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ESTABLISHING AND CLARIFYING THE ROLES AND RESPONSIBILITIES OF K-12 MATHEMATICS COACHES IN A RURAL URBAN SCHOOL DISTRICT IN CENTRAL FLORIDA

by

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A dissertation in practice submitted in partial fulfillment of the requirements
for the degree of Doctor of Education
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ABSTRACT

The goal of this dissertation in practice was to define the roles and responsibilities of K-12 mathematics coaches in a rural, urban school district in central Florida. To do this, coach roles and responsibilities from existing coaching approaches were examined. The roles and responsibilities were closely examined for alignment with the objectives of the work of the coach – improving instruction and increasing student achievement. The result was proposed roles and responsibilities for K-12 mathematics coaches in Targeted County School District in central Florida.

Review of the literature found that clearly delineated and communicated roles and responsibilities are vital to the success of mathematics coaches. Poorly defined and/or communicated roles and responsibilities result in barriers that prevent the coach from meeting the objectives of his/her job: improving instruction and student achievement. Clearly established and communicated job responsibilities for mathematics coaches positively impact the effectiveness of the coach, resulting in support for teachers and students and, in turn, a positive impact on student achievement. Research suggests that in addition to instructional practices, teachers also need support in content knowledge, curriculum, assessment, and data analysis.

The proposed roles and responsibilities developed as a result of this research will be used to establish clear job descriptions for elementary and secondary mathematics coaches in Targeted County, Florida.

ACKNOWLEDGMENTS

This process, this journey, has been a long time in the making. As with all aspects of life, this experience has shaped, and was shaped by, many dimensions: work, friends, family, and my own self-motivation. In the end, I have attained another personal goal and prepared myself for the next step(s) in my life. This would not have been possible without the guidance, support, and encouragement from many stakeholders.

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I have also been blessed to work with great role models. Penny Noyer and Michael Allen, you have provided me with the best training grounds a teacher could receive. Thank you for your leadership. There are many staff members from Horizon Middle School who have impacted my growth – too many to mention and if I tried I would surely (and unintentionally)

miss someone. Therefore, a collective thank you goes out to all of the staff members from Horizon whom I had the pleasure to work with over the span of 15 years.

I also learned quite a bit about myself from my very first teaching post and administrator. How can one forget a principal who calls you into his office to tell you "your expectations are too high; you need to learn to accept mediocrity?" That conversation resonates with me to this day - and my expectations are still high.

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This has by no means been a solo effort.

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CHAPTER 1 CONTEXT AND HISTORY OF PROBLEM

1.1 Problem of Practice

In the School District of Targeted County, Florida, K-12 mathematics coaches do not have clearly defined job descriptions and have expressed a sense of frustration regarding stakeholder perceptions of their roles and responsibilities. Because there is a lack of clarity in the job description of the coaches, this dissertation in practice will provide proposed mathematics coach roles and responsibilities, grounded in research, for use by the district to ensure a clear understanding of the work of the coach for all stakeholders. Intended outcomes also include improved instruction in mathematics and positive effects on student achievement, both objectives of the work of the coach.

To date, the School District of Targeted County, Florida (SDTC) published two job descriptions relevant to the job of mathematics coaches. Last updated in 2006, the district posted a job description for the position of "Secondary Mathematics/Science Coach." This job description applies to mathematics and science coaches serving grades 6-12. The district also published a job description for the position of "Elementary Mathematics/Science Coach" for those coaches serving grades K-5. Both job descriptions generically defined the roles and responsibilities of the coach, and delineated between the two content areas by having the reader select the term mathematics or science where appropriate. While the district did publish a job description solely for "Elementary Science Coach", no job description exists for an Elementary Mathematics Coach.

As indicated by feedback expressed in a professional meeting and survey responses, current K-12 mathematics coaches in Targeted County have expressed that there is confusion

from stakeholders regarding job expectations and the work of the coach. The lack of clear roles and responsibilities for K-12 mathematics coaches has also resulted in job performance inconsistencies from site to site.

Since 2010, the School District of Targeted County has consistently performed below the state average on the Florida Comprehensive Assessment Test (FCAT), a state standardized mathematics test administered in grades 3 through 12. Furthermore, the district's mathematics scores have shown little growth, or improvement, from year to year. There is a need to examine, within the district, the supports for schools that are designed to improve mathematics achievement. This includes the work of mathematics coaches. The implementation of consistent roles and responsibilities for K-12 mathematics coaches in Targeted County may help to increase student achievement mathematics. Success in mathematics education is important for individuals, because it gives students college and career options, and it increases prospects for future income. The National Mathematics Advisory Panel (2008) noted that the value of such preparation promises to be even greater in the future. The National Science Board (2008) indicated that the growth of jobs in the mathematics-intensive science and engineering workforce is out-pacing overall job growth by 3:1.

The National Commission on Mathematics and Science Teaching for the 21st Century (2000) cited improving mathematics and science teaching as "the most direct route to improving mathematics and science achievement for all students." The design of roles and responsibilities will allow not only coaches, but all stakeholders, to better understand the various ways mathematics coaches can support classroom teachers, students, and the school at large, to improve instruction and student achievement in mathematics.

This dissertation in practice will examine approaches in contemporary mathematics coaching in order to construct roles and responsibilities for K-12 mathematics coaches in Targeted County, Florida. The intended outcome will be clear and consistent roles and responsibilities, based on research, to help stakeholders, better understand and support the work of the coach.

The research question that guided this dissertation in practice was:

> Which elements of a coaching program best define the roles and responsibilities for mathematics coaches in a rural urban school district in central Florida?

1.2 Organizational Context

Shortly after Florida achieved statehood in 1845, a state public school system was established. Education in territorial Florida followed suit to that of the colonial states, with a focus on educating the poor. The Constitution of the State of Florida noted that the state would assume the duty of educating all children (Vogel, 1990). Twenty-one schools fell under the jurisdiction of Targeted County upon its establishment in May 1887 (Vogel, 1990). In 1983, the Southern Association of Colleges and Schools accredited all public schools in Targeted County. Targeted was the first school district in central Florida to earn this distinction (Vogel, 1990). Targeted County, Florida is home to 287,416 residents.

The School District of Targeted County, Florida is a rural urban district with a high level of

poverty and moderate diversity. The school district serves over 56,000 students in grades K-12 and employs over 7,000 faculty and staff. The district includes twenty-four (24) elementary schools, eight (8) middle schools (grades 6-8), eight (8) high schools, three (3) K-8 schools, one (1) 6-12 performing arts school, ten (10) alternative educational schools and thirteen (13) charter schools.

A five member elected school board governs the School District of Targeted County. Leadership for the district consists of a superintendent, deputy superintendent, and three assistant superintendents (one for the elementary level, one for the middle grades level and one for the high school level). A principal and one to two assistant principals manage each school site. The district's mission statement is "Education which inspires all to their highest potential".

Table 1-1: Student Demographics in Targeted County, Florida

Identified Racial Group	**Percentage of Students**
White	74%
Black	14%
American Indian or Alaskan	6%
Asian	3%
Pacific Islander	<1%

Nearly 56% of the students are identified as Hispanic. The district serves a significant number of English Learners (EL), with many middle schools reporting almost 25% of their

population as EL. Well over 50% of the schools in the district are Title 1 schools. There is a high rate of mobility across the district.

The district secures 11% of its funding from the government, 38% from local revenue, and 51% from the state of Florida. The school district's budget for the 2014-2015 school year was nearly $450,000,000 with $10,807,000 in funds earmarked for Instructional and Curriculum Development. These monies funded literacy coaches, one for each non-charter school in the district. However, other content area coaches, such as mathematics and science coaches, were funded by individual school budgets. Since hiring a mathematics or science coach is at the discretion of school-based administration, these coaches are not employed at all schools within the district. When schools have employed mathematics and science coaches, common expectations across the district are unclear. This has contributed to the confusion by stakeholders over the roles and responsibilities of the mathematics coach as well as the inconsistencies in mathematics coaches' roles and responsibilities from site to site.

The School District of Targeted County, Florida has been utilizing mathematics coaches since the 2006-2007 school year. Presently, the district employs thirty mathematics coaches for grades K-12; each serves a single school. Unlike the district's literacy coaches, mathematics coaches are not subject to any type of vetting process, do not receive any specific job training, and have no specific coaching model under which to operate.

1.3 Addressing the Problem

Florida was one of the first states to widely implement reading coaches. The large-scale implementation was in response to the demands of No Child Left Behind. In 2004, the state of Florida and then Governor Jeb Bush launched "Just Read, Florida!" (JRF), a division of the State of Florida Department of Education, aimed at supporting reading instruction. JRF developed a statewide coaching model for reading coaches. JRF also provided professional development and support for reading coaches and reading teachers. The "Just Read, Florida!" office employed area specialists who worked one on one with school districts and coaches. "Just Read, Florida!" also developed and provided a reading endorsement program for teachers across the state of Florida.

During the 2005-2006 school year, Targeted district curriculum staff in the elementary department began the process of replicating a similar structure for mathematics coaches. A few schools began to "cash in" allocations for positions such as a learning resource specialist positions for that of a mathematics coach. Schools without allocations to cash in would often relieve a classroom teacher, generally the department head, of a portion of their class load in order to serve as a coach. The district's elementary curriculum personnel created professional development trainings for those few who were moving into mathematics coaching positions.

As reported by district curriculum staff, the costs associated with the implementation of adding a mathematics coach were not well received by site-based administrators and the district's initiative quickly died out the following year. Subsequently, there has not been as strong of a push from the district for schools to employ mathematics coaches. The existing positions are at the behest of the school-based leadership. In addition to not having a job

description designated exclusively for mathematics coaches at any level in the district, there is no formal coaching model for mathematics coaches provided from the district, unlike with literacy coaches. Professional development for mathematics coaches is conducted independently through the elementary, middle, and high school curriculum departments, thus potentially contributing to the inconsistencies across the K-12 spectrum.

1.4 History and Conceptualization

1.4.1 International

Mathematics coaches are not widely employed in countries that boast high levels of student achievement in mathematics (Mudzimiri et. al., 2014). Most Asian countries do well in mathematics as evidenced by results from the Trends in International Mathematics and Science Study (TIMSS). In 2011, Korea, Singapore, Chinese Taipei, Hong Kong, and Japan ranked higher in mathematics than the United States for both grades 4 and 8 (TIMSS Report, 2011).

In Japan, the approach to improving mathematics teaching and learning is done through lesson study (Fernandez & Yoshida, 2004). The four-step process of lesson study, which includes setting goals, planning, delivery, and reflection, requires teachers to reflect not only on student learning, but on content, design, and broad issues in teaching and learning. At the school level, a typical lesson plan cycle last one year. Although each lesson and the subsequent post-lesson discussion each last only a day, the teachers reflect and often write a long summary report (Fujii, 2014). The lesson plan cycle is also used at the district level. The widespread implementation of this teacher centered (and lead) professional development approach mirrors much of what is done by mathematics coaches in the United States. However, in Japan, this

teacher-led approach is more of a "bottom-up" approach as compared to the perceived "top down" approach of coaching.

International comparisons by the National Mathematics Advisory Panel (2008) show that American students have not been succeeding in the mathematical part of their education at anything like a level expected of an international leader. At the time of the panel's report, only China, Singapore, and Sweden reported utilizing mathematics coaches and only at the elementary level.

Instruction in areas such as the Middle East and North Africa is conducted mostly through lecture (Fujii, 2014). In South Africa where instruction is largely achieved through recitation and memorization, there is little information on mathematics coaches being implemented on a local level. However, there is some indication of national level mathematics facilitators (Fujii, 2014).

The 2010 Gauteng Primary Literacy Strategy – renamed the Gauteng Primary Language and Mathematics Strategy (GPLMS) in 2011 - was implemented as a multi-pronged approach to teacher support intervention for the lowest performing primary schools of the province which attempted to close the gap between performing and under-performing schools (de Clerq, 2014). The focus was to improve the teaching of language and mathematics. Although hoped to be a solution for improving the quality of instruction in lower performing schools, this initiative was unsuccessful, due in part to the "expense" of utilizing coaches. The utilization of an instructional coach costs six to 12 times more than professional development alone (Knight, 2007). This is an expense that many countries just can't afford (de Clerq, 2014).

