth grade students from 30 classrooms participated in the study. Researchers collected two data points during a sixteen-month time period which included videotape and a post assessment. Each teacher was videotaped approximately three times during the second semester using a new curriculum. Three significant findings emerged as a result of this study. According to Ni et al. (2017), first, tasks with opportunities for multiple representations were found to be positive predictors of students' improvement in solving complex questions. Second, frequent implementation of tasks with high cognitive demand were found to be positive predictors of students' interest in learning mathematics. Third, the findings indicate mathematical tasks that connect procedural and conceptual aspects of mathematics perpetuate positive relationships with mathematics.

Boston and Wilhelm (2015) examined 114 middle school mathematics classrooms across four school districts to determine and eliminate opportunity gaps in students' learning. The authors analyzed data from a four-year study conducted from 2007 to 2011 in four large urban school districts. The data included videos taken during year one of the study of teachers instructing a lesson. Approximately 30 teachers' video recorded lessons were viewed and scored using rubrics for accountable talk and academic rigor. After the data were scored using the rubrics, the district means, standard deviations, and score frequencies were calculated and compared. The researchers found a high level of cognitively challenging tasks utilized in lessons. The tasks required students to express, in various ways, their mathematical thinking and reasoning. However, implementation of the tasks was at a significantly lower level which did not allow the students to use high-level thinking skills or reasoning. Discussions of the tasks were also at a lower level, and in some cases, no discussion occurred at all. The research also indicated teachers provided very few opportunities for students to use and connect mathematical representations. The findings also indicated students seldom were asked to provide explanations or justifications.

Lack, Swars and Meyers (2014) explored the engagement of students, low and high, in mathematical discourse while completing mathematical tasks in a standards-based classroom. The researchers' qualitative study employed a descriptive, holistic, multi-case methodology complete the study. Four sixth-grade students participated in the study. Approximately, nine instructional lessons were recorded of which two were small group interactions and the remaining seven were whole group interactions. Findings indicate students considered it easier to find answers to tasks than to explain the task when left to their own devices. The findings of the study reinforce the significance of the teacher in facilitating mathematical discourse.

The purpose of Fuentes' (2018) study was to increase the caliber of students' small group discussions by utilizing less teacher to student conversations and more student to student discussion. Fuentes (2018) conducted an action research project of a classroom teacher during which she analyzes and adjusts her instructional practices to facilitate discourse among students as they work collaboratively. The researcher utilizes a four-stage approach which includes (1) evaluating small group dynamics, (2) evaluating small group student to student communication, (3) evaluating teacher interactions with small group and (4) modifying teacher interactions with small groups. This research was conducted with a geometry class of sixteen students. Students were organized into groups of four. Observation notes and audio recordings were made daily of each group over a three-month period. The researcher found students began to appreciate their conversations with other students. Fuentes (2018) also found students began to frequently question, listen to and evaluate the work of their peers.

Ni, Zhou, Li and Li (2014) examined mathematical discourse and how it may relate to various aspects of tasks. The researchers explored aspects of tasks such as high cognitive demand, multiple representations, and multiple solution paths. In the study, the researchers observed 90 fifth-grade mathematics classes. The data collected during the study was obtained from another study and based on transcribed video-taped lessons which encompassed more than 1,700 fifth-grade students. Ni et al. (2014) found high cognitive demand were indirectly affiliated with increased mathematical discourse. The researchers also found high cognitive demand tasks were associated with higher order questioning. Findings suggest the types of tasks selected by teachers may also influence the type of mathematical discourse exhibited in the classroom.

Kiemer, Gröschner, Pehmer and Seidel (2015) conducted a study to examine if video-based teacher professional development centered on productive classroom discourse positively impacted teachers' practice as well as increased students' interest development and learning. Approximately ten teachers participated in the study. Six teachers participated in the intervention group (IG) and four teachers in the control group (CG). The control group participated in a traditional professional development program. along with 226 ninth grade students. The study was conducted over the 2011/2012 school year (SY) and utilized a longitudinal two group intervention design with pre and post-tests. Teachers in the control group exhibited a significant decrease in the amount of simple feedback given to students and an increase in the amount of productive feedback given. According to Kiemer et al. (2015), students in the intervention group exhibited a significant increase in their perceived autonomy, interest changes, and intrinsic learning motivation.

Conclusion

Many schools in America are engaged in the turnaround/transformation process. The turnaround/transformation process is extensive and involves building the capacity for change. In building the capacity for change, focus is often placed on the teacher, goals and/or the vision. Bulldog Middle has chosen to focus on building the capacity of its mathematics teachers. In order to successfully enhance teachers' instructional capacity, the proper tools must be utilized to facilitate a change in the instructional practices of teachers (Stoisch, 2016). Instructional coaching is an effective tool used to provide job-embedded professional development to teachers with a focus on effective mathematics instruction. When implemented properly, instructional coaching can lead to increased usage of strong mathematical practices which, in turn, holds the potential to increase student achievement.

The ILT of Bulldog Middle School used the research in this chapter on building capacity, instructional coaching and effective mathematics instruction to inform its decisions. The research in this chapter provided the frameworks which informed the development of the action plan outlined in Chapter Three. The action plan incorporates the elements of the research in an effort to build capacity through the development of teachers' content and pedagogical knowledge.

Chapter III:

METHODS

Introduction

This chapter presents the applied research design and methods used in this research to address the problem of low content and pedagogical knowledge of teachers of middle school mathematics. Applied research is designed to address both a problem of practice and to improve organizational effectiveness by developing the capacity for organizational learning. The details of the applied research design guiding this research are presented and explained. Chapter Three is divided into three parts. First, an explanation of the collaborative development of the action plan to address the problem of low content and pedagogical knowledge is provided. This section includes an overview of collaborating stakeholders, a review and timeline of the process, existing research guiding the work, and internal data examined to create the action plan.

The second part presents the full action plan. The research questions presented in Chapter One begins this section. Each research question is designed to guide the evaluation of one element of the action plan. The different elements of the action plan represent a specific collaborative effort to address the problem. Each element includes one or more measurable goal. This section provides the details of exactly what will take place for each element: what systems will be in place, what participants will be expected to do and accomplish, what timelines will be followed, what resources of time and material will be required, and who will be responsible for each activity or effort required of participants.

The final part of Chapter Three presents the program evaluation of the action plan to be conducted following one year of implementation. A formative assessment will be used for each element of the action plan. To guide the formative assessment, each element will be evaluated using multiple sources of qualitative and quantitative data. The focus of the evaluation will be to determine the level of goal attainment and to access the organizational development occurring through the applied research process. All of the research questions will be answered with data collected and analyzed through the program evaluation process.

Development of Action Plan

In developing the action plan to build capacity in Bulldog Middle School, the collaborating stakeholders used the relevant research contained in Chapter Two to determine key elements of their plan. Research from Stosich (2016), which identified job-embedded support from experts as a key factor in brining about changes in instructional practices, was instrumental in the adoption of coaching as a method to build capacity. Also, research conducted by Synder et al. (2015) informed the development of the cyclical coaching process for providing support to teachers. Finally, research conducted by others such as Russo and Hopkins (2016) and NCTM (2014) informed the practices around which coaches provided instructional support. The research presented in Chapter Two provided the infrastructure of action plan.

Throughout the development and implementation of this action plan, several members of the Excel department and Bulldog Middle School participated. The collaborating stakeholders consisted of an instructional mathematics support advisor (district), the instructional leader director, the principal, two PLC coaches, six teachers and students. Each member of the organizational team served a distinct role in the implementation of the action plan.

The instructional support math advisor served as the content and pedagogical specialist of the team. The advisor's role was to prescribe and provide interventions for teachers as well as content specific professional development. The advisor also worked with mathematics content lead of the school to develop the instructional skills of the teachers.

The mathematics administrative content lead often had a background in mathematics. However, at Bulldog Middle School, the administrative content lead was one of the school's professional learning community (PLC) coaches with no background in mathematics. This leader's role was crucial in the execution of the action plan as this person, in cooperation with the principal, developed the cycle of professional learning implemented at the school level and facilitated for the math teachers. This leader also supported the work of the math department through assisting with the implementation of the curriculum and intervention planning.

The principal was the instructional leader of the school. The principal's role in the implementation of the action plan was to determine the focus of the cycle of professional learning (CPL). The principal worked with mathematics administrator content lead and the instructional leader director (ILD) to develop the CPL. The ILD is the mentor and supervisor of the principal.

The teachers were the focus of the study. The teachers were responsible for providing effective instruction to the students to develop the students' mathematical knowledge. The teachers implemented the curriculum, participated in school and district level professional development, and received the instructional interventions.

The central focus of this applied research study was to increase the instructional capacity of teachers in middle school mathematics and engage stakeholders in organizational learning. The low scores of middle school math students on TNReady and NWEA coupled with the high

TEM scores and low designated school levels served as indicators to both district and school leaders that there was a disconnect between teacher capacity and the instruction provided to students.

As a result, district and school level leaders were charged with developing a plan to increase the capacity of middle school math teachers in the district. The plan started with district leaders giving principals the autonomy to develop and implement their own action plan based on the needs of their schools. The only caveats to the principal's autonomy was they were required to develop an instructional leadership team (ILT) and collaborate with district support to incorporate cycles of professional learning (CPLs) within their plan.

Principals began to work with their ILTs and district support (math advisors) to devise a plan that would develop the instructional capacity of teachers. The ILT consisted of teachers who served as lead math teachers, administrators who served as content administrative leads, a district instructional facilitator, an instructional leadership director, and the principal.

During the first phase of development of the action plan, the instructional leadership team and the instructional support mathematics advisor gathered information from the NWEAP at the beginning of the year to determine the average student growth for individual teachers in the previous school year (2016-2017). The instructional leadership team and the instructional support math advisor also participated in a norming walk with the middle school ILD to standardize the observation process and determine good indicators of effective instruction. After the norming walks, the ILT and instructional math support advisor conducted a learning walk using the instructional practice guide (IPG) with a focus on core action two to determine the instructional level of teachers. This process also identified areas of need for each teacher. Once the learning walk was completed, a focus group convened to discuss the observation evidence

and suggestions for support. Also, during this phase, the ILT and/or the instructional math support advisor administered a self-assessment survey focused on the eight mathematical teaching practices to identify their perceived areas of need. This teacher survey was also used in determining the professional development needs of the teachers

The second phase in developing the action plan was the development professional development. During this phase, the ILT developed cycles of professional development to address the professional development needs of the teacher. The instructional advisor and ILD may have been consulted to assist in prescribing professional development based their observations using the IPG. The district also developed professional development in form of zone-wide collaboratives based on the observations and the data collected in phase one of the action plan.

The final phase in developing action plan consisted of the implementation of the professional development plan. The teachers received professional learning and/or development through PLCs conducted by the mathematics administrative content lead at the school level and/or outside mathematics consultants. The teachers received individualized job-embedded professional development from the instructional support math advisor. Another form of professional development received by teachers was the collaborative which the instructional support mathematics advisors for the district facilitated.

Bulldog Middle School decided to build its plan around providing content specific coaching on pedagogical practices with teachers individually, collaboratively (by grade band) and collectively (by content area). These models were employed as a means of building the pedagogical and content knowledge of teachers which Koellner et al. (2013) indicates a key element in teachers delivering more effective mathematical instruction.

Action Plan Overview

Through the implementation of the action plan, this applied action research study sought to answer the following questions:

1. Did the action plan result in 75% of students reaching their NWEA/MAP target score in mathematics?
2. Was the coaching/professional development plan implemented correctly?
3. What successes were identified as a result of the implementation process?
4. What, if any, are the negative outcomes created by the program implementation?
5. To what extent, if any, did the implementation of the action plan lead to increased organizational capacity?

The action plan presented in this chapter utilizes four elements in effort to answer the proceeding questions. The action plan was conducted during the 2018-2019 school year with an estimated total cost of implementation of $219,282.