In summary, the use of mathematics coaches in other countries is not as prevalent as in the United States. In Japan, where teachers participate in their own professional development

through Lesson Study, there is little confusion as to the expectations of the lesson study process. In economically underdeveloped areas of the world, mathematics coaches are not utilized at the local level due to the prohibitive costs of employing such a person.

1.4.2 National

The national push for literacy as a result of No Child Left Behind and the educational policy changes that ensued served as the impetus for school districts across the nation to begin implementing literacy coaches. While there is presently no similar nationwide push resulting in the implementation of mathematics coaches, some schools and districts across the nation are taking it upon themselves to follow suit in the area of mathematics. Because there is no funding earmarked nationally to support the hiring of mathematics coaches, the decision to do so then falls on states, districts, and, in many cases, individual school sites.

In 2002, the National Center for Improving Student Learning and Achievement in Mathematics and Science (NCISLA) released a report on a multi-year study conducted to examine what successful schools and school districts were doing to transform teaching in mathematics and science. The study reported that teachers identified time spent planning and collaborating with content specialists inside their schools as the most impactful resource (Gamoran, Anderson, Quiroz, Secada, Williams & Ashmann, 2002).

Research on the effective components of a mathematics coaching model reiterated two main points: the roles and responsibilities of mathematics coaches must be defined and they must be clearly communicated to all stakeholders. A well-defined, structured model of coaching which is presented and communicated thoroughly across all levels of the organization is critical

to the success of any coaching program (Mudzimiri, Burroughs, Luebeck, Sutton, & Yopp, 2014). As reported by McGatha (2009), the results show that one of the most effective components of a coaching program is the broad communication to all stakeholders about the roles and responsibilities of the mathematics coach so that everyone worked from a common understanding.

Coaches assume a variety of duties, some of which are not easily defined. A research brief published by the National Council of Teachers of Mathematics acknowledges that there are varying roles and responsibilities for mathematics coaching positions (McGatha, 2009). The National Mathematics Advisory Panel (2008) reported a "considerable blurring" across types and roles of mathematics coaches and Poglinco (2003) reported that some coaches had never even seen a written job description.

Furthermore, researchers feel that the lack of a well-crafted and communicated model may also impact the influence of coaching in schools as well as how coaches interact with teachers (McGatha, 2009; Mudzimiri et.al., 2014; Neufield and Roper, 2003; Poglinco, 2003). Literature shows that uncertain job descriptions often led to confusion and mistrust between the coach, teachers, and administration, while the lack of clear definition of the coach's role lead to teacher misconceptions of the coach's role and, subsequently, generated a lack of trust and tenuous relationships (Poglinco, 2003; McGatha, 2009). Neufield and Roper (2003) found that uncertain job descriptions often led to confusion and mistrust between the coach, teachers, and administration. Hartman (2012) reported that when teachers believe that a mathematics coach is in a supervisory position, it leads to an atmosphere of mistrust

This lack of clear definition of the coaches' role leads to teacher misconceptions of the coaches' role and, subsequently, generates a lack of trust and tenuous relationships between

coaches and teachers. Similar findings were corroborated in 2007 by the Center for Strengthening the Teacher Profession (Weschler, 2007). A lack of understanding of the roles and responsibilities of the coach can have a negative impact on coach-teacher relations.

1.4.2.1 States and Districts

In 2002, the Virginia Mathematics and Science Coalition (VMSC) Mathematics Special Task Force reported that the lack of a statewide definition of "math specialist" was resulting in confusion about the roles and responsibilities of the math specialists across the state. Furthermore, the lack of a defined model for mathematics specialists was causing problems in terms of one's preparation or qualifications for the mathematics specialist job. As a result, the coalition released its first of two reports on the job description, competencies, and licensure of math specialists. In this report, a list of eight recommended responsibilities was released. The report also included recommended competencies for mathematics specialists along with recommendations for licensure of mathematics specialists.

Evaluation of the Mathematics Specialist Program revealed positive influences at the elementary level. In 2008, the Virginia Mathematics and Science Coalition formed another task force to examine the roles and responsibilities, competencies, and licensure for middle school math specialists. The report, published in 2009, contained suggestions for modifying the coursework required for licensure. The report also yielded a revised list of responsibilities for the math specialist.

The Spokane School District reported using some form of instructional coaching

in their district since 1991. In 2004, the district developed an Instructional Coaching Model to bring coherence to all of the district's differing roles. They revisited this model in 2007 to develop a more clear and specific description of the model to increase coherence of the model across the district. The purpose of Spokane School District's Instructional Coaching Model is to help close the student achievement gap and accelerate learning for all students by building teacher capacity through implementation of effective instructional practices (Casey, 2008).

The revisions to Spokane's Instructional Coaching Model included a process for implementing the coaching model at the school level, a coaching continuum; training and support for coaches including a 3-5 year training cycle with specific topic in coaching foundations, curriculum and assessment, pedagogy, Professional Learning Communities, Social Justice, and Data Usage. The revisions also resulted in nine clearly defined roles for coaches.

Interestingly, the model included roles for administrators and teachers as well. The model also included specific documentation of what the role of the coach excludes, such as evaluating teachers. Clear communication as to the roles and responsibilities of the coach allows everyone to work from a common understanding and has been noted as one of the more effective components of a successful program (Mangin, 2005).

States are not only addressing the problem of unclear or non-existent job descriptions, but also many are going beyond to implement entire coaching models that include processes for training and certification. Along with Virginia and Washington, the state of Kentucky has passed legislature to fund and support mathematics coaches (McGatha, 2010). In 2010, 10 states offered endorsements or certification for mathematics coaches or specialists. Recently, that number has increased to 19 states.

1.4.3 Local: District Perceptions

Until 2013, the School District of Targeted County divided curriculum and instructional responsibilities between two areas – elementary (K-5) and secondary (6-12). In May of 2013, the district divided the secondary curriculum and instructional responsibilities into two divisions, middle school (6-8) and high school (9-12). A new assistant superintendent and staff were hired for the middle school department. The staff includes a language arts and reading resource teacher, a science resource teacher, a mathematics resource teacher and a K-12 social studies resource teacher. Tasked with the specific focus of serving only grades 6-8, the middle school curriculum and instruction content area specialists work closely with the teachers and staff from the district's eight middle schools, four K-8 schools, and three 6-12 schools. Targeted and more individualized support at each level, brought to light the inconsistencies in job expectations for 6-12 and K-5 mathematics coaches. Of all of 15 schools serviced by the middle school division, barely half (7) have mathematics coaches. The coaches have expressed administrator confusion about the roles and responsibilities of the mathematics coach and the desire for a clearly defined set of responsibilities under which to operate.

The Director of Elementary Curriculum and Instruction explained that little has been done to clarify the roles and responsibilities of K-12 mathematics coaches since that initial, failed attempt by elementary curriculum personnel in 2005-2006. "We didn't get support from the school administrators, so the program just ceased and no one has attempted to revisit the issue" (personal conversation, February 2015).

School district curriculum staff responsible for implementing mathematics curriculum at the elementary, middle, and high school levels convey that no attempts have been made to

establish a coaching model, job description, or guideline for mathematics coaches. "I have been doing this job for three years and they have never had a clear job description," noted one staff member (personal communication, January 2015).

Recently, the district's professional development department contracted with an outside trainer to provide a three-day seminar on coaching. The trainer, who specializes in coaching, provided an extensive three-day session, which mirrored a state approved post-secondary course on coaching. All school level literacy, mathematics, and science coaches as well as district level curriculum personnel were invited to attend. The workshop focused on several aspects of coaching including interpersonal skills, data analysis, and teacher-coach conversations.

District personnel will replicate the training as part of a new initiative to provide ongoing training for the district's K-12 literacy, mathematics, and science coaches. While this may address some of the challenges the K-12 mathematics coaches face, the lack of job descriptions and clearly defined roles and responsibilities still exists.

1.4.4 Local: Coach Perceptions

Conversations with Targeted County mathematics coaches indicate that their roles and responsibilities vary from site to site. One mathematics coach reported that she does morning duty, three lunch duties, and afternoon bus duty every day and often does other administrative type duties throughout the day if called upon. Other mathematics coaches have shared similar experiences. Another mathematics coach reported having to cover classes (substitute) when teachers are absent. At some schools, coaches work one on one with students in small group settings (generally remediation). Some spend a portion of their day handling discipline referrals.

Still others spend half, if not more, of their time doubling as the school's testing coordinator. As one coach reported, "I log more hours for testing than any other activity I should or should not be doing" (personal communication, January 2015). For those who are able to spend time in classrooms, many are uncomfortable modeling lessons or are unfamiliar with how lead discussions with teachers. They often alienate those they are intended to support. The lack of clear definition of the coach's role may be responsible for teacher and administrator misconceptions of the role of the coach.

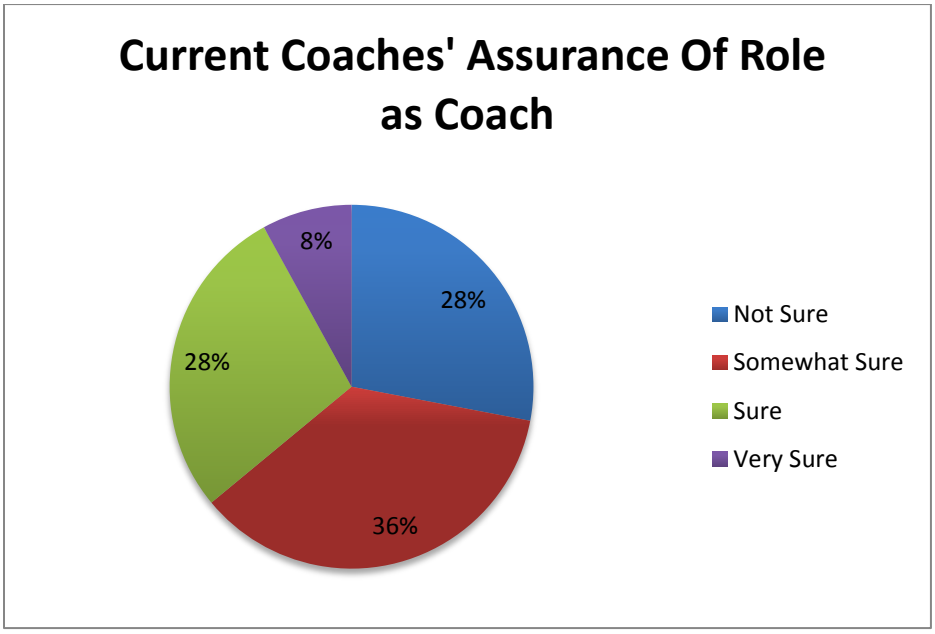


Figure 1-1: Targeted County Mathematics Coaches' Assurance of Role as Coach

As part of a course assignment for Milestone II of the University of Central Florida's Professional Practice Doctorate Program, the researcher conducted an informal survey with twenty-five of the district's existing school based mathematics coaches. Using a 4-point Likert

scale, coaches were asked to rate their understanding of their role as a coach. Twenty-eight percent (28%) indicated that they were not sure of their role. Thirty-six percent (36%) reported being somewhat sure, twenty-eight percent (28%) sure, and eight percent (8%) very sure. Collectively, sixty-four percent of the mathematics coaches responded as being less than sure about their role as a coach. The purpose of this informal survey was to seek out information to corroborate the concerns expressed to the researcher earlier through personal conversations. When sixty-four percent of the respondents indicated being less than sure about their role as a coach, the researcher decided to explore this problem of practice further.