The action plan encompassed four elements. The first three elements of the plan addressed the school's effort to build the capacity of mathematics teachers through professional development to increase their content and pedagogical knowledge. Element one focused on building the capacity of teachers collectively (zone) while elements two and three had a narrower focus of the individual or grade levels of the school. Element four addressed student growth in the area of mathematics. Appendix A contains a table displaying the action plan, the methods used for evaluation of each element, a timeline, resources and responsible parties. The tools used to evaluate each element such as the IPG, surveys and focus group survey are contained in Appendices B through G. Data analysis and coding documents are contained in Appendices H and I.

Element One: Collective Professional Development.

The overall goal of the action plan was to increase the content and pedagogical knowledge of teachers through the use of professional development in an effort to increase student achievement. The first element addressed increasing the teachers' content and pedagogical knowledge collectively (by content area). Teachers participated in professional development designed to meet their needs and build instructional capacity. District collaboratives were used to focus on delving into the math content. Teachers learned to decompose standards to determine the underlying learning goals within the standard. Teachers also completed tasks which according to Mundy et al (2007) allow teachers to see the bigger picture of mathematics and use various strategies and/or models to complete them. The district collaboratives also included teachers from other schools that teach the same grade level. Instructional support mathematics advisors conducted district collaboratives at least once a month for all teachers within the zone. District collaboratives started in September of 2018 and continued until March 2019. Each collaborative was optional for teachers because they were conducted after school hours and will cost the district $636 for two days of planning and preparation time of the instructional support math advisors.

Element Two: Individualized Professional Development.

Individualized planning was also used to develop the content and pedagogical knowledge of teachers. Teachers participated in individual planning sessions with mathematics advisors. The planning sessions were conducted on an as needed basis and focused on developing an effective mathematics lesson which included the implementation of the eight mathematical teaching practices (NCTM, 2014). During these sessions, teachers learned how to identify and plan for student misconceptions, develop purposeful questions, decide which representation(s)

should be the focus during the lesson, and work mathematical problems using models and strategies. Teachers also learned when and how to facilitate meaningful discourse among students as well as how to identify tasks and problems that align with the learning goal of the lesson. The individualized planning sessions were conducted from September of 2018 until March of 2019. The district incurred an estimated cost of $13,356 for planning sessions conducted throughout the 2018-2019 school year.

All six mathematics teachers were observed and provided feedback during the school year. Each teacher was observed at least two times a month during the school year. The mathematics advisor and various stakeholders (principals, assistant principals, and ILDs) conducted the observations. Once the observation was conducted, the teacher received feedback and recommendations. The observations occurred from September 2018 to March 2019. The district incurred an estimated cost of $80,136 for observation and feedback sessions conducted by the math advisor.

Element Three: Collaborative Professional Development.

The focus of element three was to develop the school's capacity to collaboratively maintain and facilitate professional growth in its teachers. In order to achieve this goal, mathematics advisors worked with the administrative and teacher content lead to develop knowledge of effective mathematics instruction and leadership skills respectively. The mathematics advisor also worked with the administrative content lead to develop the focus for grade level mathematics collaboratives as well as department PLCs. The collaborative planning sessions and PLCs allowed teachers to plan with other math teachers as well as engage in safe practice with peers on newly learned strategies or areas of weakness. The mathematics advisor also worked with the mathematics content lead to develop his/her leadership skills through

engaging in co-observations. The co-observations served as means of training the lead teacher to provide productive feedback and recommendations to his/her peers. The collaborative planning session were conducted once a week with each grade level. The PLCs were conducted once a week with the entire math department. The district incurred an estimated cost of $106,848 for PLCs and collaborative planning sessions conducted from September 2018 to March 2019.

The school ILT and mathematics advisor worked together to conduct a learning walk/focus group to review the instruction of math teachers. The learning walk/focus group were conducted twice during the 2018-2019 school year. Each learning walk/focus group member was given an element of core action two of the IPG to evaluate during the walk using the IPG. Once the learning walk concluded, the members of the ILT engaged in a focus group. The district incurred an estimated cost of $7,632 for the personnel used to conduct the walk. The district incurred an estimated cost of $10,674 for personnel needed to administer the assessment, the assessment, and lost instructional time.

Element Four: Increased Student Achievement.

Element four of the action plan addressed student achievement. The students in grades six through eight were administered the Northwest Evaluation Association/Measures of Academic Progress (NWEA/MAP) test to determine growth. The test was given three times during the school year. The first test was given in August 2018 to determine a baseline or starting point for each student. After taking the first assessment, students were assigned set a goal for the next assessment which was given in December 2018 or January 2019. Scores were then evaluated to determine the percentage of students who met their target score. Students then set another goal which was evaluated in May 2019.

Program Evaluation of the Action Plan

The action plan utilized both qualitative and quantitative descriptors of instructional practice in an action research design to provide 360-degree view of the instructional capacity of middle school mathematics teachers in the Excel of Bark County Schools. The 360-data collection model was used to gather feedback from multiple sources about each teacher's instructional level. The feedback provided throughout the plan was used to adjust and monitor the plan in an effort to facilitate continuous cycles of improvement. Each element of the action plan was evaluated quantitatively and /or qualitatively.

Evaluation of Collective Professional Development.

The professional development element was evaluated using various methods to assess progress towards both short and long-term goals. The short-term goal of the professional development was to increase the content and pedagogical knowledge of the teachers. The long-term goal of the professional development was to change the instructional practices of middle school mathematics teachers. The teachers were given a survey (see Appendix B) to determine if the professional development enhanced their content and/or pedagogical knowledge of mathematics. The survey given to teachers after each professional development session contained both open-ended and closed-ended questions. Both the qualitative and quantitative data collected from the survey were assembled for formative assessment.

The professional development element was also evaluated using core action two of the instructional practice guide (IPG) (see Appendix C). Classroom observations of teachers were conducted throughout the year using the IPG (a coaching tool developed by Achieve the Core). Core action two of the IPG consisted of five indicators, which encompass NCTM's (2014) eight mathematical practices of effective teachers. This tool was used to determine if there was any

change in the instructional practices of teachers. The IPG was also used to collect both quantitative and qualitative data for formative assessment of the instructional practices of teachers.

Evaluation of Individualized Professional Development.

The second element evaluated was individualized professional development. The short-term goal of individualized professional development was to develop the teachers' capacity to plan effective lessons utilizing NCTM's (2014) eight mathematical practices. The long-term goal of individualized professional development was to develop the capacity of teachers to consistently implement lessons that exemplify effective instructional practices and rooted in conceptual understanding rather than procedures. The instructional math advisor's field notes were used to determine the frequency and focus of planning sessions conducted with teachers.

The IPG was used to evaluate the planning sessions as well. The IPG was used when observing the lessons planned with and/or without the instructional math advisor. The qualitative and quantitative data collected using this tool was used for formative assessment.

A teacher interview (see Appendix D) was also conducted to evaluate this element. Open-ended questions were asked to determine the areas in which teachers require assistance. The interview contained questions that addressed the conceptual frameworks of building teacher capacity, mathematics instruction and instructional coaching. The interview served as a summative assessment.

A survey (see Appendix E) consisting of a four-point scale was used to determine the level of implementation of mathematical practices by teachers. This survey was administered at the beginning, middle and end of the school year. The data obtained from this instrument was

used to determine the level of implementation of the mathematical teaching practices at various points throughout the year.

Finally, a focus group/learning walk (see Appendix F) consisting of members of the instructional leadership team (ILT) was assembled to conduct a learning walk. The focus group/learning walk was conducted twice during school year. The learning walk provided a more extensive view of the teachers' instruction. Each stakeholder was given an area in which to focus his or her observation. The focus group/learning walks was used to determine the individual coaching needs of the teacher and identify their strengths and weaknesses in instructional practice. The data collected was used for formative assessment.

Evaluation of Collaborative Professional Development.

The third element to be evaluated was collaborative professional development. The short-term goal of this element was to facilitate professional growth in instructional practice. The long-term goal of collaborative professional development was to build the capacity of the school to maintain its professional growth. A closed-ended survey (see Appendix G) was used to determine whether the teachers perceived the grade level planning sessions and PLCs as effective. The closed-ended survey was administered at the end of the school year. Data collected from this survey was used for summative assessment.

Evaluation of Increased Student Achievement.

Finally, the fourth element to be evaluated was increased student achievement. The short-term goal of this element was to increase student achievement by five percent. The long-term goal was for at least 75% of students to reach their target goal. The IPG was used to gauge the implementation of effective teaching practices.

The NWEA/MAP is a research-based assessment that measures growth and proficiency. The NWEA/MAP is a 45-minute personalized assessment aligned to common core standards that adapts based on students' responses. The assessment was administered three times during the school year. This assessment was used to determine student growth and the number of students that reach the target score.

Data Analysis

The purpose of this study was to increase the content and pedagogical knowledge of teachers while engaging in organizational learning. The action plan developed to accomplish the goal of building the teachers' instructional capacity incorporated collective, collaborative and individual professional development as a means of strengthening the instructional practices of teachers to increase student achievement. Throughout the implementation of the action plan, quantitative and qualitative data were collected and analyzed to evaluate the action plan.

Each piece of data collected was used to answer one or more of the research questions presented earlier in this chapter (see Appendix K). Research question number one was addressed using the data collected from the NWEA/MAP assessment. The data collected was analyzed to determine the average growth of the students in mathematics. The number and percentage of students who met their goal was indicated by department, class and grade level.

Research question two was addressed using data collected from instructional practice guides, field notes/weekly support logs, teacher interviews, PLC surveys, and learning walk/focus groups. The data collected was used to provide a descriptive and quantitative analysis of the professional development activities in which each teacher was involved. The instructional practice guide was used to document the professional development services that were provided to the teachers as indicated in the next steps section of the IPG document. The field notes/weekly

support log was analyzed to determine the number and frequency of interactions, a description of the types of interactions, and the amount of time engaged. The teacher interview data was also used to document the frequency of visits and verify supports the teachers received. The data collected from the learning walk/focus group was used to identify strengths and weaknesses of each teacher as well as determine the necessary individualized professional development needed. The data obtained from the learning walk/focus group began the initial process of developing the individualized professional development plan.

Research question three was addressed using data collected from the IPG, teacher interviews, NWEA/MAP data, teacher surveys, PLC surveys and professional development surveys. The IPG was used to document the teachers' progress throughout the coaching process. The data collected from the IPG was used to determine if the teacher is utilizing the feedback and suggestions from observations during instruction or planning. The teacher interviews were used to determine the teachers' perceived benefits of coaching. The NWEA/MAP data was used to identify trends in student achievement throughout the coaching process. The teacher surveys were used to determine if teachers are implementing more of the eight mathematical practices. The PLC survey determined the teachers' perceptions of work done in professional learning communities. Table two provides an alignment of the data collection tools, the research questions and an explanation of how the tools will be used to answer the research questions.

Table 2

Research Questions, Data Collections Tools and Explanation Alignment

Research Question	Data Collection Tool	Explanation
Did the action plan result in 75% of students reaching their NWEA/MAP target score in mathematics?	NWEA/MAP data	The NWEA/MAP data was used to determine the percentage of students who met the target scores set forth by the teacher and students.
Was the coaching/professional development plan implemented correctly?	Instructional Practice Guide (IPG)	The instructional practice guide was used to document the professional development services provided by the instructional support math advisor. After each observation, the instructional support math advisor indicated the next steps in the professional development process.
	Instructional support math advisor's field notes/weekly support log	The field notes / weekly support log provided documentation on the follow through of the next steps. It also documented any additional supports provided by the instructional math support advisor.
	Teacher Interview	The teacher interview was used to document the frequency of visits by the instructional support advisor as well as verify the coaching supports the teachers received.
	PLC Survey	The PLC survey was used to determine if the PLC aspect of the professional development was implemented properly.
	Learning Walk/ Focus Group	Identifies the strengths and weaknesses of each teacher around which coaching services were provided. The learning walk/ focus group began the initial process of developing the individualized professional development plan.
What successes were identified as a result of the implementation process?	Instructional Practice Guide (IPG)	The instructional practice guide was used to document progress throughout the coaching process. Are the teachers implementing the suggestions provided when given feedback? To what extent are the suggestions being implemented?