1.5 Survey of Coaches

In order to obtain more information regarding the perspectives of Targeted County mathematics coaches, the researcher invited all coaches to participate, via an online survey tool (Survey Monkey), in a brief, open ended survey to gather data regarding their understanding of their roles and responsibilities as mathematics coaches, what activities/job duties the coaches engaged in on a regular basis, the greatest challenges they faced as mathematics coaches, and what resources they felt they needed to better perform their job as mathematics coaches. These four open-ended survey questions were influenced by themes presented in the research of Chval (2010) and Obara (2010).

Survey responses were received from nine (9) of the thirty (30) coaches. (The thirty coaches represented both full time and part time mathematics coaches). Survey results indicated that the mathematics coaches who responded possessed an understanding of their roles and responsibilities as described by most coaching models. So why did only thirty-six percent of the mathematics coaches who responded to the informal Lickert scale question earlier indicate that

they felt sure in their understanding of their role as a coach? One possible reason could be that those who responded to the survey were the same nine coaches who indicated feeling sure (7) or very sure (2) about their role as a coach on the earlier Lickert question. While possible, the likelihood of this explanation is less than probable. Therefore, the Lickert scale data, which were used to inform the researcher of a possible problem with the understanding of the roles and responsibilities of K-12 mathematics coaches in Targeted County, Florida, were used only for that purpose. The survey results obtained by the researcher were used to evaluate the challenges K-12 mathematics coaches faced.

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Table 1-3 is a summary of the survey responses. Both individual and aggregated responses per question can be found in Appendices E-Q.

Table 1-2: Summary of Results for Mathematics Coaches Survey Question #1.

Question #1	Summary of Survey Results
Describe the activities you regularly perform as a coach and how much time you spend each week on each activity.	9 participants (100%) - working w/teachers in classrooms modeling or observing lessons, analyzing data, coaching, planning, gathering resources, providing professional development, administering assessments
	6 participants (66%) - other duties (i.e. substituting, attending meetings)
	4 participants (44%) other duties as assigned by admin
	2 participants (22%) - hallway, lunch, or bus duty

Survey question #1 asked coaches to describe the activities they regularly performed and how much time they spent a week on each activity. All respondents indicated spending time each week working with teachers in the classroom - modeling or observing lessons; analyzing data; coaching; planning; gathering resources; providing professional development; and administering assessments. Twenty-two percent of respondents noted hallway, lunch, or bus duty as a large portion of how they spend their time. Forty-four percent noted other duties as assigned by administration as a portion of time spent and sixty-six percent reported other duties such as substituting or attending meetings as a portion of time spent.

Table 1-3: Summary of Results for Mathematics Coaches Survey Question #2.

Question #2	Summary of Survey Results
Describe your understanding of your roles and responsibilities as a math coach.	6 participants (66%) - supporting teachers
	4 participants (44%) - student achievement
	3 participants (33%) - ensuring adherence to state and local curriculum
	Very few – supporting teachers, lesson planning, classroom management support

Survey question #2 invited coaches to describe their understanding of their roles and responsibilities as a coach. Although there was some variation in the responses, 66% of the coaches specifically indicated that supporting teachers was part of their responsibilities as a coach. While two-thirds of the coaches indicated that they understand teacher support to be an objective of their work, very few reported specific responsibilities such as lesson planning or classroom management support (although in Table 1-3 all indicated spending time each week on these activities). Forty-four percent noted student achievement as a responsibility. One third of the respondents cited ensuring adherence to state and local curriculum and data analysis as a responsibility. Less prominent responses included supporting students, lesson planning, and classroom management support.

Table 1-4: Summary of Results for Mathematics Coaches Survey Question #3.

Question #3	Summary of Survey Results
What is/are the biggest challenge(s) you face as a math coach?	7 participants (78%) - lack of administrative support for or understanding of the role of the coach
	5 participants (55%) - lack of time
	2 participants (22%) - teacher resistance

In an attempt to pinpoint what obstacles or challenges coaches were confronted with, survey question #3 asked coaches to identify the greatest challenge(s) they face as a mathematics coach. Seventy-eight percent indicated lack of administrative support for or understanding of the role of the coach as a challenge. Fifty-five percent of the coaches cited (the lack of) time as a hurdle and 22% noted teacher resistance as an obstacle.

Table 1-5: Summary of Results for Mathematics Coaches Survey Question #4.

Question #4	Summary of Survey Results
What resources do you feel you need in order to perform your job as a mathematics coach?	6 participants (66%) - administrative support
	2 participants (22%) - teacher buy-in
	Math manipulatives, iPad tablet

Queries into what resources coaches felt they needed in order to perform their job varied. One coach indicated more district made assessments would be helpful, while another requested

more math manipulatives and one suggested a tablet to replace her laptop. However, there were a few similarities in the responses. Sixty-six percent of the responses to question #4 were identified specifically as or were influenced by administrative support and could be tied to the lack of clear roles and responsibilities for mathematics coaches. For example, freedom from other duties to "do my job", more support for coaches, and a more organized plan for coaches were included in that category. Twenty-two percent specifically noted teacher buy-in.

1.5.1 Local: Summary

In summary, while coaches seem to understand their roles and responsibilities, two general themes regarding obstacles impeding the work of the coach emerged from the survey results: too much time is spent on other, non-coaching duties, and a lack of administrative support. Both of these could be tied to the lack of understanding of the roles and responsibilities of the mathematics coach. Coaches in the research study by Neufeld and Roper ((2003) also noted that other school-related duties took time away from their ability to work directly with teachers. Poglinco et al., (2003) expanded on this notion reporting that because of the lack of a clear job description, coaches might perform several tasks that might hinder their effectiveness. The establishment of clear and consistent roles and responsibilities for K-12 mathematics coaches in Targeted County should alleviate some of these challenges.

Customarily, coaches are hired to improve instruction and positively impact student achievement. Research from Fullan and Knight (2011) suggests that giving coaches the "wrong work" to do is, in essence, sabotaging to the organization. When coaches end up doing administrative or clerical work, which sometimes results when the roles and responsibilities of

the coach are unclear, they are not able to meet their objectives of helping teachers and improving student achievement (Fullan & Knight, 2011). It is the responsibility of the principal to protect and support the role of the coach (Taylor, et al. 2007). When principals are unable to provide coaches with either clarity or support, coaches' efforts are often met with resistance and little change will occur in the classrooms (Full & Knight, 2011). The roles and responsibilities of the mathematics coach should be clearly defined and broadly communicated to all stakeholders.

1.6 Establishing Roles and Responsibilities

The absence of a specific job description for mathematics coaches and the generalized, one-size-fits-all mathematics and science coach job description most likely contributes to confusion between coaches, teachers, and administration. Additionally, the lack of clear definition of the coach's role may be responsible for teacher and administrator misconceptions of the role of the coach. This dissertation in practice establishes roles and responsibilities for K-12 mathematics coaches in Targeted County. This requires the collaboration and support of elementary, middle, and high school level mathematics coaches and principals, district level mathematics coaches, K-12 curriculum directors, assistant superintendents, and the superintendent of Targeted County.

In order to construct roles and responsibilities for K-12 mathematics coaches in Targeted County, the researcher examined state and district level coaching programs, focusing on the tenets on which the models were based, in order to guide the establishment roles and responsibilities that would meet the need of mathematics coaches and stakeholders in Targeted County. Examination included consideration of how the roles and responsibilities of coaches were defined. The researcher considered the needs of the Targeted County mathematics coaches and sets forth roles and responsibilities, as demonstrated by research, which were aligned to the needs of the Targeted County coaches and met the goal of clearly define the roles and responsibilities of K-12 mathematics coaches in Targeted County.

The research question that guided the design for this dissertation in practice was:

Which elements of a coaching program define the roles and responsibilities for mathematics coaches in a rural urban school district in central Florida?

The National Mathematics Advisory Panel (2008) recognized coaching as a popular approach to improving the teaching of mathematics. A coach can be defined as a teaching professional who works collaboratively with a classroom teacher to improve that teacher's practice, with the goal of affecting student learning (Sutton, Burroughs, & Yopp, 2011).

The day-to-day job assignments of coaches can vary widely across schools and districts (Mudzimiri et. al., 2014), thus the need for a framework and structure that will meet multiple needs of districts and schools. However, the central and essential role of the coach is to support instruction. This includes working side by side with teachers, in their classrooms, to maximize instruction.

Clear and consistent roles and responsibilities for mathematics coaches should solve the existing problem of practice as it would give coaches, teachers, and administrators clear guidelines as to the focus of the work of the mathematics coach.

1.7 Designing the Roles and Responsibilities

Research for this problem of practice included surveying existing mathematics coaches to determine areas of need. This information was used to guide the objectives of the project. Additionally, a review literature pertaining to and examining existing mathematics coach models was conducted to identify effective components of mathematics coaching programs. A clearly defined set of roles and responsibilities for K-12 mathematics coaches will be proposed for use to define roles for coaches in Targeted County.

Establishment clear and consistent roles and responsibilities for K-12 mathematics coaches in Targeted County will require the involvement of existing mathematics coaches,

district mathematics personnel, site administrators, and assistant superintendents for instruction. Involved parties will be needed to review the guidelines and make suggestions for revision as needed.

The establishment of clear goals and milestones that gauge the progress of the work will be done in order to measure the effective accomplishment of each milestone. Existing coaches and district level personnel will be involved in evaluating the achievement of goals. In the event that goals are not met, the evaluating body will determine what changes or revisions need to be made, create a plan for making identified changes or revisions, and reevaluate. A timeline for the major milestones of this project is reflected below.

1.8 Project Timeline

Table 1-6: Project Milestones and Completion Targets

Milestone	To Be Completed By
Needs Survey / Analyze Results	April 15, 2015
Continued Research of Existing Models & Effective Components	April 30, 2015
Creation of Model & Implementation Plan	May 31, 2015
Plan Review and Revisions	June 15, 2015
Final Deliverable	July 1, 2015

Final deliverables for this project will be clearly defined roles and responsibilities for K-12 mathematics coaches, which will be proposed to district administration for use across all grade levels throughout the district.

CHAPTER 2 DESIGNING ROLES AND RESPONSIBILITIES

The goal of this dissertation in practice is to design clear and consistent roles and responsibilities for K-12 mathematics coaches in Targeted County, Florida. By providing clear and consistent guidelines within which coaches can work, it is anticipated that all stakeholders will better understand and be able to support the work of the coach. The objectives of the work of the coach are to improve instruction and student achievement in mathematics.

2.1 Key Terms: Mathematics Specialist and Mathematics Coach

Many use the terms mathematics coach and mathematics specialist interchangeably; however, the National Council of Teachers of Mathematics (NCTM) defines mathematics specialists as those who work directly with students (the most common form of which being a "pull out program" wherein the mathematics specialist pulls students out of class to work with them one on one in the area of mathematics) and mathematics coaches as those who work with teachers and are involved in professional development, grade-level mathematics study groups, seminars, workshops, and coaching and modeling in the classroom (National Council of Teachers of Mathematics, 2009). It is important to note, however, that not all literature written on this subject adheres to the same naming conventions. Although the nomenclatures may be different, the end goal remains the same: improving student achievement (Rapacki and Francis, 2014).

The lack of state sanctioned definitions results in no common language; as a result, districts continue to use different nomenclatures for the same position. For the purpose of this

dissertation in practice, the researcher will use the term mathematics coach, as that is the descriptor used in the School District of Targeted County, Florida.

2.2 Coaching in Education

The idea of coaching in the educational arena was first introduced by Joyce and Showers in the 1980s as an extension of professional development to support the transfer of new knowledge into the classroom. Joyce and Showers found that the knowledge gained by means of professional development was more likely to transfer over to practice when followed up by some form of coaching (Joyce & Showers, 1981, 1982, 1983).

Coaching programs vary from state to state and district to district. A wide number of coaching programs in the United States are designed around coaching models. The type of model and the degree of its establishment may influence the coach's role in terms of working with teachers and the school system. (Mudzimiri et. al., 2014). Barlow et. al. assert that the there are three coaching models widely being used by mathematics coaches: cognitive coaching, content-focused coaching, and instructional coaching (Barlow, Burroughs, Harmon, Sutton and Yopp, 2014).

The cognitive coaching model focuses on helping teachers to improve their instructional effectiveness by becoming more reflective about teaching (Garmston, 1993). Cognitive coaches mediate to influence teachers (Mudzimiri et. al., 2014). The conversations between the coach and the coachee focus more on the cognitive functions of teaching. Cognitive Coaching uses a three-phase cycle: pre-conference, observation, and post-conference and relies upon the teacher, not the coach, to evaluate the lesson. Similar to the original clinical supervision model developed by Anderson and Goldhammer in 1969, the ultimate goal of Cognitive Coaching is teacher autonomy.

The content-focused coaching approach emphasizes students' learning of a particular subject (Mudzimiri et. al., 2014) and makes student learning in that content area the central focus of coaching. This model also utilizes the three-phase coaching cycle of pre-conference, observation, and post-conference. Content focused coaching is coaching in which attention is given to the content aspect of instruction in addition to teaching practices (West, 2009).

Instructional coaching focuses on teaching practices through a partnership approach between the coach and teacher (Knight, 2007). Knight's theoretical framework for a partnership approach to coaching is based on seven principles – equality, choice, voice, dialogue, reflection, praxis, and reciprocity - derived from research and theoretical writing from scholars such as Greenleaf and Senge (Knight, 2007). Instructional Coaching requires coaches to deeply understand many scientifically proven instructional practices, including classroom management, content enhancement, instructional practices, formative assessment, and other teaching practices. Referred to as "The Big Four", the foundational tenets of the model are simply noted as: classroom management, content, instruction, and assessment for learning (Knight, 2007).

Consideration of these models, along with mathematics coach roles and responsibilities from existing programs across the US were reviewed when working to develop the roles and responsibilities for mathematics coaches in Targeted County.

2.3 Programs Considered

2.3.1 Chval Program

The Chval program was intended to aid teachers in the transition from experienced teacher to coach. New coaches are often unclear about their roles and responsibilities as are other stakeholders in school and districts where this type of instructional coaching program is new or undefined. Coaches Chval studied were also struggling to establish relationships with classroom teachers now that they were functioning under the role of a coach. The Chval study followed new mathematics coaches for one year and through systematic observations, meetings, and trainings and was able to establish roles for the coaches. The establishment of roles helped the coaches to embrace their identity as a coach, had a positive impact on their self-efficacy beliefs, and improved the coaches' relationships with their stakeholders. The programs drew upon the research of existing reading and mathematics coaching programs.

2.3.2 Spokane Program

The purpose of the Spokane program was to develop a clear and specific instructional coaching program in order to build coherence across the Spokane School District (Spokane Public Schools, 2010). One unique factor about the Spokane model was that not only did the model address the roles and responsibilities of the coach; it also addressed the roles and responsibilities of principals and the teachers. Although literature exists noting the importance of the principal's role in the success of a coaching program (Taylor et. al., 2007), no other programs reviewed by the research established such clear expectations for administrators and

teachers. The model also addressed duties that were *not* part of the coach's role and included a coaching continuum. This was one of the most "fleshed out" models found.

2.3.3 Walpole Program

Dr. Sharon Walpole has authored a number of professional development books on both differentiated instruction and coaching. Along with co-authoring The Literacy Coach's Handbook, Walpole also coordinated a statewide coaching program for the state of Georgia. The approach, which she refers to as "reform-oriented coaching", is geared toward improving student achievement amidst an ever-changing background of educational reform (Walpole, McKenna, & Morrill, 2011). Walpole's work has not only been the impetus for establishing statewide reading (or literacy) coaching models, but her work has also been consulted and used as a basis to help develop statewide and district models for mathematics coaches as well (Chval, 2010). Throughout her work, she addressed the roles of a coach as: planning and/or providing intervention, working with teachers both individually and in groups, providing PD, organizing materials and resources, conducting demonstration lessons and observations, working with data, managing curriculum, and ensuring the fidelity of both curriculum and assessment.

This model was selected because of its universal application at both the statewide and district levels and its timelessness across disciplines. Operating without any type of direction as to their roles and responsibilities, the majority of the mathematics coaches in Targeted County report using the literacy coach model as a starting point for the work they are to be doing.

2.3.4 Virginia Program

Over the course of seven years, the state of Virginia released two special task force reports detailing research regarding the roles and responsibilities of mathematics specialists. In 2002, a task force was charged with establishing a job description, job preparation, competencies, and licensure for math specialists. In 2009, the task force released a follow up report in which they refined the roles and responsibilities, preparation, and competencies of the mathematics specialist, along with suggestions on ways to sustain a successful mathematics specialist program.

While this dissertation in practice is addressing a local (district level) problem of practice and not a statewide problem, the Virginia mathematics specialist model was examined closely because of its successful implementation and sustainability. As other states and districts look to this model as a guide for their own implementation, it seems only fitting that it be examined for this problem of practice as well.

Although this dissertation in practice is not addressing competencies, preparation, or licensure for mathematics specialists, these may perhaps be issues subsequently addressed in Targeted County. Understanding how each of these components works together to create a comprehensive program seems beneficial for establishing the roles and responsibilities for mathematics coaches in Targeted County.

2.3.5 Dickenson Program

In the fall of 2007, Dickenson School District, a small mid-western school district, implemented a mathematics coaching model. The coaches' "mission" was to work with teachers

and administrators in order to create an environment of instructional practice which increased student achievement in mathematics (Chval, 2010). One component of the coaching model was an eighteen-item description of the roles and responsibilities of the mathematics coach. This was one of the most extensive descriptions of the responsibilities of the mathematics coach found in the programs examined.

This program was selected for further examination in part because of its comprehensive description of the responsibilities of the mathematics coach. Additionally, prior to the implementation of the program, the mathematics coaches in Dickenson School District were operating similarly to the coaches in Targeted County. They were not sure of their new roles as mathematics coaches or exactly what their job responsibilities were. None of the coaches in Dickenson had ever worked with or observed a mathematics coach.

2.4 Rationale for Choices

The National Council of Teachers of Mathematics asserts that the design of a mathematics coaching program is an important factor in the effectiveness of mathematics coaches (NCTM Research Clip). That being said, the rationale behind the choices made in designing a description of roles and responsibilities for K-12 mathematics coaches in Targeted County is an important factor in the effectiveness of Targeted County mathematics coaches. The coaching models selected for close examination for this process were selected with intention.

2.4.1 Chval Program

The researcher elected to use the roles from the Chval model because many of the mathematics coaches in Targeted County expressed not being sure of their relationship to teachers, students, and administration at their school. The roles presented in this model – supporter of teachers, supporter of students, supporter of school, learner – were thought to be a good fit for the coaches in Targeted County. However, as the research progressed, the roles proved to be too broad, in complete opposition to the clearly defined roles and responsibilities needing to be defined in the new model. Hence, further examination of roles was done using a coaching model from Spokane Public Schools.

Because the emphasis of this article was on establishing one's identity as a mathematics coach, the roles of a mathematics coach were discussed in depth, but there was little information on the responsibilities of a mathematics coach.

2.4.2 Spokane Program

This model was selected for further investigation because, like the Spokane School District, Targeted County Schools lack clear and specific roles and responsibilities for mathematics coaches. In order to increase student achievement and promote vertical articulation of the mathematics curriculum, Targeted County mathematics coaches need a model that builds coherence across the district.

The roles from the Spokane model were selected due to the clear delineation they provided between classroom roles versus instructional roles and instructional roles versus curriculum roles. Other models had a tendency to try to consolidate these. The responsibilities

of the coach in the Spokane model contained some tasks that appeared to more district specific than generalizable, so the coaching responsibilities from this model were not used for further investigation.

2.4.3 Walpole Program

Walpole and Blamey conducted a research study with principals and literacy coaches to identify the roles and responsibilities of coaches. Their research was cited many times in literature on mathematics coaching. It was suggested that their work on coaching is often applied to mathematics coaching as well since empirical research on the roles and responsibilities of mathematics coaches is limited (Walpole & Blamey, 2008). Their findings indicated that coaches take on many roles and responsibilities. Because their findings were presented in a more general approach – the roles and responsibilities of a coach as opposed to the roles and responsibilities of a literacy coach, much of their work was easily applied to this research. In fact, many of the coaching models reviewed during this process acknowledge the work of Walpole and colleagues as a foundational part of their own research and model development.

This model was selected because of its universal application at both the statewide and district levels and its timelessness across disciplines. Operating without any type of direction as to their roles and responsibilities, the majority of the mathematics coaches in Targeted County report using the literacy coach model as a starting point for the work they are to be doing. The researcher did not use the roles from this model because they were very similar (almost to the point of redundancy) to the roles utilized by Chval.

2.4.4 Virginia Program

In 2008, the Virginia Mathematics and Science Coalition formed a task force to study the role and responsibilities of middle school mathematics specialists. This report was an extension of an earlier report from 2002 by the task force, which focused on the job description, competencies, preparation, and licensure of elementary, and middle school level mathematics specialists. While the intent of this later study was to initially focus on only elementary mathematics coaches, as the study progressed members saw a larger need to address middle school level as well. The purpose of the study was to establish clearer roles and responsibilities for mathematics coaches.

The recommended responsibilities from the Virginia coalition Task Force Report were considered in the design of the Targeted model because they tied each of the responsibilities to increasing student achievement in mathematics. Since improving student achievement in mathematics is an outcome goal of the Targeted model, the researcher elected to examine Virginia's recommended responsibilities more closely.

The researcher did not use the roles from the Virginia model because the model focused mainly on the responsibilities of the mathematics coach and recommendations for competencies needed by anyone who wishes to serve as a mathematics coach.

2.4.5 Dickenson Program

The Dickenson model provided a mathematics coaching model that had been implemented in a similar demographic environment and in response to the same coaching concerns. It also provided a model designed for a more granular level than the Virginia model.

The Dickenson model provided one of the most extensive descriptions of the responsibilities of the mathematics coach found in the models examined.

This model was selected for further examination in part because of its comprehensive description of the responsibilities of the mathematics coach. Additionally, prior to the implementation of the model, the mathematics coaches in Dickenson School District were operating similarly to the coaches in Targeted County. They were not sure of their new roles as a mathematics coach or exactly what their job responsibilities were. None of the coaches in Dickenson had ever worked with or observed a mathematics coach. Roles from this model were not as clearly delineated, and therefore, not used.

2.5 Designing the Roles and Responsibilities

A review of the literature found few programs that clearly delineated both roles and responsibilities for mathematics coaches. Therefore, the researcher began to evaluate the literature by looking at coaching roles and responsibilities independently. When examining the research on the roles of the mathematics coach, two examples stood out. Both had been created in response to situations where the stakeholders were unsure of the roles of the coach due to the lack of any type of job description or job clarification.

These two programs were selected for further examination since they originated from circumstances as the problem of practice being addressed in this dissertation. Table 2-1 notes the role of the coach from the perspective of each of the selected programs.

Table 2-1: Role of the Coach – Two Perspectives

Perspective 1: CHVAL'S Needs of Stakeholders	Perspective 2: SPOKANE's Task Oriented
Coach as supporter of teachers (teachers)	Classroom supporter (classroom)
Coach as supporter of students (students)	Instructional supporter (instruction)
Coach as supporter of school at large (school)	Curriculum/Content facilitator (curriculum)
Coach as learner (learner)	Data Coach (data)
	Facilitator for change (change)
	Learner (learner)
	Professional learning facilitator (PD)
	Resource (resource)
	School leader (school)

The two program approaches were Chval's (2010) study on the transition from an experienced teacher to a mathematics coach as published by Elementary School Journal and a district-wide program created by Washington's Spokane Public Schools. The approaches represented two different perspectives. Chval specifically defined the role of the coach in relationship to the needs of the stakeholders (teachers, students, and school). This approach was of great interest to the researcher due to the results of the survey data showing that the stakeholders in Targeted County appear to be unclear about the roles and responsibilities of Targeted County mathematics coaches. The second approach was more focused on the specific work of the coach. The researcher examined the both approaches to see how to best approach developing roles for Targeted County coaches.