	Teacher Interview	The teacher interview was used to determine the teachers' perceived benefits of coaching.
	NWEA/MAP data	The NWEA/MAP was used to identify trends in student achievement through out the coaching process.
	Teacher Survey	The teacher survey was used to document teachers' progress in implementing the eight mathematical teaching practices in the day-to-day instruction.
	PLC survey	The PLC survey was used to determine the teachers' perceptions of the work done in the professional learning communities.
	Professional Development Survey	The professional development survey provided data of the teachers' perceived benefits of each professional development session.
What, if any, are the negative outcomes created by the program implementation?	Instructional Practice Guide (IPG)	The instructional practice guide was used to document progress throughout the coaching process. Are the teachers implementing the suggestions provided when given feedback? To what extent are the suggestions being implemented?
	Teacher Interview	The teacher interview was used to document the teachers' perceived benefits of instructional coaching
	NWEA/MAP data	The NWEA/MAP was used to determine trends in student achievement through out the coaching process.
	Teacher Survey	The teacher survey was used to determine teachers' progress in implementing the eight mathematical teaching practices in the day-to-day instruction.
	PLC survey	The PLC survey was used to document the teachers' perceptions of the work done in the professional learning communities.

	Professional Development Survey	The professional development survey provided data of the teachers' perceived benefits of each professional development session.
To what extent, if any, did the implementation of the action plan lead to increased organizational capacity?	PLC survey	The PLC survey provided the teachers' perceptions of the professional learning community and the extent of its effectiveness.
	Teacher Survey	The teacher survey documented the change, if any, in the teachers' perceived implementation of the eight mathematical teaching practices.
	Instructional practice guide (IPG)	The instructional practice guide documented the changes in the teachers' instructional practice with regards to content and pedagogical knowledge throughout the year.

Coding.

The researcher listened to all audio recordings of the interview session at least two times to become familiar with the data. Once the researcher completed listening to the audio recordings, the researcher assigned each interviewee a pseudonym (such as Teacher A). The audio recordings were then transcribed and grouped by the conceptual frameworks (mathematics instruction, building capacity, and instructional coaching). For example, transcriptions of the questions in the interview protocol that address mathematics instruction were grouped together with the interviewee's pseudonym listed beside the transcribed response. The document produced was then reviewed with a focus on the major topics that appear and how they support the conceptual frameworks. A second review of the document was conducted to find illustrative quotations aligned with the conceptual frameworks.

Interim Analysis.

Once the interviews were completed, the instructional leadership team (ILT) conducted a focus group/learning walk to gather data on the instructional practices of teachers. The data were

gathered through the observational notes of the individual members of the team and typed. Each team member's notes were assigned a pseudonym. The researcher read the notes and highlighted pertinent information. The document was read again with a focus on the major topics connected to the aforementioned conceptual frameworks.

After completing the focus group/learning walk, the ILT met immediately to conduct a focus group session. The researcher audio recorded the session. The researcher listened to the recording to become familiar with the information. After the second listening session, the researcher summarized the focus group session. The session was also transcribed. The transcribed document was reviewed for relevant information and illustrative quotations connected with the conceptual frameworks.

Observations were conducted throughout the study. The observations were conducted by the instructional mathematics advisor. Each teacher's observation was given a pseudonym. The researcher read the data gathered by the observer. A second reading of the observation was conducted and focused on math instructional practices and identifying pertinent information. The data was then organized by core action two indicators of the Instructional Practice Guide (IPG), recommendation/feedback (glows and grows), and next steps of the instructional math coach/advisor to identify trends in the data.

Matrix Development.

A research checklist and concept-clustered matrix (see Appendix I) was also used to analyze the data obtained in this study. The research checklist was used to connect the evidence found in the interviews, observations and focus groups to relevant research. The concept-clustered matrix will identify evidence (such as quotes, documents and observations) and themes

aligned with the conceptual frameworks constructs (mathematical instruction, building teacher capacity, and instructional coaching).

Conclusion

Building the organizational capacity of a school demands the cooperation and collaboration of stakeholders in the development and implementation of the action plan. The goal of this action plan was to develop the content and pedagogical knowledge of teachers to increase student achievement in mathematics. As teachers develop their content and pedagogical knowledge, they increased and strengthened their use of effective mathematical practices which leads to increased organizational capacity and student achievement. A collaboratively developed action plan along with measurable goals and an evaluation plan was executed to increase the organizational capacity of Bulldog Middle School. Chapter Four reveals the findings for this research study.

Chapter IV:

RESULTS

Introduction

The purpose of the current study was to build the capacity of middle school mathematics teachers to increase student achievement. The study was initiated to address the issue of low content and pedagogical knowledge of middle school mathematics teachers as well as low student achievement in the area of mathematics at Bulldog Middle School. The applied research study with program evaluation began with a thorough investigation of literature on capacity building, instructional coaching, effective mathematics instruction and student achievement, as well as professional development. The analysis of the literature revealed capacity building as a key component of the educational transformation and turnaround process. The literature explored professional development and instructional coaching as means of building the capacity of teachers both individually and collectively to strengthen the school's capacity. Finally, the literature review unveiled effective mathematics instruction implemented through the usage of eight the mathematical teaching practices as a valid approach to increasing the learning experiences of students.

The literature discussed in Chapter Two formed the foundation for the development of the action plan presented in Chapter Three. Chapter Three explained the methodology of the study. The chapter included the action plan for addressing the issue of low content and pedagogical knowledge of teachers and a program evaluation for assessing whether the program goals were met. The action plan presented in Chapter Three outlined the different elements of the

program such as collaborative, collective, and individualized professional development. Various tools including surveys, interviews, observations, and focus groups/learning walks were employed to evaluate the elements. Chapter Three also addressed which data collection tools were used to answer each research question as well as an explanation of the alignment. All data collected were analyzed, and the results are presented in this chapter.

In Chapter Four, the results are presented in response to each of the research questions. First, Chapter Four contains an account of the evaluation of each element and answers the following research questions which were presented in Chapter One:

1. Did the action plan result in 75% of students reaching their NWEA/MAP target score in mathematics?
2. Was the coaching/professional development plan implemented correctly?
3. What successes were identified as a result of the implementation process?
4. What, if any, are the negative outcomes created by the program implementation?
5. To what extent, if any, did the implementation of the action plan lead to increased organizational capacity?

Secondly, this chapter reports the results of the data collected in efforts to evaluate the overall program, its execution, and the impact on the stakeholders' knowledge, behavior, awareness, and/or attitudes. Also, an account of the organizational improvement/learning or lack thereof are reported are reported in this chapter. Afterwards, a data comparison of the 2017-2018 and 2018-2019 school years are presented. Finally, the chapter concludes with a summary of the results.

Research Question One

The first research question sought to determine if 75% of the students who were taught middle school mathematics at Bulldog Middle reached their target score in mathematics. The

NWEA/MAP assessment was utilized as a tool to determine the percentage of students who met the target scores set forth by the teacher and the students. The assessment was administered three times during the 2018-2019 school year. The first assessment was used to establish a baseline for each student. The second and subsequent NWEA/MAP assessments were used to determine the growth and student progress towards mastery.

Upon completing each assessment, the students were assigned a RIT (Ready for Instruction Today) score based upon their performance on the assessment. Then, the students in collaboration with the teacher were entrusted with determining a goal for the next assessment of the NWEA/MAP. In the case of Bulldog Middle, the students, teachers and other stakeholders elected to use the projected growth set forth by NWEA as goal for the next assessment. After completing the series of NWEA assessments, more than half of the student population met or exceeded their growth target score in mathematics. Although over half of the student population met or exceeded projected growth, the goal of 75% of the student population reaching their projected growth was not accomplished as more than 200 students either did not meet their projected growth score or regressed over the course of the implementation of the action plan.

The middle school mathematics teachers administered the first assessment during the August 29 –September 19 window set forth by the district. The assessment was administered online. As shown in table three, during the first administration of the assessment, Bulldog Middle School assessed 210 sixth grade students, 237 seventh grade students and 222 eight grade students. The average RIT score for sixth grade was 197.9. The average RIT scores for seventh and eighth grade were 202.2 and 208.7 respectively. The district grade level mean RIT score was 206.3 for sixth grade, 212.5 for seventh grade, and 218.1 for eighth grade. The standard

deviation (SD) of the data set was 15.4, 18.4, and 18.7 respectively for sixth, seventh and eighth grade.

Table 3

Fall 2018 NWEA Data

Grade	Total Number of Students	Mean RIT	Standard Deviation (SD)	District Grade Level Mean
Sixth Grade (6)	210	197.9	15.4	206.3
Seventh Grade (7)	237	202.2	18.4	212.5
Eighth Grade (8)	222	208.7	18.7	218.1

In the first administration of the NWEA/MAP, the results also indicated at the sixth-grade level, 64 students scored at or above the district grade level mean RIT. According to table four, 69 seventh graders and 68 eighth graders scored at or above the district grade level mean RIT. The norm grade level means RIT in sixth, seventh, and eighth grade were 217.6, 222.6 and 226.3 respectively. Of the 210 students assessed in sixth grade, 18 students scored at or above the norm grade level mean RIT. In seventh grade, 34 out of the 237 students scored at or above the norm grade level mean RIT. Thirty-three of the 222 students in eighth grade scored at or above the norm grade level mean RIT.

Table 4

Fall 2018 Students At or Above Norm and District Level Mean

Grade	Students At or Above District Grade Level Mean RIT	Percentage of Students At or Above District Grade Level Mean RIT	Norm Grade Level Mean RIT	Students At or Above Norm Grade Level Mean RIT	Percentage of Students At or Above Norm Grade Level Mean RIT

Sixth Grade (6)	64	30.48%	217.6	18	8.57%
Seventh Grade (7)	69	29.11%	222.6	34	14.35%
Eighth Grade (8)	68	30.63%	226.3	33	14.86%

As shown in table five, the results of the fall administration of the NWEA/MAP assessment projected more than 58% of the sixth-grade students would score in Below category of the state assessment (given at the end of the year). About 34% of the students in sixth grade would score in Approaching category, and 7.6% in the On-Track category. Seventh grade projections yielded more than 64% of student scoring in Below, about 30% in Approaching and 4.6% in On-Track. About 67% of the eighth-grade students were projected to score in Below, about 29% in Approaching, and less than 4% On-Track. The assessment projected none of the students (0%) would aspire to the Mastery category in all grade levels.

Table 5

Fall 2018 TN Ready Projections

Grade Student	Count	Below		Approaching		On-Track		Mastered	
		Count	Percent	Count	Percent	Count	Percent	Count	Percent
6	210	122	58.1%	72	34.3%	16	7.6%	0	0%
7	237	153	64.4%	73	30.8%	11	4.6%	0	0%
8	222	150	67.6%	64	28.8%	8	3.6%	0	0%
Total	669	425	63.5%	209	31.2%	35	5.2%	0	0%

The second NWEA/MAP assessment was administered during the district mandated window of November 29- December 19. The teachers at Bulldog Middle School administered

the assessment during mathematics classes in grades six through eight. According to table six, approximately 245 sixth grade students took the winter NWEA/MAP assessment. The mean RIT for sixth grade was 203.4 with a standard deviation of 14.5. The district and norm grade level mean for sixth grade on the second administration of the NWEA assessment were 209.2 and 221 respectively. Approximately 91 sixth grade students scored at or above the district grade level mean and 33 students scored at or above the norm grade level mean.

In seventh grade, 238 students assessed using the NWEA/MAP assessment. The mean RIT for seventh grade was 205.2 with a standard deviation 18.8. The district and norm grade level means were 215 and 225.3 respectively. Approximately 76 seventh grade students scored at or above the district grade level mean and 26 at or above the norm grade level mean.

Finally, in eighth grade, 239 students were administered the NWEA/MAP assessment. The mean RIT score for Bulldog Middle School eighth graders was 212.4 with a standard deviation of 18.8. The district and norm grade level means were 220.8 and 228.5 respectively. The number of students scoring at or above the district and norm grade level means were 92 and 46 respectively.