In 2010, The Elementary School Journal published the results of the work of Kathryn Chval and colleagues wherein they examined the roles and responsibilities of new mathematics coaches. The focus of the study was to observe how new coaches responded to their new roles and responsibilities as they began to build their new identity as a coach. The approach described the roles of the coach in terms of the coaches' relationship to their stakeholders. Chval and colleagues noted four main roles of the coach:

* Coach as supporter of teachers
* Coach as supporter of students
* Coach as supporter of school at large
* Coach as learner (self)

The researcher felt that working to define roles for the mathematics coaches of Targeted County using this approach seemed promising due to the survey results indicating that the coaches felt that their stakeholders were unclear about the roles of a mathematics coach.

The second approach the researcher chose to examine more closely was a coaching program from Washington. In 2010, Spokane Public Schools implemented a district-wide coaching program identifying nine (task-oriented) roles of the coach:

* Classroom Supporter
* Instructional Supporter
* Curriculum/Content Facilitator
* Data Coach
* Facilitator for Change
* Learner

* Professional Learning Facilitator

* Resource

* School Leader

This approach to coach roles was selected for further examination for two reasons. First, similar to Chval's program, Spokane's program was created due to a lack of clarity of the roles and responsibilities of the mathematics coach – a district wide problem similar to that of Targeted County. Additionally, many of the roles in the Spokane program appear to align with the coaching roles of the literacy coach program already established by the Targeted County.

2.6 Aligning Roles and Responsibilities

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The perspectives from the two aforementioned sources (Chval's approach and Spokane District Schools' approach) were each addressed separately. These perspectives were applied, through the process of alignment, to three additional coaching models (Walpole, Virginia, Dickenson County), which defined, in detail, the responsibilities of the mathematics coach.

The purpose of this process was to identify which approach to mathematics coach roles, Chval's relationship approach or Spokane's task oriented approach, would lend itself to a more comprehensive definition of the roles of a mathematics coach. In order to examine the two approaches, the roles from each approach were aligned to the responsibilities of the mathematics coach as defined in three additional models. The researcher also utilized this process to identify any potential gaps. For example, were there any responsibilities from the three models under review that did not align to the roles being used? If so, what would this indicate? The sense of

an incomplete set of identified roles? Coaching responsibilities that do not align to the roles of the coach?

2.7 Alignment Process

This researcher's alignment process included two cycles. Each cycle examined the responsibilities of a mathematics coach as described in the following coaching programs: Walpole, the State of Virginia, and Dickenson School District.

In the first cycle of alignment, the researcher used the roles of the coach, needs of the coach as outlined in Chval's needs of the stakeholders' approach, and applied them to the responsibilities of the coach in the Walpole, State of Virginia, and Dickenson programs.

In the second cycle of alignment, the researcher used the roles of the coach as outlined in Spokane's task-oriented approach, and applied them to the responsibilities of the coach in the Walpole, State of Virginia, and Dickenson programs.

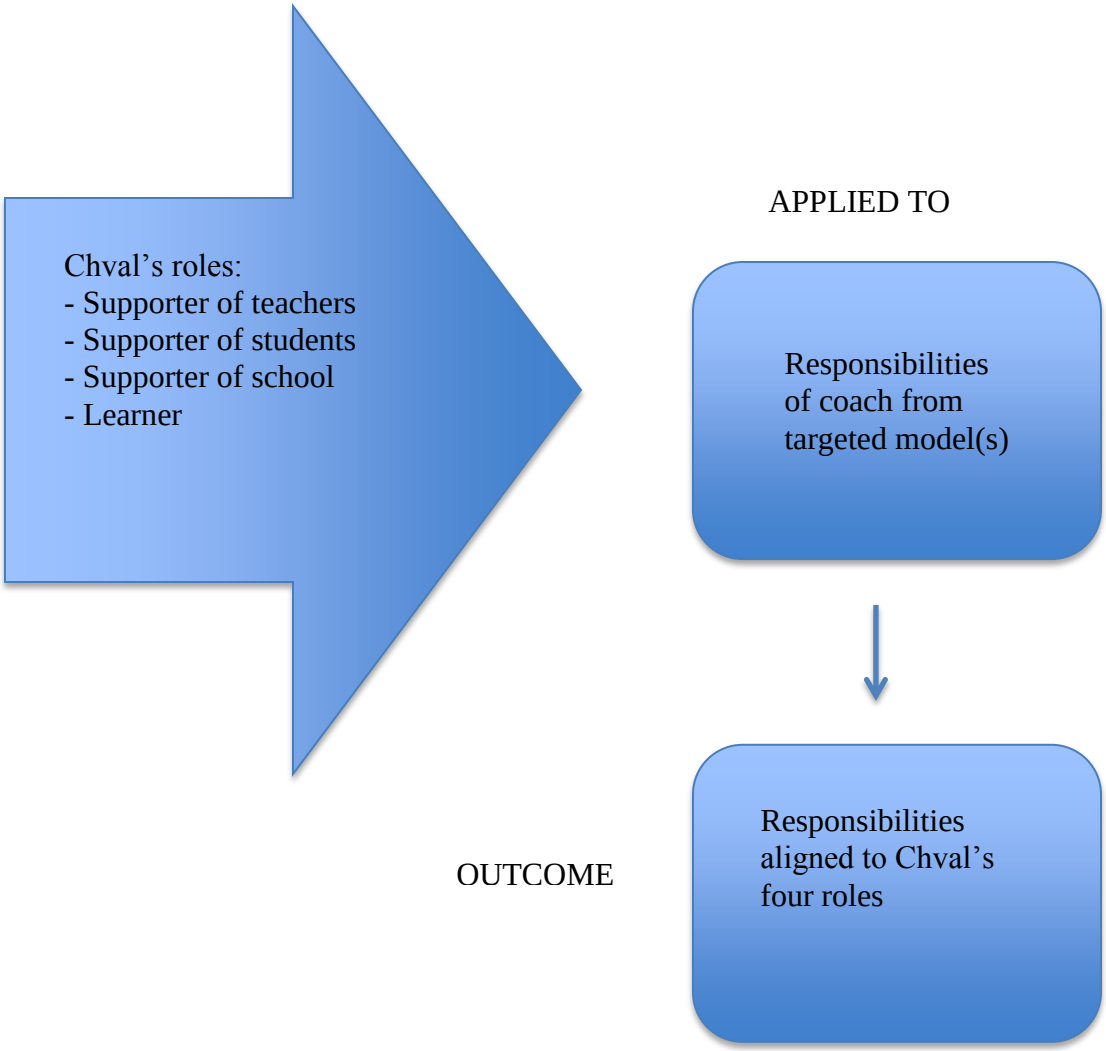


Figure 2-1: Process Model for Aligning Roles and Responsibilities Using Roles From Chval's Model

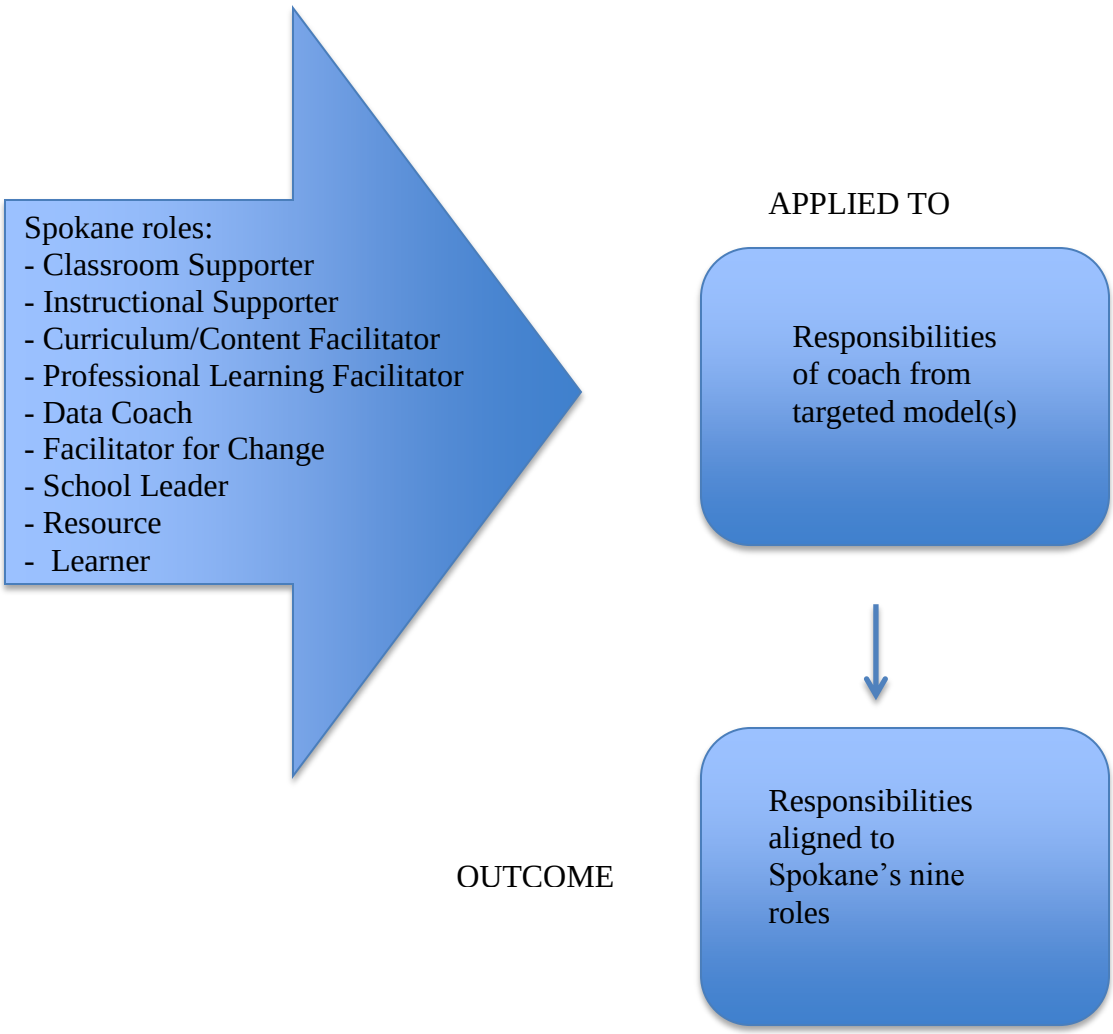


Figure 2-2: Process Model for Aligning Roles and Responsibilities Using Roles From Spokane's Model

2.8 Results: Chval's Needs of Stakeholders Approach

Results from the first cycle of alignment using the needs of the stakeholders approach from Chval's program produced a large amount of coach responsibilities aligned to the role of the coach as supporter of teachers. (See Appendices R, S, T, and U) From the three models (Walpole, Virginia, Dickenson) whose responsibilities were examined, more than half of the responsibilities aligned to the role of coach as supporter of teachers. The role of coach as supporter of school yielded the second highest percentage of alignment to the responsibilities in each of the three programs.

There was one correlation to the coach as supporter of students role within two of the three models (Walpole and Dickenson); however, all correlations of the coach as supporter of students role were also aligned with the coach as supporter of teachers role. Occurrences of alignment to more than one role resulted from responsibilities that were written as compound responsibilities (i.e. planning and providing intervention or advocating for quality mathematics teaching as well as high expectations for all students to learn mathematics). The coach as supporter of students role did not align to any of the coaching responsibilities in the Virginia model.

In fact, the coach as supporter of teachers and coach as supporter of school roles were the only two roles that aligned to responsibilities from the Virginia program. None of the responsibilities in any of the three models aligned with the coach as learner role.

In summary, the majority of the responsibilities from each of the three models aligned to the coach as supporter of teacher and coach as supporter of school roles. The alignment of these roles to the responsibilities in each of the three programs was fairly consistent, with the coach as

supporter of teacher role aligning to 60-72% of the responsibilities in each program and the coach as supporter of school role aligning to 28-40% of the responsibilities in each program.

The results of the alignment process did yield clarification that two major roles of the coach involve providing support to teachers and support to the school at large. However, those roles did not provide clarification at a granular level as to the most effective roles of the coach, so another cycle of alignment was conducted using the roles from Spokane's task oriented approach.

2.9 Results: Spokane's Task Oriented Approach

Results from the second cycle of alignment using the roles from Spokane's task oriented approach produced a more balanced sense of alignment to the responsibilities from the Walpole, Virginia, and Dickenson coaching programs. (See Appendices V, W, X and Y)

The instructional supporter role aligned to 11-25% of the responsibilities in each of the three models. The school leader role aligned to 20-25% of the responsibilities in two of the three programs. The curriculum facilitator role alignment to the responsibilities in the Walpole and Virginia programs was fairly consistent (20-25%), but aligned to only 5.5% of the responsibilities in the Dickenson program.

Furthermore, both the professional learning facilitator and data coach roles aligned to only 10-12% of the responsibilities in each of the three programs. Alignment of the resource role varied from program to program, aligning to anywhere from 0 to 30% or the responsibilities depending on the program. Likewise, the alignment of the classroom supporter role varied as well from program to program, accounting for anywhere from 0 to 17% of the responsibilities.

The facilitator of change role aligned to responsibilities in the Dickenson program but not the Walpole or Virginia programs, and the learner role did not align to any responsibilities in any of the programs. Finally, the classroom supporter role did not align to any of the responsibilities in the Virginia program, although it aligned to 10-11% of the responsibilities in the Walpole and Dickenson programs.

Although the alignment of roles to responsibilities was relatively balanced throughout the Walpole and Dickenson programs, alignment of the Spokane roles with the responsibilities from the Dickenson program was the most evenly distributed.

In summary, the relatively balanced and consistent alignment of the roles from the Spokane program to the responsibilities in the Walpole, Virginia, and Dickenson programs led the researcher to conclude that the roles presented in the Spokane School District mathematics coaching program would serve as a good starting point for establishing roles for the mathematics coaches in Targeted County.

2.10 Establishment of Targeted County Mathematics Coach Roles

Separate roles that address the work of the coach at the granular level, such as supporting the classroom in general versus supporting instructional practices, help to provide a clearer understanding of the role of the coach for stakeholders. Keeping in mind that instruction can be defined as interaction involving teachers, students, and content, it is easy to see that instructionally the coach has a role independent from that of a classroom supporter. Teacher and student support in both of these contexts are important for student success. Clearly established roles addressing coach-teacher interactions (i.e. coaches role in the classroom) help to alleviate

misconceptions by stakeholders and contribute to positive coach-teacher relationships (McGatha, 2009). Because of the varying demands of each individual classroom and universal need for teacher support in implementing/utilizing quality instructional practices, the researcher elected to retain both the instructional supporter and classroom supporter roles from the Spokane program for use in the construction of the Targeted County mathematics coach roles.

Ensuring the fidelity of district and state curriculum requires a high level of knowledge and understanding of the standards. The mathematics coach should be an expert in the field of curriculum. Coaches should not only have an in depth understanding of the standards, but they should be able to support others in understanding the standards. Although none of the roles in the models examined reflected the coach's interactions with content, literature suggests that mathematics specialists and mathematics coaches should be experts in their content area. The role of curriculum/content specialist from the Spokane program will be used in the establishment of Targeted County mathematics coach roles. The role will consolidate both the curriculum and content roles, creating a role of curriculum specialist.

The alignment of the roles of both data coach and professional developer from the Spokane program was equally prevalent. As noted earlier, Joyce and Showers observed the first occurrences of coaching, peer coaching, in the 1970s when teachers collaborated with one another after professional development trainings to observe lessons and give feedback. The role of professional developer is a cornerstone in any coaching model and will be included in the Targeted County mathematics coach roles.

Using data to drive instruction is a way of work for educators. It is rare to find a school without a designated "data person" among the ranks. In some schools that person may be a Learning Resource Specialist or Curriculum Specialist. However in schools with academic

coaches, that job often falls to the coach. Understanding how to interpret data, teaching others how to interpret data, communicating the meaning of the data, and designing instruction based on data are all skills that any academic coach must possess. Almost by default, academic coaches also serve as data coaches. The Targeted County mathematics coach roles will include a role of data coach.

The role of the coach as a facilitator of change only aligned to one job responsibility when the researcher was assessing the alignment between roles and responsibilities. However, being an agent of change is a prominent characteristic of teacher leaders and mathematics coaches, or any academic coach for that matter, are generally seen by stakeholders as teacher leaders. Since the role of teacher leader (facilitator of change) generally pertains to one's role within his or her school or district, and not just his or her content area, the researcher has elected to combine the role of facilitator of changes with the coach's role in the school at large. The researcher proposes Targeted County create a role of school leader for mathematics coaches.

One role that appeared in both the needs of stakeholders approach and the task-oriented approach was that of the coach as a learner. However, this role did not align to any responsibilities from either the Walpole, Virginia, or Dickenson programs. Since this role did not align to any of the responsibilities examines, that role was eliminated from consideration when creating roles for Targeted County coaches. Should Targeted County choose to address preparation, competencies, or certification of mathematics coaches in the future, that role may be revisited at that time.

While job responsibilities associated with the role of resource aligned favorably to the responsibilities in the Walpole and Dickenson models, upon closer examination of the responsibilities which aligned to that role, the researcher determined that if the responsibilities

had been more specific they could have easily aligned to other roles such as classroom supporter, instructional supporter, or curriculum specialist. Since the role of resource could be easily absorbed into other contextual roles, Targeted County will not be not be presented with the role of resource for its coaches.

The process of aligning coaching roles with coaching responsibilities from five different, effective programs allowed the researcher to make the determination to use the coach roles from Spokane Public Schools mathematics coaching program as a foundation for establishing six (6) roles for the K-12 mathematics coaches in Targeted County.

Table 2-2 represents a comparison between the mathematics coaches' roles of both program used in the alignment process and the proposed mathematics coaches' roles for Targeted County.

Table 2-2: Comparative Representation of Coach Roles.

Coach Roles – Chval Program	**Coach Roles – Spokane Program**	**Proposed Coach Roles – Targeted County**
Supporter of Students	Classroom Supporter	Classroom Supporter
Supporter of Teachers		
	Instructional Supporter	Instructional Supporter
	Curriculum/Content Facilitator	Curriculum Specialist
	Data Coach	Data Coach
	Professional Learning Facilitator	Professional Developer
Supporter of School	School Leader	School Leader
	Facilitator for Change	
	Resource	*Contextually built into other roles*
Learner	Learner	

2.11 Establishment of Responsibilities

The process for establishing responsibilities for K-12 mathematics coaches in Targeted County began with consolidating all individual responsibilities from the Walpole, Virginia, and Dickenson programs. Responsibilities from the Walpole, Virginia, and Dickenson programs were collectively grouped by the roles to which they aligned from the Spokane program (i.e. all responsibilities, regardless of program origination, which aligned to the role of data coach were grouped together).

Then duplicate responsibilities were reduced to reflect one occurrence. For example, the responsibility of classroom modeling appeared throughout all three programs the researcher examined. Those three occurrences were reduced to just one iteration.

Next, similar responsibilities were consolidated when and if appropriate. For example the responsibility of assisting teachers in interpreting data and the responsibility of using data to plan instruction, while not exactly the same, were closely related and could be combined into one responsibility such as assisting teachers with interpreting and using data to guide instruction.

Finally, the remaining responsibilities were re-worded to be as clear and concise as possible. This process resulted in the establishment of twenty-one (21) specific responsibilities, aligned to established roles, for K-12 mathematics coaches in Targeted County.

2.12 Roles and Responsibilities for Targeted County K-12 Mathematics Coaches

Table 2-3: Proposed Mathematics Coach Roles and Responsibilities for Targeted County.

ROLES	RESPONSIBILITIES
Classroom Supporter	As a **classroom supporter**, the coach works with classroom teachers to enhance student and classroom management. The responsibilities of the coach as a classroom supporter include: • Collaborate through co-planning, co-teaching, and modeling • Assist teachers in identifying the academic needs of individual students • Assist teachers with specific classroom needs
Instructional Supporter	As an **instructional supporter**, the coach works to support interactions involving teachers, students, and content. The responsibilities of the coach as an instructional supporter include: • Assist teachers in developing appropriate and engaging classroom lessons • Support teachers' use of effective, research-based instructional practices • Ensure differentiated instruction
Curriculum Specialist	As a **curriculum specialist**, the coach works to promote and ensure the implementation of adopted standards and curriculum. The

ROLES	RESPONSIBILITIES
	responsibilities of the coach as a curriculum specialist include: • Assist teachers in understanding the standards • Ensure instruction is aligned to district, state, and national curriculum and standards • Coordinate the design of subject and grade level appropriate curriculum • Assist teachers in developing valid, reliable, and effective assessments • Support mathematics in other content areas (i.e. STEM)
Data Coach	As a **data coach**, the coach assists teachers and administration in the interpretation of data and facilitates the use of data to drive instruction. The responsibilities of the coach as a data coach include: • Assist in interpreting and utilizing formative and summative data • Assist teachers in creating formative and summative assessments
Professional Developer	As a **professional developer**, the coach provides relevant professional development opportunities for teachers and staff. The responsibilities of the coach as a professional developer include: • Provide professional development opportunities aligned to

ROLES	RESPONSIBILITIES
	teacher needs • Provide content area professional development • Provide pedagogical professional development
School Leader	As a **school leader**, the coach works to promote and support school and district initiatives to increase student achievement. The responsibilities of the coach as a school leader include: • Ensure the vertical articulation of mathematics standards from grade to grade • Design/provide input for school-wide mathematics programs • Assist in managing curriculum and materials • Facilitate communication between teachers, students, parents, and stakeholders • Foster a culture where mathematics is important

2.13 Meta Analysis to Support Coach Roles and Responsibilities

Classroom climate can have a substantial impact on student achievement. According to Hattie, classroom climate (which is composed of many teacher and management factors) has an effect size of .54 on student achievement (Hattie, 2009). Coaches can improve instruction and

increase student achievement by supporting teachers in their classrooms. Coaches can help the classroom teacher enhance student and classroom management by partnering with the teacher to plan, observe, and adjust classroom practices. In a meta-analysis published in 2009, Hattie reports that classroom management can have an effect size ranging from .52 to .80 on student achievement (Hattie, 2009).

Co-planning is another way coaches can support what is happening in the classroom. Additionally, modeling and co-teaching from coaches allows classroom teachers to observe effective strategies in the context of their own classroom. The role of the mathematics coach as classroom supporter provides assistance for the classroom teacher in identifying the needs of individual students. Identifying the needs of individual students is the first step in meeting the needs of all students and providing differentiated instruction. Meta-analyses noted that student engagement has an effect size of .48 on student achievement (Hattie, 2009).

Instruction, or the interactions involving teachers, students, and content, is another area in which coaches provide support for teachers. The role of the mathematics coach as an instructional supporter allows the coach to assist teachers in developing appropriate and engaging classroom lessons and supports teachers' use of effective, research-based instructional practices. Meta-analyses data from Hattie also shows that the effect size of emphasizing effective, research based teaching strategies (collectively) is .60 – over five times greater than that of content focused approaches (Hattie, 2009).

The School District of Targeted County utilizes a teacher evaluation system from the Marzano Research Laboratory. Research based practices from Marzano have been shown to have effect sizes as high as 1.32 on student achievement (Hattie, 2009). The average effective size was reported as .73 (Hattie, 2009).