Table 6

Winter 2019 NWEA Data

Grade	Total Number of Students	Mean RIT	Standard Deviation (SD)	District Grade Level Mean
Sixth Grade (6)	245.0	203.4	14.5	209.2
Seventh Grade (7)	238.0	205.2	18.8	215.0
Eighth Grade (8)	239.0	212.4	18.8	220.8

Table 7

Winter 2018 Students At or Above Norm and District Level Mean

Grade	Students At or Above District Grade Level Mean RIT	Percentage of Students At or Above District Grade Level Mean RIT	Norm Grade Level Mean RIT	Students At or Above Norm Grade Level Mean RIT	Percentage of Students At or Above Norm Grade Level Mean RIT
Sixth Grade (6)	91	37.14%	221	33	13.47%
Seventh Grade (7)	76	31.93%	225.3	26	10.92%
Eighth Grade (8)	92	38.49%	228.5	46	19.25%

Based upon the data from the fall and winter administration of the NWEA/MAP assessment, the mean scores of each grade level increased. Sixth grade experienced a 2.78% increase in RIT mean scores. Seventh grade increased its mean score average by 1.48% and eighth grades mean increased 1.77 %. The average of the mean score increase among grades 6 through 8 was 4.07 points.

Table 8

Difference Between Fall and Winter Mean

Grade	Fall Mean	Winter Mean	Difference of Fall and Winter Means	Percent Change between Fall and Winter Mean
6	197.9	203.4	5.5	+2.78%
7	202.2	205.2	3.0	+1.48%
8	208.7	212.4	3.7	+1.77%

When examining the fall and winter scores, the results yielded 42.19% and 83.33% increase in sixth grade students scoring at or above the district and norm grade level mean respectively. Seventh grade experienced an increase of 10.14% in the number of students scoring at or above the district grade level mean. However, when the comparing the norm grade level

mean RIT for fall and winter, seventh grade experienced a decline of 23.53% in the number of students scoring at or above the norm grade level mean RIT. Eighth grade experienced an increase in the number of students scoring at or above the district and norm grade level means of 35.29% and 39.39% respectively.

Table 9

Difference Between Fall 2018 and Winter 2019 Norm and District Mean

Grade	Fall Number of Students At or Above District Mean	Winter Number of Students At or Above District Mean	District Percent Change between Fall and Winter	Fall Number of Students At or Above Norm Mean	Winter Number of Students At or Above Norm Mean	Norm Percent Change between Fall and Winter
6	64	91	42.19%	18	33	83.33%
7	69	76	10.14%	34	26	(23.53%)
8	68	92	35.29%	33	46	39.39%

With regard to student growth from fall to winter, approximately 195 students in sixth grade had valid beginning and ending scores available to calculate growth. One hundred twenty-eight, or 65.6%, of sixth grade students met their projected growth score. Two hundred fifty-six seventh grade students had valid beginning and ending scores to calculate growth. Approximately 151, or 59%, of seventh-grade students met or exceeded their growth projections score. In eighth grade, there were 217 students with valid beginning and ending scores. According to the results obtained from NWEA portal, 128, or 59%, of eighth-grade students met their growth projections score. The total number of students with valid beginning and ending scores was 668, and out of those students 407, or 60.93%, of students met or exceeded their growth projection.

Table 10

Students Meeting Growth Projection Scores Fall 2018 to Winter 2019

Grade	Number of Students with Valid Beginning and Ending Scores	Number of Students Who Met Growth Projection Score	Percentage of Students Who Met Growth
6th	195	128	65.60%
7th	256	151	59.00%
8th	217	128	59.00%

The growth results from fall 2018 to winter 2019 of the six middle school mathematics teachers' class are reported in Table 11 below:

Table 11

Fall 2018 to Winter 2019 Growth by Teacher

Teacher	Grade	Number of Students with Valid Beginning and Ending Scores	Number of Students Who Met Growth Projection Score	Percentage of Students Who Met Growth
Teacher A	6	98	67	68.37%
Teacher B	6	97	61	62.89%
Teacher C	7	134	83	61.94%
Teacher D	7	122	68	55.74%
Teacher E	8	113	76	67.26%
Teacher F	8	104	52	50.00%
Total		668	407	60.93%

The final administration of the NWEA/MAP assessment was given February 25-March 8. Each teacher administered the assessment in his/her classroom. According to Table 12, approximately 234, 235, and 233 students were assessed in sixth, seventh, and eighth grades respectively. The mean RIT score was 205.6 in sixth grade, 207.6 in seventh grade and 215.1 in

eighth grade. The standard deviation ranged from 14.9 to 19.2 in sixth through eighth grade. The district grade level means for grades six through eight ranged from 212 to 222.9.

Table 12

Spring 2019 NWEA Data

Grade	Total Number of Students	Mean RIT	Standard Deviation (SD)	District Grade Level Mean
Sixth Grade (6)	234	205.6	14.9	212
Seventh Grade (7)	235	207.6	19.2	217.6
Eighth Grade (8)	233	215.1	19	222.9

Table 13 indicates approximately 32.92% of the students in sixth grade scored at or above the district grade level mean. Approximately 29.71% and 40.66% of students scored at or above the district grade level mean in seventh and eighth grade respectively. Also, according to Table 13, 9.82% in sixth grade, 13.19% of seventh and 23.61% of eighth grade students scored at or above the norm grade level mean RIT.

Table 13

Spring Students At or Above Norm and District Level Mean

Grade	Students At or Above District Grade Level Mean RIT	Percentage of Students At or Above District Grade Level Mean RIT	Norm Grade Level Mean RIT	Students At or Above Norm Grade Level Mean RIT	Percentage of Students At or Above Norm Grade Level Mean RIT
Sixth Grade (6)	80	32.92%	224.2	23	9.82%
Seventh Grade (7)	71	29.71%	227.8	31	13.19%
Eighth Grade (8)	98	40.66%	230.4	55	23.61%

According to Table 14, the growth from winter to spring indicates approximately 229 students had valid beginning scores in sixth grade and of those students 104 or 45.41% met or exceed growth. In seventh grade, 224 students had valid beginning and ending scores and 114 or 50.89% of the students met or exceed the growth projection. Of the 219 students with valid scores in eighth grade, 112 or 51.14% of the eighth-grade students met or exceeded their growth projection score.

Table 14

Students Meeting Growth Projection Scores Winter to Spring (Grade Level)

Grade	Number of Students with Valid Beginning and Ending Scores	Number of Students Who Met Growth Projection Score	Percentage of Students Who Met Growth
6th	229	104	45.41%
7th	224	114	50.89%
8th	219	112	51.14%

The spring 2019 results for the six middle school teachers' classes are reported below in table 15.

Table 15

Students Meeting Growth Projection Scores Winter to Spring (Teacher)

Teacher	Grade	Number of Students with Valid Beginning and Ending Scores	Number of Students Who Met Growth Projection Score	Percentage of Students Who Met Growth
Teacher A	6	121	55	45.50%
Teacher B	6	108	49	45.40%
Teacher C	7	111	54	48.60%
Teacher D	7	113	60	53.10%
Teacher E	8	106	53	50.00%
Teacher	8	113	59	52.20%

F			
Total	672	330	49.11%

According to Table 16, the number of sixth-grade students who met or exceeded their projected RIT score at Bulldog Middle School from fall 2018 to spring 2019 was approximately 107 or 56.91%. In seventh grade, 123 or 57.75% of students met or exceeded their growth score. According to the table, approximately 121 or 61.11% of eighth-grade students met or exceeded their growth score. Overall, 351 or 58.60% of the students at Bulldog Middle School met or exceeded their growth score.

Table 16

Students Meeting Growth Projection Scores Fall to Spring (Teacher)

Teacher	Grade	Number of Students with Valid Beginning and Ending Scores	Number of Students Who Met Growth Projection Score	Percentage of Students Who Met Growth
Teacher A	6	95	52	54.7%
Teacher B	6	93	55	59.1%
Teacher C	7	107	59	55.1%
Teacher D	7	106	64	60.4%
Teacher E	8	95	67	70.5%
Teacher F	8	103	54	52.4%
Total		351	599	58.60%

Research Question Two

The second research question sought to determine if the coaching/professional development plan was implemented correctly. Several of the data collection tools were utilized to answer this research question. The SWOT analysis, learning walk data, instructional practice

guide, advisor field notes, teacher interviews, and PLC surveys collected throughout the study were used to assess whether the coaching/professional development plan was implemented correctly. The results of the study revealed the coaching/professional development plan was not implemented correctly.

SWOT analysis. The initial process of building the teacher's instructional capacity began with conducting a Strengths, Weaknesses, Opportunities and Threats Analysis (SWOT Analysis) of each school. The SWOT Analysis for Bulldog Middle School was conducted on August 16, 2018. During the SWOT Analysis, the Instructional Support Team (Instructional Leadership Director, Instructional facilitator, Mathematics Manager, and Instructional Support Mathematics Advisors) observed the instruction of mathematics teachers and the content/collaborative planning session. The Instructional Support Team (IST) noted the trends of each grade level. The trends of each school were compiled into a document and submitted to the Lead Principal of the school.

Table 17

Grade 6 SWOT Analysis Advisor Notes

Grade	Strengths	Weaknesses
6	Classroom management	Lesson closure: The lessons were not closed
	Implementation of Eureka: Both teachers are implementing the curriculum	Lesson pacing
	Standards and Student Outcomes are posted and stated	
	Collaborative planning between the two teachers is evident.	

Table 18

Grade 7 SWOT Analysis Advisor Notes

Grade	Strengths	Weaknesses
7	Teachers were allowing for student representations by asking some students to show their representations on the white board. In one classroom, students were allowed to take Eureka materials as textbooks outside the classroom in order to complete homework assignments. One teacher classroom environment is conducive to high levels of classroom management. Routines, procedures, expectations are evident. During planning period, professional development on smart board operations were delivered to teachers by smart board representative	Both classrooms displayed limited to no use of Eureka Math materials. Materials were used for the last ten minutes of class and/or for homework. One teacher's classroom management may cause some interferences with the delivery of instruction. One teacher's classroom lack lesson closure to provide student with a summary of their learning for the day. Based on the delivery of lessons, there was limited evidence of grade level collaborative planning as each teacher had different (non-Eureka) activities for their lesson.

Table 19

Grade 8 SWOT Analysis Advisor Notes

Grade	Strengths	Weaknesses
8	Teachers are prepared- the materials to deliver instruction were ready (just not from Eureka) Classroom Management Evidence of collaboration- the teachers' presentation of the lesson was identical in terms of materials	Not full use of Eureka Prepared questioning for conceptual Development

Table 20

Content Planning/PLC SWOT Analysis Advisor Notes

Grade(s)	Strengths	Weaknesses
6, 7, & 8	All members of the math team, teachers, instructional resource teachers, and admin. Lead are present and participate in discussions.	Discussion focused on schedule and practices, not content During meeting, there are limited opportunities for teachers to share supports when teachers mention students not mastering different parts of the standard

After completing the analysis of each school, the schools were designated into three tier levels based upon trends of the school with tier one (1) indicating the schools in need of the least amount instructional support and tier three (3) schools in need of the most instructional support. Bulldog Middle was identified as a tier two (2) school. The instructional support mathematics advisors and manager identified curriculum interaction as central concern of Bulldog Middle. Eureka curriculum interaction was identified as an area of need because only two of the six teachers used the curriculum with fidelity.

With curriculum interaction identified as an area of concern with the mathematics team at Bulldog Middle School, the instructional support advisors along with the mathematics manager developed a plan to support the mathematics team. The plan involved providing the mathematics team with three levels of support. The first level of support was targeted towards the administrative content lead. The advisors reasoned that they would not be able to provide support on a daily basis to the teachers; therefore, the administrative content lead would have to be able to lead the work.

As a result of this decision, the instructional support team provided professional development to the administrative content lead on how to analyze lesson plans based upon the curriculum. During the two-hour professional development session, the administrative content lead was given the process, engaged in guided practice, and practiced independently the process of analyzing lesson plans. The administrative content lead was also assigned a bridge to practice assignment in which they were to analyze a teacher's lesson plan provide feedback. Prior to sending the feedback, the administrative content lead was asked to send the plan along with the feedback to an instructional support advisor for critiques.

The second level of support around curriculum interaction involved collaborative planning. During the grade level collaborative planning session, the instructional support mathematic advisors were present at various planning sessions to support the content, suggest strategies for implementation, and serve as a thought partner to the teachers. The third and final level of support around curriculum interaction entailed the instructional support mathematics advisors conducting side by side planning session using the curriculum. These sessions were individualized, organized by the instructional support mathematics advisor, and based upon an upcoming lesson delivered by the teacher. The expectation was that each teacher scheduled for a lesson planning session would complete the pre-work of analyzing the lesson. During the session, the teacher and advisors engaged a thorough discussion of the instructional decisions made and, on several occasions, indulged in deliberate practice of the lesson. Once the advisor and the teacher planned together, the advisor then observed the planned lesson, provided feedback indicated next steps in the coaching process.

Learning walk. Next, a learning walk/focus group was conducted on October 23, 2018. The participants of the learning walk/focus group included the IST and Bulldog Middle School's

mathematics administrative content lead. During this process, the instructional facilitator focused on the inclusion aspect of the instruction. Before conducting the learning walk/focus group, the participants determined the parameters of the learning walk such as scheduling who would go where and for how long. The participants observed a total of six mathematics teachers during the walk as well as an inclusion teacher. Each participant in the walk observed one grade band, which included two teachers of the same grade level, and one teacher from another grade level. Each participant utilized the instructional practice guide (IPG) to observe the teachers.

After the learning walk/focus group, the IST along with the content administrative lead met to discuss their findings. After coming to a consensus, the members of the learning walk/focus group identified five trends within mathematics instruction at Bulldog Middle School. One of the trends the learning walk/focus group found was disparate instruction practiced in inclusion classes. According the findings of the learning walk/ focus group, a "major difference in the cognitive demand expectations between inclusion classes and non-inclusion classes" was observed. The learning walk/focus group also observed the trend of a "disconnect between the teaching styles/philosophies of the inclusion and general education teacher."

The third trend identified was most of the lessons observed did not meet the intended goal. Members of the learning walk/focus group indicated the goal of the lesson was not realized by the teachers and thus did not translate to student demand. Although most of the lessons within the Eureka curriculum contain lessons with explicit goals, some have implicit goals. The lesson observed by members of the learning walk/focus group had implicit goals the teacher did not bring out during the course of the lesson. The fourth trend found during the learning walk/focus was the use of gradual release. The members of the team explained that where the goal of the lesson is implicit, the lesson is almost always an exploratory lesson and gradual

release is not necessary. The final trend observed during the learning walk/ focus group was inauthentic student engagement. Several members of the learning walk/focus group observed classes in which the students were not engaged in the mathematics but instead practices that were not grade appropriate.

As a result of the learning walk/ focus group, the members of the group established goal for the mathematics team at Bulldog Middle School. The goal was by December 19, 2018, the teachers at Bulldog Middle School would "gain a common understanding of how to deliver high quality instruction focused on specific learning targets measured through IPG walkthroughs." In order to achieve the goal, the learning/walk focus group suggested the mathematics team engage in differentiated professional development centered on internalizing Mathematical Teaching Practices one (MTP 1) and six (MTP 6) as well as aligning the IPG/TEM and MTPs.

The members of the learning walk/focus group also suggested the mathematics team engage in safe practice of a lesson prior to delivering the lesson to students to ensure the intended goals of the lesson are brought out. The members suggested the practice take place amongst themselves (during the collaborative planning or PLC) or with an advisor to ensure feedback was given. The members of the learning walk/focus group also recommended the mathematics team engage in peer observations or reflective practice (video themselves using the Swivl technology). The learning walk/ focus group members stated the instructional support team (IST) would support the mathematics team by providing professional development on MTP 1 to ensure teacher learned how establish mathematical goals to focus the learning, MTP 6 to build procedural fluency from conceptual understanding and analyze student work to identify possible gaps in instruction. As a result of the learning walk/focus group's findings, the members recommended National Council of Teachers of Mathematics' book; *Principles to Actions:*

Ensuring Mathematical Success for All as a professional reading (specifically pages 12-16 on MTP1).

The instructional support mathematics advisors also met as a team after the learning walk/focus group to develop a strategy to support the mathematics team at Bulldog Middle School. The instructional support mathematics advisors provided support based upon the findings of the learning walk/focus group, their knowledge of the teachers and previous observations conducted using the IPG over the last nine weeks. The advisors aligned the findings of the learning walk/focus group with core action 2A of the IPG.

As seen in Figure 1, the advisors decided to place Teachers A and C placed on the cycle of support. Both Teachers A and C exhibited extensive knowledge of mathematical content pertaining to their grade level and were leaders or had the potential to become a content lead within the school. Teacher B also exhibited knowledge of the sixth-grade content and had the potential to become a leader but only one teacher per grade level could be placed on the cycle of support per quarter. Teachers D, E, and F were placed on side-by-side and PLC/collaborative planning support because of their refusal to fully engage students in the district adopted curriculum. Instructional Support Mathematics Advisors were only allowed to provide support around the district adopted curriculum in side-by-side sessions.

Figure 1: Types of Support

Focus:	**Core Action 2:** Employ instructional practices that allow all students to learn the content of the lesson. **2A:** The teacher makes the mathematics of the lesson explicit through the use of explanations, representations, tasks, and/or examples. **Mathematical Teaching Practice 1:** Establish mathematics goals to focus learning. **Mathematical Teaching Practice 6:** Build procedural fluency from conceptual understanding.		
Teacher	***Cycle of Support***	***Side-by-Side***	***PLC/Collaborative Planning***

A	X		
B		X	X
C	X		
D		X	X
E		X	X
F		X	X

Teachers placed on the cycle of support were seen at least twice a week. During the cycle of support interactions, the advisors were required to meet with the teachers at least twice a week over the course of the cycle. Advisors were also required to attend the PLC or Collaborative planning sessions at least once per month. During the administration of the individualized support, 84 touches were made with teachers at Bulldog Middle School. Of those 84 touches, Teachers A and C interacted with advisors at least 30 (13 and 17 respectively) times during the course of the year. The advisors also made contact with the administrative content lead an additional seven times during the school year to discuss goals and supports for teachers.

Collective support. Teachers also received support collectively throughout the year. The iZone Instructional Support Team provided professional development to teachers in the form of collaboratives. Teachers came to these grade level professional development sessions during the months of September, October, November, and February. In the September collaborative session, the teachers learned to backwards map assessment items within in the Eureka curriculum using various tools. The October session focused on familiarizing the participants with the Eight Mathematical Teaching Practices. November's session objective was to engage the participants in the process of analyzing student work using the Equip Protocol and Eureka's Progression

Towards Mastery Document. No collaborative sessions were scheduled during the months of December or March. In January 2019, the teachers attended District Learning Day (DLD) sessions which included three professional development sessions. The first professional development session entitled "Doing the Math and Connecting Representations" focused on helping teachers work commonly missed problems and proper use of models and/or representation to work mathematical problems. The second session, "Data Rich, Action Poor: Data Driven Instruction", focused on using the Assess, Analyze and Act Inquiry Cycle of Data instruction to reinforce and enhance student success. Finally, the last session presented during DLD entitled, "People, Not Processes, Make Impactful Changes: Instructional Focus", involved participants determining the instructional practices essential to targeting student progress across the learning continuum.

At the end of each collaborative session, each teacher was given the opportunity to take a survey. Data from the February survey indicates 100% of the participants strongly agreed or agreed that the goals of the session were clearly defined. More than 70% of the participants strongly agreed the professional development sessions strengthened their knowledge of Mathematical Teaching Practice One (MTP 1). About 16% of the participants agreed the session strengthened their knowledge of MTP1 as well and around 11% of them disagreed. With regards to the extent of which the professional development session was relevant to the mathematics department, 95% of the participants either strongly agreed or agreed the professional development session was relevant and would be useful in their work. All of the participants strongly agreed or agree the presenters were knowledgeable. Overall, 95% of the participants indicated they were satisfied overall with the professional development session.

Research Question Three

The third research question sought to determine if there were successes identified as a result of the implementation process. Various data collection tools were used to identify successes as a result of the implementation process. Data collection tools included the IPG, Teacher interviews, NWEA/MAP data as well as Teacher, PLC and Professional Development Surveys. Each tool was used throughout the study to identify individual and/or collective successes throughout the year.

Throughout the year, the mathematics team members were observed numerous times by the instructional support advisor. After each observation, the advisor provided the teachers with feedback and next steps. The information gathered from each observation was used to determine next steps for the observed. The advisor worked with each teacher to provide support specific to their needs. Advisor kept a log of their interactions with teachers as well as their progress throughout the year.

In sixth grade, one success observed in Teacher A's classroom was the increased practice of sharing student work (MTP 3 and Core Action 2B). In the beginning of the school year, Teacher A would work all of the problems at the board and students shared their answers with the class verbally when called upon. As the year progressed, the teacher allowed the students to come to the board and share the solution paths and/or representations with the class. The teacher encouraged and facilitated discussion around the various solution paths presented. After students began to share their work, the advisor suggested a document camera to maximize instructional time and eliminate students rewriting their work over again on the board for the class.

Teachers E and F improved significantly in posing purposeful questions (MTP5 and Core Action 2C). According to the math advisor, the two teachers began the year providing students

with procedural lessons. As time progressed, the teacher began to pose more purposeful questions to push students towards the conceptual understanding of lessons (when called for by the standard). The advisor also indicated the teachers were using the district mandated curriculum. In the beginning of the school year, the teachers did not utilize the curriculum. Instead of using the curriculum, the teachers created their own notes for students in their classes. According to the advisor, the teachers eventually began to utilize the problems in the curriculum frequently incorporated them in their note pages.

Another success acknowledged by the seventh-grade advisor was the development of Teacher C's understanding of the "big picture" of the connectedness of the modules in the curriculum. The advisor indicated Teacher C saw the lesson as isolated pieces in the beginning of the school year and has since gained an understanding of how the concepts within the modules of the curriculum are connected.

Data collected from teacher interviews indicate teachers found engaging in a reflective process, getting content specific feedback, and strategy suggestions were valuable tools in helping them improve their instructional practice. Teacher C stated:

> "So, what the coaches do for me is all those things forced me to self-reflection because if I want to be what I say, I want to be, which is serving to the kids, then my needs can't always be at the forefront. …….So, with that being said, you've got to have a certain amount of self-reflection. So, one of the things that I noticed from the coaches that come in, is always just sharing strategies that could work. Not necessarily turn down what you're doing, but always looking at ways to improve them. So, having another set of eyes, ears is always good because most of us always believe we're great!"

Teacher A also stated she takes the feedback and strategies suggested by her coach and implements them to improve her lesson.

Research Question Four

The purpose of the fourth research question was to ascertain if negative outcomes were derived from the program implementation. Several data tools were used to collect information to answer this question. These tools included the IPG, teacher interviews, and NWEA/MAP data. Professional development, PLC and teacher surveys were also used to answer this question. One negative outcome was identified in connection with the program implementation. One trend of the data collected from teacher interviews was that some teachers felt some of the professional development offerings were repetitive and therefore, not beneficial because they had already mastered the material. Teachers also indicated their attendance at repetitive professional development sessions becomes a matter of compliance and they often felt as if they were "spinning their wheels" as a result.

Research Question Five

The fifth research sought to determine to what extent, if any, the implementation of the action plan lead to increased organizational capacity. Tools such as the PLC and Teacher Surveys along with the IPG were used to answer research question five. These tools served as an indicator of teachers' perceptions on effectiveness of professional learning communities, implementation of the eight mathematical practices, as well as documented the changes in the teachers' instructional practice throughout the year.

An analysis of the data indicated the organizational capacity of the school grew considerably as a result of the program implementation. As the end of the school year neared, the school members began to take more of an initiative in analyzing the school's instructional

practices. The instructional support team did not lead the last learning walk conducted at the school. Instead, the school conducted their own learning walk, determined the area of needed improvement and developed their own cycle of professional learning to address the needs. The school identified MTP4 as an area of need. The cycle of professional learning (CPL) developed as a result of the identified need consisted of a professional read (*NCTM's Principles to Action*), a professional development session, and implementation of one week of safe practice. The instructional support team was invited to the professional development session for support but did not facilitate the professional development session.