. As a curriculum specialist, the mathematics coach works to promote and ensure the implementation of adopted standards and curriculum. In this role, the mathematics coach is responsible for ensuring that classroom instruction is aligned to district, state, and national standards and curriculum. This also includes assisting teachers in developing valid and reliable assessments, and ensuring standards based instruction in individual classrooms. Data from assessments plays an important role in instruction. Mathematics coaches can assist teachers and administration with effectively utilizing data to drive instruction leading to student success. As a curriculum specialist, mathematics coaches ensure the implementation of standards based instruction in the classroom. As a data coach, mathematics coaches assist teachers is creating valid and reliable assessments aligned to standards. In addition to assisting teachers in creating assessments (both formative and summative) the mathematics coach is also responsible for assisting in interpreting the results, or data, generated by assessments. Being able to accurately interpret assessment data is critical for teachers as they utilize the data to drive instruction in their classrooms. Hattie notes that formative assessments, when utilized effectively, can have an effect size as high as .90 on student achievement (Hattie, 2009).

Serving as a professional developer at the school level, the mathematics coach can provide professional development tailored to the needs of teachers and staff. The mathematics coach's approach to professional development should be twofold. The mathematics coach should provide both content area and pedagogical professional development. Providing content focused professional development works to ensure that teachers have the conceptual understandings necessary to conduct their jobs, while pedagogical professional development works to ensure that teachers are aware of appropriate and effective research-based instructional strategies. Through the roles of classroom supporter, curriculum specialist, and instructional

supporter, the coach can also provide the critical coaching follow up component to the professional development cycle (transfer of training). Meta-analyses on the impact of professional development report that professional development has an effect size of .62 on student achievement (Hattie, 2009).

Aside from working with teachers individually and in grade level groups, mathematics coaches working within Targeted County K-12 mathematics coach roles and responsibilities will also take on the role of school leader. Here the mathematics coach will carry out responsibilities directly related to mathematics programs and initiatives that impact the school as a whole. These initiatives should focus on increasing student achievement in mathematics. Thus, the mathematics coach as a school leader should be focusing on improving instruction and student achievement at the individual and collective level.

As a school leader, the coach ensures the vertical articulation of the standards from grade to grade. The mathematics coach should also design and provide input for any and all school-wide mathematics programs, including, but not limited to remediation, acceleration, and math club. Ultimately, the mathematics coach should serve to foster a school culture where mathematics is important.

2.14 Meeting Targeted County Needs as Identified by Survey

Table 2-4: Comparative Representation of How Proposed Roles & Responsibilities Meet The Needs of Stakeholders as Identified Through Coaches Survey Question #1.

Question #1	Summary of Survey Results	How Proposed Roles & Responsibilities Address Results
Describe the activities you regularly perform as a coach and how much time you spend each week on each activity.	9 participants (100%) - working w/teachers in classrooms modeling or observing lessons, analyzing data, coaching, planning, gathering resources, providing professional development, administering assessments	Establishment of clear and consistent roles and responsibilities supports and validates this work the coaches are already doing
	6 participants (66%) - other duties (i.e. substituting, attending meetings)	Establishment of clear, research based, roles and responsibilities will help all stakeholders – coaches, administrators, teachers – understand the work of the coach and the activities coaches should be engaged in to support instruction and student achievement
	4 participants (44%) other duties as assigned by admin	
	2 participants (22%) - hallway, lunch, or bus duty	

Table 2-5: Comparative Representation of How Proposed Roles & Responsibilities Meet The Needs of Stakeholders as Identified Through Coaches Survey Question #2 .

Question #2	Summary of Survey Results	How Proposed Roles & Responsibilities Address Results
Describe your understanding of your roles and responsibilities as a math coach.	6 participants (66%) - supporting teachers	Establishment of comprehensive roles and responsibilities for coaches will assist coaches (and stakeholders) in understanding how each aspect of the work of the coach is integrated.
	4 participants (44%) - student achievement	
	3 participants (33%) - ensuring adherence to state and local curriculum	
	Very few – supporting teachers, lesson planning, classroom management support	

Table 2-6: Comparative Representation of How Proposed Roles & Responsibilities Meet The Needs of Stakeholders as Identified Through Coaches Survey Question #3.

Question #3	Summary of Survey Results	How Proposed Roles & Responsibilities Address Results
What is/are the biggest challenge(s) you face as a math coach?	7 participants (78%) - lack of administrative support for or understanding of the role of the coach	Establishment of clear, research based, roles and responsibilities will help all stakeholders – coaches, administrators, teachers – understand the work of the coach and the activities coaches should be engaged in to support instruction and student achievement
	5 participants (55%) - lack of time	Establishment of clearly defined roles and responsibilities will help all stakeholders understand how and on what activities a coaches time should be spent, ideally reducing the time spent on activities which detract from the work of the coach.
	2 participants (22%) - teacher resistance	Establishment of clear, research based, roles and responsibilities will help all stakeholders – coaches, administrators, teachers – understand the work of the coach and contribute to establishing a relationship of trust between coach and teachers.

Table 2-7: Comparative Representation of How Proposed Roles & Responsibilities Meet The Needs of Stakeholders as Identified Through Coaches Survey Question #4.

Question #4	Summary of Survey Results	How Proposed Roles & Responsibilities Address Results
What resources do you feel you need in order to perform your job as a mathematics coach?	6 participants (66%) - administrative support	Establishment of clear, research based, roles and responsibilities will help all stakeholders – coaches, administrators, teachers – understand the work of the coach and the activities coaches should be engaged in to support instruction and student achievement
	2 participants (22%) - teacher buy-in	Establishment of clear, research based, roles and responsibilities will help all stakeholders – coaches, administrators, teachers – understand the work of the coach and contribute to establishing a relationship of trust between coach and teachers.
	Math manipulatives, iPad tablet	Not applicable

The mathematics coach roles and responsibilities created for Targeted County through this dissertation in practice will address the two most prevalent challenges revealed through the survey data – the lack of administrative support and lack of time. Survey results showed that mathematics coaches in Targeted County are spending too much time on other, non-coaching

related duties. Results also revealed a reported lack of support from administration. The lack of administrative support and the assignment of other non-coaching duties could be tied to stakeholder lack of understanding of the role of the coach. Coaches in the research study by Neufeld and Roper ((2003) also noted that other school-related duties took time away from their ability to work directly with teachers. The lack of stakeholder understanding of the roles and responsibilities of the mathematics coach could be responsible for the perceived resistance from teachers.

A well-defined, structured model of coaching which is presented and communicated thoroughly across all levels of the organization is critical to the success of any coaching program (Mudzimiri, et.al., 2014). If thoroughly communicated to all stakeholders, these established roles and responsibilities will help all stakeholders understand and support the work of K-12 mathematics coaches in Targeted County. As noted by Taylor, Moxley, Chanter, & Boulware (2007), the roles and responsibilities of the coach are a cornerstone for effective coaching.

CHAPTER 3 FRAMEWORK ANALYSIS

3.1 Intended Outcomes

The outcomes of establishing clear and consistent roles and responsibilities for existing and subsequent K-12 mathematics coaches in Targeted County, Florida include providing a common understanding for all stakeholders of the work of the coach and improved coach-stakeholder relationships. With a common understanding of the work of the coach, the objectives of improvement in mathematics instruction and student achievement can be more easily accomplished.

3.1.1 Understanding of Coaches' Roles and Responsibilities Will Improve

The primary goal of this dissertation in practice was to clarify the roles and responsibilities of K-12 mathematics coaches in Targeted County. The establishment and implementation of this work will provide a common understanding for all stakeholders as to the roles and responsibilities of the mathematics coaches. This understanding will allow administrators to support the work of the coach by focusing time spent on duties that align with the coaches' roles and responsibilities.

The National Council of Teachers of Mathematics (2009) reported that one of the most effective components of a coaching program is the broad communication to all stakeholders about the roles and responsibilities of the mathematics coach so that everyone worked from a

common understanding. A well-defined, structured model of coaching which is presented and communicated thoroughly across all levels of the organization is critical to the success of any coaching program (Mudzimiri, et.al., 2014).

3.1.2 Coach-Stakeholder Relationships Will Improve

Collaborative relationships between coaches and teachers are not easily established. Coaches often face resistance from teachers who adhere to cultural norms such as autonomy, egalitarianism, and seniority (Ippolito, 2010). Clearly defined roles and responsibilities will also help alleviate any misconceptions regarding the role of the coach in coach-teacher relationships

Established roles and responsibilities aid in allaying the fears and skepticism of stakeholders who may be suspicious of the function of the coach and benefit the establishment of relationships between the coach and stakeholders. The first practice for successfully leveraging the coach position is to clearly define the coach's roles and responsibilities (Taylor, et.al, 2007). The coach and faculty will learn exactly what to expect and how assistance will be provided to groups and individual teachers (Taylor, et. al., 2007). This framework, established for mathematics coaches in Targeted County, Florida, clearly defines the coach's roles and responsibilities and will allow all stakeholders, including coaches, to better understand the various ways mathematics coaches can support classroom teachers, students, and the school at large, to improve instruction and student achievement.

3.1.3 Instruction in Mathematics

Implementation of these research based roles and responsibilities will support coaches in working to improve classroom instruction and increase student achievement in mathematics. Student achievement is affected most directly by the quality of instruction, which includes the quality of the curriculum, the pedagogy, and the assessment (Newmann, King, & Youngs, 2000). These roles and responsibilities for Targeted County mathematics coaches will support curriculum, pedagogy, and assessment. As a curriculum specialist, coaches are not only responsible for assisting teachers in understanding mathematics standards. They are also responsible for ensuring that instruction is aligned to district, state, and national curriculum standards and must coordinate the design of subject and grade level appropriate curriculum. Mathematics coaches are also responsible for assisting teachers in developing assessments that are valid and reliable. The coach is responsible for supporting and ensuring the use of research based instructional practices within the classroom. In their role as a professional developer, coaches are responsible for providing pedagogical focused training and support for teachers. Implementation of these roles and responsibilities will support the work of the coach to ensure that quality curriculum, pedagogy, and assessment are in place to impact student achievement.

Instruction is directly affected by school capacity, including the strength of teachers, programs, and the community (Newmann, et.al., 2000). The roles of the coach support classroom teachers in many aspects. In addition to instructional support and professional development, the coach provides teachers with support in the classroom by collaborating with teachers on planning and delivery of lessons and identifying and responding to individual student needs. These proposed roles and responsibilities not only address the roles of coaches in support

teachers, but also coaching roles that promote school as well as district-wide programs. The role of the coach as a school leader delineates the responsibilities of the coach in establishing programs to meet the needs of all students and promote a culture where mathematics is valued. Working within the role of school leader, coaches provide cohesion to the school community. According to Newmann (2000), a school's instructional capacity is enhanced when its programs are coherent.

3.1.4 Student Achievement in Mathematics

A meta analysis conducted by Blank and de las Alas (2009), showed cross-study evidence that teacher professional development in mathematics does have positive effects on student achievement. The role of the coach as a professional developer assures that the coach works with teachers to provide both content and pedagogical training as well as addressing individual professional development concerns. In addition to providing professional development aimed at enhancing the pedagogical aspect of teaching, the coach as a professional developer also collaborate with teachers to increase their knowledge of and instruction in mathematics. Desimone, Porter, Garet, Yoon, & Birman (2002) found that the degree to which professional development was focused on improving and deepening teachers' content knowledge is one factor of professional development which has the greatest impact on teacher instruction. A study conducted by Harris and Sass (2011) found that content-focused teacher professional development is positively associated with productivity in middle and high school mathematics. Further, a report issued by the U.S. Department of Education in 2007 asserted that while it is challenging to show that, despite an intuitive and logical connection, professional development

translates into gains in student achievement, the department acknowledged links exist between professional development, teacher learning and practice, and student achievement

Student learning and the quality of instruction depend on a variety of structural resources (Newmann, et. al., 2000). The establishment of these roles and responsibilities for mathematics coaches in Targeted County, Florida provides that structural resource which has been lacking.

3.2 Unintended Outcomes

The focus of this dissertation in practice was to establish a structural resource for stakeholders in Targeted County, Florida that will provide a common understanding of the roles and responsibilities of K-12 mathematics coaches, with the intended outcomes of improving coach-stakeholder relationships, mathematics instruction, and student achievement. However, there are most likely unintended outcomes that will emerge as well. On a broad scale, some unintended outcomes include drawing more attention/interest to the mathematics coaching program, a change in the percentage of schools utilizing mathematics coaches, and impact on the district's literacy and science coaching programs.