Data from the PLC survey (see Table 20) indicated the mathematics team engaged positively in PLCs to meet the needs of their students. Data also suggests PLC members were committed to development of the students, school and the professional learning community. As noted in Table 20 from the PLC survey, 100 % of the strongly agree PLC members worked together to learn and implement new skills. One hundred percent of the strongly agree PLC members were committed to the improvement of the school and increasing student achievement. Also, 100 % of PLC members indicated they strongly agreed or agreed the use of data analysis as means of determining the effectiveness of instructional practices.

Table 21

PLC Survey Results

Question	Strongly Agree	Agree	Strongly Disagree	Disagree
PLC members work together to learn and implement new skills at work.	66.67%	33.33%	0%	0%
PLC members are committed to the improvement of the school and increasing student achievement.	100%	0%	0%	0%

PLC members work together to develop and implement plans to meet the needs of students.	100%	0%	0%	0%
PLC members learn through engaging in collective discourse.	66.67%	33.33%	0%	0%
PLC members respect each other's ideas.	66.67%	33.33%	0%	0%
PLC members are committed to the implementation of the curriculum.	66.67%	33.33%	0%	0%
PLC members conduct data analysis to determine if their instructional practices are productive.	66.67%	33.33%	0%	0%
My instructional practices have changed as a result of actively participating in PLCs.	66.67%	33.33%	0%	0%
My classroom instruction has improved as a result of actively participating in PLCs.	66.67%	33.33%	0%	0%

Comparison of 2017-2018 with 2018-2019

Table 22

Growth Summary Comparison 2017-2018 and 2018-2019

	2017-2018 School Year (SY)			2018-2019 School (SY)		
	6th	7th	8th	6th	7th	8th
Percentage of Students who Met or Exceeded their Projected Growth	43.22%	51.65%	47.97%	56.91%	57.75%	61.11%

According to Table 21, the in 2017-2018 SY 43.22% of students in sixth grade met or exceeded their projected growth. Approximately, 51.65% and 47.97% of seventh and eighth

grade students, respectively, met or exceeded their growth during the 2017-2018 SY. At the end of the 2018-2019 SY, 56.91% and 57.75% of sixth and seventh grade students met or exceed their projected growth score. In eighth grade, 61.11% of the students met or exceed their forecasted growth score.

Table 23

Projected Proficiency Comparison

Grade	Below		Approaching	
	2017-2018	2018-2019	2017-2018	2018-2019
6	62.6%	62.1%	28.0%	30.9%
7	60.2%	65.3%	36.3%	29.7%
8	72.7%	59.3%	19.8%	36.1%

Data presented in Table 22 shows 62.6% and 62.1% of sixth grade students were projected to score in the Below category of the TNReady Assessment for the 2017-2018 and 2018-2019 Sys respectively. Approximately 60.2% (2017-2018 SY) and 65.3% (2018-2019 SY) of seventh grade students were forecasted to score in the Below category. In eighth grade, 72.7% (2017-2018 SY) and 59.3% (2018-2019) of the students were projected to score in the Below category.

Of the sixth-grade students in 2017-2018, 28.0% were projected to score in the Approaching category on the TNReady Assessment. Approximately 30.9% of sixth grade student in 2018-2019 SY were forecasted to score in the Approaching category. In seventh grade, 36.3% (2017-2018 SY) and 29.7% (2018-2019 SY) were projected to score in the Approaching

category. In eighth grade 19.8% and 36.1% of students were projected to score in the Approaching category for the 2017-2018 and 2018-2019 school years, respectively.

Table 24

Projected Proficiency Comparison continued

Grade	On Track		Mastery	
	2017-2018	2018-2019	2017-2018	2018-2019
6	9.3%	7.0%	0%	0%
7	3.5%	5.0%	0%	0%
8	7.5%	4.6%	0%	0%

According to Table 23, 9.3%, 3.5% and 7.5% of sixth, seventh and eighth grade students, respectively, were forecasted to score on track for the TNReady Assessment for the 2017-2018 SY. Projections for the 2018-2019 SY indicated 7.0%, 5.0%, and 4.6% of sixth, seventh, and eighth grade students would score on track on the TNReady Assessment. Projections for both years indicated no students would score in the Mastery category on the TNReady Assessment.

Conclusion

Although all of the program goals were not fully achieved, results suggested a substantial amount of growth among Bulldog Middle School students. The results of the study also suggest organizational improvement among the stakeholders as referenced by the collaboration in implementing the program as well as the self-initiated learning walk and development of the CPL. Chapter four also highlights the successes of teachers in expanding their content knowledge and embracing new challenges such as the implementation of the curriculum. All of the results presented in Chapter four suggest Bulldog Middle faculty and staff are making

headway in building the school's organizational capacity. Chapter Five provides further recommendations for building the organization's capacity, details the limitations of the study, and compares the findings results of 2018-2019 with results from the previous year.

Chapter V:

DISCUSSION

Introduction

The purpose of this applied research study was to build the capacity of Bulldog Middle School's mathematics teachers. This research study sought to increase student achievement in mathematics through the development of teacher content and pedagogical knowledge. Several strategies were used to develop the content and pedagogical knowledge and practices of teachers. These research-based strategies included job-embedded professional development as well as instructional coaching, collaborative planning, professional learning communities and professional development in the form of grade-level collaboratives. In addition to the research-based strategies utilized, five research questions were used to guide the study. These questions sought to determine if the implementation of the action plan led to 75% or more of the students meeting their projected RIT score. The questions also sought to determine the successes and/or negative outcomes of the implementation of the action plan as well as the extent to which the implementation lead to increased organizational capacity.

This chapter presents a discussion of the findings presented in Chapter Four as well as conclusions based upon those findings and recommendations. First, a discussion which includes the five program standards and analyzes and interprets the findings presented in Chapter Four. Then, a summary of the organization's involvement and development throughout the process. Following the summary, a response to whether the goals of the program were met, highlights of contributing factors and limitations associated with achievement of the goals, and an evaluation

of the program are discussed. Finally, a narrative of the researcher's inferences and recommendations based upon the findings and results are addressed.

Program Evaluation Standards

The five program evaluation standards--utility, feasibility, propriety, accuracy, and accountability--were used to evaluate the implementation of the program. According to Yarbrough et al. (2011), the five program standards provide a logical way to examine the caliber of a program to build capacity in response to the needs of the stakeholders which ultimately leads to improvement of the program and contributes to the organization's value.

Utility, according to Yarbrough et al. (2011), is supported by eight standards and seeks to examine the extent to the evaluation processes and products are valuable in meeting the stakeholder's needs. The program implemented in this study allowed for all stakeholders to gain from the increased instructional capacity of teachers. Teachers learned new teaching strategies and developed their content knowledge which improved their instruction. As a result of improved instruction, students gained a stronger conceptual foundation in mathematics. The instructional leaders and other stakeholders participated in the learning walk/focus groups which allowed them to provide input throughout the process. The organizational leaders also gained valuable insight into how to assess and develop a plan of action to increase the capacity of the organization.

The next program standard utilized to evaluate the program was the standard of feasibility. Yarbrough et al (2011), describes feasibility as "the extent to which resources and other factors allow an evaluation to be conducted in a satisfactory manner" (p.288). With regards to the program implemented, several resources are required to successfully replicate the study. These resources include time, content specialist in the area of mathematics, willingness of

stakeholders and/or participants to engage in the program, and access to programs to track students' progress such as NWEA or STAR.

The third program standard, propriety, speaks to the fairness, legality and ethics of the program (Yarbrough et al., 2011). To ensure the program was enacted using all the attributes of propriety, the researcher received Collaborative Instructional Training Initiative (CITI) training before the development of the program. The training included several modules focused on protecting the rights of students and participants, federal regulations, informed consent, privacy and confidentiality, as well as ethical principles. In addition to the CITI training, the program description along with the various data collection tools were submitted to the University of Mississippi's Institutional Review Board (IRB) for approval. The approval also required the consent of the researcher's dissertation chair. To maintain compliance all surveys were completed anonymously. Each participant was informed of his/her rights with regards to the study as well as the right to withdraw from the study at any time. All qualitative data obtained from teachers and /or advisors during interviews or coaching session were kept confidential.

Accuracy, the fourth program standard, addresses the element of integrity with regards to conclusions and the findings. According to Yarbrough et al. (2011), accuracy attends to approximately eight standards which include reliability, validity, reduction or error and bias, data collection, data analysis, logic, conclusions and communication. Several types of data were collected during the study. These data types include interviews, advisor notes, focus groups/learning walks, surveys and observations. Data collected for this research study can be validated through district records and/or voice recordings obtained with the permission of participants. Some data presented in the research was collected through various conversations and/or interactions with stakeholders and therefore, were not cataloged after each interaction.

Some data presented in the study may have been affected by changes implemented during the program. For instance, RIT scores for seventh-grade are not based on one teacher's instruction but a compilation of teachers. This was due to aforementioned teacher changes throughout the year.

According to Yarbrough et al. (2011), the fifth and final program standard, accountability, examines the methodology of the study. The focus of this standard is to ensure sufficient documentation is obtained throughout the study. Documentation of each element presented in Chapter Three was obtained throughout out the evaluation process. For example, the teachers participated individualized planning sessions with instructional support advisors. Therefore, the dated notes detailing the sessions serve as documentation of this element. The researcher maintained all data and/or documentation of the evaluative process throughout the study. Also, researcher analyzed the quantitative and qualitative data according to the methods outlined in Chapter Three. All findings reported are supported through documents and data collected throughout the evaluation process.

Personnel and structural changes

Bulldog Middle School was placed on the state priority school list of 2012. As a result of being on the state priority school list, Bulldog Middle School was placed in the EXCEL department of Bark County Schools. This department specializes in school turnaround. School turnaround is a process which involves building the organizational capacity of schools to increase and sustain student achievement. This department provides priority schools with specialized supports such as instructional coaches/advisors as well as professional development to build the capacity of the schools.

Since its designation as a priority school, Bulldog Middle School has experienced changes in the school's culture and climate as well as the faculty and staff. Over the last three years, several changes occurred at Bulldog Middle School or the district level that had a significant impact on the organization's engagement in turnaround process as well as its ability to increase student achievement.

2016-2017 SY. During the 2016-2017 school year, Bulldog Middle School endured several changes that had a significant impact on the school's ability to build its capacity. At the beginning of school year, the EXCEL department lost an instructional advisor which decreased the amount of support the department was able to provide. The department was down to two advisors who services more than 12 schools combined. As a result, the manager of the advisors provided support to mathematics teachers at Bulldog Middle. However, because of the manger's other duties, support was limited.

After about three months of limited support, a new advisor was hired to provide support to middle schools. This advisor was assigned to Bulldog Middle School. The advisor was trained for approximately one month before being released to work independently in November. The advisor noted, after start of providing support to the school, the mathematics department was short one eighth-grade mathematics teacher. To accommodate the shortage, the principal elected to move the eighth-grade creative writing teacher to the mathematics team. Although the teacher was certified in mathematics, the teacher's content and pedagogical knowledge was limited.

At the end of the 2016-2017 school year, several faculty members indicated they would not return for the 2017-2018 at Bulldog Middle School. The principal was promoted to another position within the EXCEL department. One of the sixth-grade mathematics team members accepted an advisor position in the department as well. The other sixth-grade mathematics

teacher left Bulldog Middle to pursue a career outside of education. The recently added eight-grade teacher did not return to the school as well. These departures lead to a significant deficit in the faculty at Bulldog Middle.

2017-2018 SY. At the end of the 2016-2017 school year, a new principal was identified for Bulldog Middle School. The new principal hailed from another school in the department where he served as the assistant principal. New sixth and eighth-grade teachers were hired. The sixth-grade teacher was an experienced elementary teacher and was new to the school and sixth-grade mathematics curriculum. The other sixth-grade teacher was moved from the social studies team at Bulldog Middle to teach mathematics. The eighth-grade teacher was a second-year alternate route teacher who completed her student teaching at Bulldog Middle years earlier in sixth-grade.

The 2017-2018 school year also began with several changes regarding advisor support provided to the school. Before the start of school, an advisor was assigned to the school. However, prior to the beginning of the school year, the advisor accepted another position outside of the department. Another advisor was deployed to a district high school due an overwhelming shortage of mathematics teachers. This left the department with one middle school mathematics advisors, who was not familiar with seventh and eighth-grade curriculum, to support nine middle schools at the beginning of the school year. As a result, support provided to Bulldog Middle School was extremely limited. At the beginning of October, one advisor returned from deployment and was assigned Bulldog Middle School. Shortly thereafter, the advisor was rehired and once again, Bulldog Middle was reassigned to that advisor.

Structural changes also occurred during the 2017-2018 because of new leadership. These changes included the new procedures for changing classes, class schedules, and faculty changes.

Faculty changes during the 2017-2018 school year included a shortage of an assistant principal due to medical leave. These changes were detrimental to school's structure, teacher morale and students' behavior.

2018-2019 SY. At the end of the 2017-2018 school year, only one teacher on the mathematics team left. To replace the seven-grade mathematics teacher, the principal hired a seasoned middle school mathematics teacher. Prior to the end of the first semester, the teacher announced his departure from the school. The mid-year replacement for the teacher was the six-grade teacher who left after the 2016-2017 school year to pursue a career outside of education.

Another announcement made mid-year was that the other seventh-grade teacher received a promotion. The seventh-grade mathematics teacher was promoted to PLC coach as the former coach was promoted to assistant principal. While in search for another seventh-grade mathematics teacher, the current teacher would continue to teach and perform his PLC duties.

Discussion.

Throughout the implementation of the action plan, there were several deviations from the original plan that may have impacted the results of the study. At the beginning of the school year, the organizational structure of the EXCEL department changed. Instead of the instructional support advisors reporting to the manager, advisors reported to the ILD (Instructional Leadership Director). The middle school ILD was a former elementary principal with an English and Language Arts background. A new manager was also hired to work with the advisors to build content and coaching knowledge as well as refine coaching practices. The ILD assigned the advisors to grade levels instead of schools. Therefore, there were three advisors assigned to Bulldog Middle School with one per grade level instead of one per school.

As a result of the organizational change, changes were made to the structure of support provided to the teachers. On October1st, the ILD held a support team meeting. The meeting included all advisors and managers from each subject area. The meeting was centered around the 90- Day Instructional Support Plan. The plan outlined support for August through November. In August, the advisors' focus was data collection. During the month of August, advisors were to ensure teachers had access to and were using the district mandated curriculum. Advisors also collected various notes on planning and co-planning lesson structures within the schools as well as observed school-based planning sessions. In addition to aforementioned advisor tasks, the advisors also engaged side-by-side lesson planning session which included safe practice opportunities with teachers.

Another deviation from the plan was the learning walk/focus group. Initially, the learning walk/focus group involved each person focusing on one indicator of the IPG. However, when the plan was enacted, each person who participated in the learning walk used the entire IPG when observing. Also, the learning walk was only implemented three of the quarters. One advisor noted, "I felt like the last walkthrough was not effective." She went on to state that earlier learning walks/focus groups allowed her to spend at least 45 minutes each class whereas, the last one she spent fifteen minutes in the class which was not enough to get a complete picture of instruction.

In reflection on the results presented in Chapter Four, the results of research question one indicated Bulldog Middle did not meet its goal to have 75% of their students meet their projected RIT score. The results show that a little more than half of the students met their projected RIT score. There are several factors that may have contributed to school not meeting the set goal. In looking at the scores for seventh-grade, there was a significant back slide in their scores. During

the winter administration of NWEA, scores in seventh-grade plummeted with more than 23.53% of students, who previously scored at or above the norm grade level mean, not meeting the norm mean for the winter administration. The regression may be product of a combination of things such as the departure of one of the seventh-grade teachers, the reluctance of a teacher to buy into the full implementation of the curriculum or over exhaustive implementation of procedural lesson without connections to conceptual understanding.

After speaking with one of the teachers regarding RIT projection goals, the teachers indicated goals were not set by the students. Instead, the goal set by the NWEA system was used a gauge of growth. Students also did not take the test in May. The final administration of the NWEA assessment was given in March after Spring Break. The original date of May would have allowed for the students to receive more than four weeks of additional instruction.

Another factor that might have attributed to the students not meeting the 75% goal was the limited amount of interaction with instructional coaches. After the first nine weeks, the instructional focus for advisors changed. During the second nine weeks, there was a focus placed on providing more time to teacher placed on the cycle of support. The advisor could only place one teacher, from all the schools supported, on the cycle of support and other teachers would only be seen on a limited basis. Furthermore, teachers placed on the cycle of support were more seasoned teachers with a moderate to high level of content and pedagogical knowledge. This left teacher who struggled with content and pedagogy with limited interactions and support from advisors. Bulldog Middle had two of its six teachers placed on the cycle of support.

With regards to the implementation of coaching/professional development plan, there were several intervening factors contributed to deviation of the proposed course of action. Throughout, the school year supports offered and provided by advisors changed. At the

beginning of the year, support was provided around planning for all teachers. The second nine weeks supports provided using the cycle of support, observations and feedback, and PLC support. Towards the third nine weeks, individualized supports to teachers were extremely limited and PLC continued. During these times, teachers began to ask advisor when they were coming back for follow-up and advisors could not definitively answer. This was because of the inconsistency perpetuated by EXCEL administration.

Collective support was provided to teachers and reported in Chapter four. However, no collaborative sessions were offered during the months of December and March. Originally, there were to be collaboratives that month and then the collaborative for December was changed to a celebration with no content or pedagogical practices addressed. EXCEL administration cancelled the celebration and decided to deliver treats to teachers. The March collaborative was cancelled due to conflict with another EXCEL event.

Limitations of the Study

Several limitations surfaced as the study progressed. One limitation identified was the number of participants. In the initial action plan, six teachers were anticipated to participate in the study. At the beginning of the study, two of the participants declined to participate in the data collection process. After Teacher D departed, the replacement teacher opted not to participate in the study as well. This left a total of three participants who participated in the data collection process. Two of the three participants participated in the interview process.

Another limitation to the study was district research approval. After receiving IRB approval for the study, the district was provided with the approval letter and district approval process began. District approval was not received until September 26, 2018. Once this document was received, the researcher began to collect data from participants. The researcher was given

limited access to participants during school hours for data collection. Also, access to professional development surveys developed by the EXCEL department was denied.

Comparison of 2017-2018 SY and 2018-2019 SY

According to data presented in Chapter Four (*see* Table 21), when tracking students from sixth-grade to seventh grade, an increase of 14.53% was observed in the students who met or exceeded their projected growth met. Also, students tracked from seventh-grade to eighth-grade had a noticeable increase of about 10% in the number of students who met or exceeded the projected growth. No data was available to track the eighth-grade students to ninth grade.

The percentage of sixth-grade students projected to score below mastery increased by 2.7% (*see* Table 22) as those students were tracked in seventh-grade for the 2018-2019 SY. The projected proficiency of seventh grade students in 2017-2018 SY was 60.2%. As these students were tracked in eighth grade during the 2018-2019 SY, 59.3% of the students were projected to score below mastery; a decrease of 0.9%.

According to Table 23, approximately 9.3% of sixth-grade students were projected to be on track for the TNReady Assessment during the 2017-2018 school year. However, projections for the 2018-2019 SY indicated only five percent of those students will score on track which is 4.3% lower than the previous SY. When tracking students in seventh-grade during 2017-2018 SY, data indicates a 1.3% increase in the percentage of those students slated to be on track on the TNReady Assessment. During both school years, no students were projected to score at the mastery level during both school years.

Although there is an increase in the projections between the 2017-2018 SY and 2018-2019 S, there is still a considerable amount (more than half) of students functioning below grade

level. Over 93% of the students at Bulldog Middle School are considered to have minimal to limited capability of understanding their grade level standards and/or skills.

Recommendations

Future research on this subject could be strengthened by a larger and more inclusive sample size. The sample size in this research study consisted of only three teachers; two of which were in the same grade level. A larger sample size to include all the teachers from the school and inclusive of all grade levels, would strengthen the study significantly. Access to professional development survey data would also be beneficial in providing a more thorough analysis of the impact of professional development on teachers' practices. Additionally, further research should include consistent application of instructional coaching services to strengthen the validity of the results.

Consistency in the strategy and services provided to teachers will lead to more thorough assessment of teachers' content and pedagogical knowledge as well as strategic methodology in developing their area of weakness. Considering the recent findings of inconsistencies throughout the program, leadership has opted to develop all instructional support team members in training on coaching teachers. Incorporating a unified strategy for developing teachers will help to maintain consistency among the support team, teachers and school administration. Beginning in the 2019-2020 SY, advisors will use the protocols outlined in *Get Better Faster: A 90 Day Plan for Coaching New Teachers* (Bambrick-Santoyo, 2016) to streamline the coaching process. This is just one of many strategies to be implemented in the EXCEL department as the department attempts to turnaround 24 schools within two school years.

Conclusion

This research study was implemented with a focus of developing the instructional capacity of middle school mathematics teachers. As the research progressed, it was found that in order to facilitate change, everyone had to be motivated and dedicated to the cause of increasing student achievement. The involvement of stakeholders was extremely valuable in this study because in this program, the improvement of one's own practice created small, yet substantial, change which led to improvement of the organization's practices as a whole. As each teacher dedicated him/herself to improving their instructional practice, the organization began to see significant improvement and instructional gains. The organization acquired and strengthened the instructional practices needed to improve student achievement through their shared learning experience.

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APPENDICES

APPENDIX A: ACTION PLAN

Action Plan/Logic Model

Elements	Goals	Timeline	Who	Evaluation Data
Collective Professional Development	Short term – Increase the content and pedagogical knowledge of teachers Long term – Change the instructional practices of middle school mathematics teachers	July 2018 – March 2019	Instructional Support Math Advisor Team, Outside Professional Developers and Teachers	Professional development survey (Appendix B) Instructional practice guide (Appendix C) Sign-In sheets
Individual Professional Development	Short term – Develop teachers' capacity to plan effective lessons using NCTM's (2014) eight mathematical teaching practices Long term – Develop the capacity of teachers to consistently implement lessons the exemplify effective instructional practices and rooted in conceptual understanding	August 2018-Spring 2019	Instructional Support Math Advisor, ILT, Teachers	Instructional practice Guide (Appendix C) Teacher interview (Appendix D) Teacher survey (Appendix E) Learning walk/focus group (Appendix F) Instructional support math advisor's field notes/weekly support log (Appendix J)
Collaborative Professional Development	Short term – Facilitate professional growth in instructional practice Long term – Build the capacity of the school to maintain its professional growth	August 2018-Spring 2019	Instructional Math Support Advisor, Content Lead, and Teachers	PLC survey (Appendix G)
Increased Student Achievement	Short term – Increase student growth by five percent Long term – 75% of the students reach their target goal	October 2017-March 2019	Teachers, Instructional Math Support Advisors, Students, and Content Lead	NWEA/MAP data

APPENDIX B: PROFESSIONAL DEVELOPMENT SURVEY

Professional Development Survey

General Research Topic: Building capacity of middle school math teachers

Specific Research Questions: What successes were identified as a result of the implementation process?

Conceptual frameworks: *building teacher capacity, mathematics instruction, instructional coaching*

Statement of Consent:

This survey is part of an applied research study to fulfill partial requirements for a Doctor of Education degree for LaShonda Ross-Ivory from The University of Mississippi. The study is examining capacity building of middle school mathematics teachers. Any questions regarding the project and its findings can be emailed to:

lashondaivory@yahoo.com
lross@go.olemiss.edu

Any questions can also be directed to the Dissertation Chair, Dr. Jill Cabrera Davis, by email or by phone at The University of Mississippi:

jdcabrer@olemiss.edu; (662)915-2989 (office)

Thank you for taking the time to speak with me about your experiences as a teacher. The information you provide today will help us understand the instructional needs of the school and best ways to provide supports to teachers. Protecting your rights is of utmost importance to us. Any identifiable information will be removed from the responses you give. Please respond to each item.

	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree
1.This professional development session increased my content knowledge in mathematics.					
2.This professional development session strengthened my knowledge of effective teaching practices in mathematics.					
3.The goals of the professional development session were clearly defined.					
4.The topics discussed in the professional development session were relevant to me.					
5.The training provided in this professional development session will be useful in my work.					
6.The presenter was very knowledgeable.					
7. I am satisfied with the professional development I received today.					

APPENDIX C: INSTRUCTIONAL PRACTICE GUIDE

Date: Advisor:

Teacher Name: School:

Grade: Lesson:

Learning Goal:

Standard(s) addressed in this lesson:

CORE ACTON 2: Employ instructional practices that allow all students to learn the content of the lesson.	
Indicator	**Evidence**
A. The teacher makes the mathematics of the lesson explicit through the use of explanations, representations, tasks, and/or examples. The mathematics presented is clear and correct.	
B. The teacher provides opportunities for all students to work with and practice grade-level problems and exercises.	
C. The teacher strengthens all students' understanding of the content by strategically sharing a variety of students' representations and solution methods.	
D. The teacher deliberately checks for understanding throughout the lesson and adapts the lesson according to student understanding.	
E. The teacher facilitates the summary of the mathematics with references to student work and discussion in order to reinforce the purpose of the lesson.	
Feedback/Recommendations	**Next Steps**

Adapted from *The Instructional Practice Guide: Coaching tool* by Achieve the Core, 2016.

Retrieved from https://achievethecore.org/content/upload/IPG_Coaching_Math_k-8.pdf

APPENDIX D: TEACHER INTERVIEW

General Research Topic: Building capacity of middle school math teachers

Specific Research Questions: Was the coaching /professional development plan implemented correctly? What successes were identified as a result of the implementation process?

Conceptual frameworks: *building teacher capacity, mathematics instruction, instructional coaching*

Statement of Consent:

This interview is part of an applied research study to fulfill partial requirements for a Doctor of Education degree for LaShonda Ross-Ivory from The University of Mississippi. The study is examining capacity building of middle school mathematics teachers. Any questions regarding the project and its findings can be emailed to:

lashondaivory@yahoo.com
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Any questions can also be directed to the Dissertation Chair, Dr. Jill Cabrera Davis, by email or by phone at The University of Mississippi:

jdcabrer@olemiss.edu; (662)915-2989 (office)

Academic Background

1. How long have you been in the education field?
2. How long have you been teaching mathematics?
3. How long have you been teaching at Bulldog Middle School?
4. At what level do you have the most teaching experience (elementary, middle or high school)?

Instructional Practice

1. Describe a typical mathematics lesson in your class.
2. What types of instructional techniques are most frequently employed during the course of one of your mathematics lessons?
3. Tell me ways you differentiate your instruction.
4. Has instructional coaching had any affect on your instructional practice? If so, how?

Building Capacity

1. What are the instructional expectations for mathematics teachers at Bulldog Middle School?
2. What area(s) of instruction do you feel are your strengths? Why?
3. What area(s) of instruction do you feel you need the most improvement? Why?

Coaching Services Received

1. How often do you receive visits from your instructional coach or content lead?
2. Describe the coaching services you most often receive.
3. What coaching services do you feel are the most beneficial for you?
4. Which coaching services provided are the least beneficial to you?
5. What expectations do you have for an instructional coach?

APPENDIX E: TEACHER SURVEY

General Research Topic: Building capacity of middle school math teachers

Specific Research Questions: What successes were identified as a result of the implementation process?

Conceptual frameworks: *building teacher capacity, mathematics instruction, instructional coaching*

Statement of Consent:

This survey is part of an applied research study to fulfill partial requirements for a Doctor of Education degree for LaShonda Ross-Ivory from The University of Mississippi. The study is examining capacity building of middle school mathematics teachers. Any questions regarding the project and its findings can be emailed to:

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lross@go.olemiss.edu

Any questions can also be directed to the Dissertation Chair, Dr. Jill Cabrera Davis, by email or by phone at The University of Mississippi:

jdcabrer@olemiss.edu; (662)915-2989 (office)

Thank you for taking the time to complete this survey. The information you provide today will help us understand the instructional needs of the school and best ways to provide supports to teachers. Protecting your rights is of utmost importance to us. Any identifiable information will be removed from the responses you give. We want you to feel comfortable answering any questions fully and honestly. Please respond to each item.

	Never	Rarely	Sometimes	Often	In all or most lessons
I engage students in purposeful sharing of mathematical ideas, reasoning, and approaches, using varied representations.					
I select and sequence student approaches and solution strategies for whole-class analysis and discussion.					
I facilitate discourse among students by positioning them as authors of ideas, who explain and defend their approaches.					

I ensure progress toward mathematical goals by making explicit connections to student approaches and reasoning.					
I identify what counts as evidence of student progress toward mathematics learning goals.					
I elicit and gather evidence of student understanding at strategic points during instruction.					
I interpret student thinking to assess mathematical understanding, reasoning, and methods.					
I make in-the-moment decisions on how to respond to students with questions and prompts that probe, scaffold, and extend.					
I reflect on evidence of student learning to inform the planning of next instructional steps.					
I advance students' understanding by asking questions that build on, but do not take over or funnel, students' thinking.					
I make certain to ask questions that go beyond gathering information to probing thinking and requiring explanation and justification.					
I ask intentional questions that make the mathematics more visible and accessible for student examination and discussion.					
I allow sufficient wait time so that more students can formulate and offer responses.					

	Never	Rarely	Sometimes	Often	In all or most lessons
I anticipate what students might struggle with during a lesson and am prepared to support them productively through the struggle.					
I give students time to struggle with tasks and ask questions that scaffold students' thinking with stepping in to do the work for them.					
I help students realize that confusion and errors are a natural part of learning, by facilitating discussions on mistakes, misconceptions, and struggles.					
I praise students for their efforts in making sense of mathematical ideas and perseverance in reasoning through problems.					
I select tasks that allow students to decide which representations to use in making sense of the problems.					
I allocate substantial instructional time for students to use, discuss, and make connections among representations.					
I introduce forms of representations that can be useful to students.					
I ask students to make math drawings or use other visual supports to explain and justify their reasoning.					
I design ways to assess students' abilities to use representations meaningfully to solve problems.					

	Never	Rarely	Sometimes	Often	In all or most lessons
I ask students to discuss and explain why the procedures that they are using work to solve particular problems.					
I connect student-generated strategies and methods to more efficient procedures as appropriate.					
I provide students with opportunities for distributed practice of procedures.					

Adapted from National Council of Teachers of Mathematics. (2014). Principles to actions: Ensuring mathematical success for all. Reston, VA: NCTM, National Council of Teachers of Mathematics.

APPENDIX F: LEARNING WALKS/FOCUS GROUPS

General Research Topic: Building capacity of middle school math teachers

Specific Research Questions: Was the coaching /professional development plan implemented correctly? What successes were identified as a result of the implementation process?

Conceptual frameworks: *building teacher capacity, mathematics instruction, instructional coaching*

Statement of Consent:

This focus group is part of an applied research study to fulfill partial requirements for a Doctor of Education degree for LaShonda Ross-Ivory from The University of Mississippi. The study is examining capacity building of middle school mathematics teachers. Any questions regarding the project and its findings can be emailed to:

lashondaivory@yahoo.com
lross@go.olemiss.edu

Any questions can also be directed to the Dissertation Chair, Dr. Jill Cabrera Davis, by email or by phone at The University of Mississippi:

jdcabrer@olemiss.edu; (662)915-2989 (office)

Thank you for taking the time to speak with me about your experiences as a teacher. The information you provide today will help us understand the instructional needs of the school and best ways to provide supports to teachers. Protecting your rights is of utmost importance to us. Any identifiable information will be removed from the responses you give. We want you to feel comfortable answering any questions fully and honestly. With that being said, are you willing to proceed with the focus group?

1. What are some strengths you observed in each class? Grade level?
2. What are some weaknesses you observed at each class? grade level?
3. What trends are present throughout the department?
4. What are your noticings or wonderings around your given indicator? (provide evidence)
5. How would you rate the teacher based upon your given indicator? (provide evidence)

APPENDIX G: PROFESSIONAL LEARNING COMMUNITIES (PLC) SURVEY

General Research Topic: Building capacity of middle school math teachers

Specific Research Questions: What successes were identified as a result of the implementation process?

Conceptual frameworks: *building teacher capacity, mathematics instruction, instructional coaching*

Statement of Consent:

This survey is part of an applied research study to fulfill partial requirements for a Doctor of Education degree for LaShonda Ross-Ivory from The University of Mississippi. The study is examining capacity building of middle school mathematics teachers. Any questions regarding the project and its findings can be emailed to:

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lross@go.olemiss.edu

Any questions can also be directed to the Dissertation Chair, Dr. Jill Cabrera Davis, by email or by phone at The University of Mississippi:

jdcabrer@olemiss.edu; (662)915-2989 (office)

Thank you for taking the time to complete this survey. The information you provide today will help us understand the instructional needs of the school and best ways to provide supports to teachers. Protecting your rights is of utmost importance to us. Any identifiable information will be removed from the responses you give. We want you to feel comfortable answering any questions fully and honestly. Please respond to each item.

1=Strongly Disagree (SD) 2= Disagree (D) 3=Agree (A) 4= Strongly Agree (SA)

	SD	D	A	SA
PLC members work together to learn and implement new skills at work.				
PLC members are committed to the improvement of the school and increasing student achievement.				
PLC members work together to develop and implement plans to meet the needs of students.				
PLC members learn through engaging in collective discourse.				
PLC members respect each other's ideas.				
PLC members are committed to the implementation of the curriculum.				

PLC members conduct data analysis to determine if their instructional practices are productive.				
My instructional practices have changed as a result of actively participating in PLCs.				
My classroom instruction has improved as a result of actively participating in PLCs.				

APPENDIX H: IPG ANALYSIS DOCUMENT

Teacher Pseudonym	**Core Action Two:** Employ instructional practices that allow all students to learn the content of the lesson.					**Glow**	**Grow**	**Next Steps**
	Indicator A	Indicator B	Indicator C	Indicator D	Indicator E			

APPENDIX I: CONCEPT CLUSTER MATRIX

Conceptual Frameworks Construct(s)	**Themes**	**Evidence**		
		Pertinent Quotes	**Documents**	**Observations**
Mathematics Instruction				
Building Teacher Capacity				
Instructional Coaching				

APPENDIX J: FIELD NOTES/ WEEKLY SUPPORT LOG

Day	School/Location	Action	Individual(s) Involved
Monday			
Tuesday			
Wednesday			
Thursday			
Friday			

VITA

LaShonda Q. Ross-Ivory

EDUCATION

2011
Specialist in Education, Supervision and Administration, Delta State University

2008
Master of Arts, Teaching, Mississippi Valley State University

2003
Bachelor of Science, Business Administration, University of Mississippi

ACADEMIC EMPLOYMENT

2016-Present
Instructional Support Mathematics Advisor, Shelby County Schools: iZone

2014-2016
Assistant Principal, Leflore County School District, Leflore County Elementary School

2011-2014
High School Mathematics Teacher, Greenville Public School District

2008-2010
Middle School Mathematics Teacher, Leflore County School District

2005-2008
Elementary Mathematics Teacher, Leland School District

2004-2005
High School Mathematics Teacher, Coahoma Agricultural High School

PROFESSIONAL CREDENTIALS

7-12 Business Education, Mississippi License

7-12 Mathematics Education, Mississippi License

Administrator, Career Level, Mississippi License

7-12 Business Education, Tennessee License

7-12 Mathematics Education, Tennessee License

ILL-B Beginning Administrator, Tennessee License

Superintendent, Administrator, Tennessee License

PROFESSIONAL AFFLIATIONS

National Institute for School Leadership (NISL)

Mississippi Professional Educators (MPE)