3.2.1 Drawing Attention to Mathematics Coaching Program

The lack of clear jobs descriptions for any level of mathematics coach in Targeted County contributes to the uncertainty, held by all stakeholders, of the roles and responsibilities of the mathematics coaches. While this dissertation in practice provides a structure for establishing clear roles and responsibilities of the coach, it is not an all-encompassing job description. One unintended outcome of this research is the potential for drawing closer attention to the

mathematics coaching program itself. This may include the investigation into, and possible establishment of a specific coaching model or approach. It is also likely to prompt the establishment of an all-encompassing job description specifically for mathematics coaches; this currently does not exist. The establishment of a designated job description for mathematics coaches would open the doors of discussion for the commencement of standard requirements for mathematics coach candidates. Agreeing upon a standard set of requirements or qualifications for mathematics coaches may also initialize the assembly of a mathematics coaching pool, similar to the existing literacy coaching pool utilized by the district.

Drawing attention to the mathematics coaching program in Targeted County may favorably impact the program if it results in additional resources. Shedding light on some of the inconsistencies of the program may encourage district level administration to take a closer look at other areas of the program that are lacking. One area of inequity is funding. The district earmarks no funding for mathematics coaches. This means that there are no funds to support the professional development of coaches or provide any other resources necessary for coaches to conduct their jobs effectively.

3.2.2 Change in Percent of School's Utilizing Mathematics Coaches

It was noted earlier that formation of clear roles and responsibilities for coaches positively impacts all stakeholders. As a result of having a structure under which coaches can operate, the percentage of schools utilizing mathematics coaches may increase. Particularly for schools where administrative lack of understanding of the role of the coach exists, this work may provide the structure, support, and assurance needed for school based administration to employ a mathematics coach.

3.2.3 Impact on Other Content Area Coaching Programs

Calling attention to and focusing on the needs of the mathematics coaching program will most likely generate interest and attention towards the district's science and literacy coaching programs. The science coaching program, which is in an even more fragile state than the mathematics program, may benefit from this research. One positive outcome would be a close examination of the roles and responsibilities of the science coaches. Taking actions to clearly define the roles and responsibilities of K-12 science coaches has the potential to yield improvement in instruction and student achievement in science education. This could also result in similar outcomes for the science coaching program.

There is also a possibility that addressing the roles and responsibilities of K-12 mathematics coaches would renew interest in the district's existing literacy coaching program. As suggested by a review of the literature, revisiting and re-evaluating programs are necessary for the success and longevity of a coaching program. The literacy coaching program, although currently successful, may benefit from re-evaluation.

3.3 Measures

Despite an intuitive and logical connection, even the U.S. Department of Education (2007) agreed that it is challenging to show that professional development translates into gains in student achievement. They did, however, acknowledge links between professional development, teacher learning and practice, and student achievement. In order to measure the impact of this work on student achievement in mathematics in Targeted County, Florida, examination of coach impact on teacher learning and practice and student achievement can be conducted.

The impact of the coach on teacher learning and practice can be noted through classroom observations and survey. Observations can reveal behaviors such as to what extent the teacher utilizes effective, research based instructional practices or how the teacher monitors and responds to individual student learning needs. Student achievement data can be obtained through formative assessment and progress monitoring tools as well as formal and informal summative assessments.

3.4 Summary

Utilization of these roles and responsibilities for K-12 mathematics coaches in Targeted County, Florida will benefit many stakeholders. To begin, coaches will be able to operate with more focus and purpose when provided defined parameters within which to work. Gaining an overall understanding of their job and it components should help coaches see the integration of their roles and responsibilities, not just isolated duties. As other stakeholders gain a common understanding of the roles and responsibilities of the mathematics coach, time spent on coach related tasks and coach-teacher relationships may improve. When functioning within well-defined parameters, coaches can have a positive impact on instruction, which, in turn, can have a positive impact on student achievement.

Acknowledging the importance of establishing clear roles and responsibilities for Targeted County mathematics coaches is likely to call much needed attention to the mathematics coaching program as a whole. This may precipitate further improvements to the mathematics coaching program or even promote growth of the program. It is also possible that this dissertation in practice impacts other coaching programs in Targeted County, such as the science coaching program or literacy coaching program.

CHAPTER 4 IMPLICATIONS

4.1 Implications

Providing a common understanding of the work of the coach, improving coach-stakeholder relationships, and improving instruction and student achievement in mathematics will not come without implications. However, it is the belief of the researcher that there are many positive implications that will occur as a result of implementing a structured system of roles and responsibilities, beginning with the coaches. Due to the lack of structure regarding their roles and responsibilities, mathematics coaches in Targeted County voiced frustration and indicated a sense of not being as effective as they would like. Clearly defined roles and responsibilities will provide guidelines within which to work and should lend a sense of direction for coaches who are struggling with the parameters of their job. This sense of direction should help to alleviate some of the frustration coaches are currently experiencing as well as serve to diminish that sense of frustration for subsequent coaches.

Being able to work within defined parameters, coaches should have a more balanced sense of work, with les time spent on non-coach related duties, and increase their success as a coach. Coaching is a multi-faceted job, spending too much time and energy on one aspect of coaching while ignoring others can be detrimental. The framework provides a complete picture of the scope of the work of the coach and should help coaches and administrators balance their workload and improve success.

In addition to improving instructional quality, coaches also serve teachers in the use of data. The proposed roles call for the coach to serve as a data coach, fulfilling this role should improve teacher understanding and use of data. Teachers and the school at large should see

better identification of student needs and achievement using data as well as an increase in data driven instruction. Better use of data and faster identification of problem areas with allow for more appropriate and timely interventions for students.

As coach-teacher relationships improve and student achievement increases, the sense of a common goal for all which emerges from the implementation of clear roles and responsibilities for mathematics coaches will contribute positively to the culture of schools and their stakeholders. This collective sense of purpose and culture together with improved instruction should yield positive results on student achievement and the success of the school overall.

While the positive implications of implementing these roles and responsibilities should be encouraging, it is foreseeable that the implementation of such a framework may have some negative implications, particularly for school budgets. As noted in Chapter One, mathematics coaches are not funded by the district, but rather from individual school budgets. For this reason, many schools support either part-time coaches or no coaches at all. The costs associated with the employment of a mathematics coach are often a negative consideration for school-based administrators. As noted in the unintended outcomes, the implementation of this framework may precipitate an increased interest in utilizing more mathematics coaches which may apply more pressure to some schools to employ a full time mathematics coach, subsequently taxing the budgets of some schools that are already struggling.

4.2 Further Recommendations

Establishing clear roles and responsibilities will be a positive step forward for the mathematics coaching program in Targeted County, Florida. However, there is more work that still needs to be done, beginning with the establishment of complete job descriptions for K-12

mathematics coaches. Formalized job descriptions that incorporate these established roles and responsibilities are recommended. Formalized job descriptions would not only include coach roles and responsibilities, but also provide guidelines for desired qualifications of individuals seeking to work as a mathematics coach in Targeted County, Florida.

It is also recommended that the district establish and maintain a process for providing professional development for all instructional coaches. Working with adults requires a different set of skills than those acquired through pedagogical study. Mathematics coaches, as well as literacy and science coaches, could benefit from professional development on andragogy and interpersonal communications.

Upon reflection of the effectiveness of these structured roles and responsibilities, it may be beneficial for the district to apply the same measures for science coaches, as the job description and support situation for science coaches is similar to that mathematics coaches have faced.

4.3 Program Preparation

Many aspects of the coursework in the professional practice doctorate prepared the researcher to identify, examine, and respond to this problem of practice in Targeted County. The bulk of the coursework in the program prepares professionals to be able to identify, analyze, and evaluate complex problems of practice within organizations. The coursework also built the capacity for understanding possible problems and approaches for addressing problems. Coursework in organizational theory assists practitioners in developing a conceptual understanding of organizations and their frameworks. This understanding, coupled with the

understandings gained by studying the social, emotional, and psychological influences on human behavior were beneficial in gaining a fully developed understanding of this problem of practice.

Those same understandings are important when functioning in a leadership role, which was the role of the researcher throughout two laboratories of practice. One lab of practice allowed the researcher to apply knowledge of curriculum design as the leader of a cohort of literacy coaches and reading endorsement facilitators in Targeted County. The cohort was responsible for restructuring the coursework in the reading endorsement program offered by the district to align with new legislative changes to Florida's reading endorsement certification. A second lab of practice opportunity allowed the researcher to utilize curriculum, instructional, and leadership skills as a content developer and state facilitator for the Florida Department of Education's Common Core Summer Institute in 2013. The institute was designed to inform K-12 teachers about changes in the state's educational standards and instructional approaches to meet the standards. The institutes were offered in 7 locations across the state of Florida.

Coursework in the specific area of curriculum and instruction aided the researcher in also provided a solid foundation for understanding, designing, and evaluating the implementation of curriculum and a deeper understanding of andragogy. The approaches learned through coursework in andragogy were buttressed by the understandings gained through the study of influences on human behavior. This knowledge was pertinent when undergoing the dissertation in practice because of the nature of the relationship between coach and teacher.

Finally, the courses taken in instructional leadership played an important role in this particular problem of practice because those courses allowed the researcher to look at instructional practices from a leadership/administrative viewpoint. This understanding was critical when addressing a district-wide problem that impacts each school individually. Having

that administrative perspective aided the researcher in developing a framework for mathematics coaches' roles and responsibilities that met the needs of not only the coaches, but their stakeholders as well.

APPENDIX A:
TARGETED COUNTY ELEMENTARY MATH/SCIENCE COACH JOB DESCRIPTION

51A

TITLE: **Elementary Math/Science Coach**

QUALIFICATIONS:

1. Minimum of a Bachelor's degree in Elementary Education from an accredited college or university, (a Master's Degree is desirable) a valid Florida teaching certificate.
2. A minimum of three years successful teaching experience and one year experience in a leadership role as grade-level chairperson.
3. Demonstrated competency in knowledge of the Sunshine State Standards, scientifically-based mathematics/science research, exemplary practices in mathematics/science instruction and data analysis.
4. Ability to plan, organize and direct activities for teachers.
5. Ability to establish and maintain effective working relationships with teachers, administration, district staff, and the public.
6. Experienced in facilitating adult training.

REPORTS TO: School Principal and Director of Elementary Education

POSITION GOAL: This position focuses on student achievement by working with teachers to ensure quality implementation of research-based mathematics and science program(s) and scientifically-based mathematics and science strategies/practices at the elementary school level.

PERFORMANCE RESPONSIBILITIES:

1. Serve as coach, mentor, and conduct on-going classroom observations of mathematics and science instruction,
2. Facilitate implementation of appropriate mathematics and science curriculum by providing technical assistance and on-going support for elementary school teachers as they identify and implement authentic learning activities and materials, implement effective teaching strategies, evaluate student progress, and participate in student screening and progress-monitoring,
3. Support and assist classroom teachers in assessing the specific mathematics and science needs of students, develop appropriate, differentiated instruction, and refer students to the elementary school remediation process if necessary,
4. Assist the District in implementing the elementary school mathematics and science curricula at the school level,
5. Provide opportunities for professional development in mathematics and science components, scientifically-based mathematics and science research, high quality mathematics and science instruction, and data interpretation and management; involving teachers, assistants, administrators, parents, and other stakeholders,
6. Coordinate and assist with mathematics and science assessments, student progress monitoring, and training teachers in student data analysis,
7. Participate in the selection and/or adoption of textbooks and other instructional materials at the school and/or county level,
8. Assist in the preparation and monitoring of the School Improvement Plan/Continuous Improvement Model,
9. Inventory and monitor the use of mathematics/science materials,
10. Coordinate vertical articulation between grade levels,
11. Perform other duties as directed by the Principal or the Director of Elementary Education.

PERIOD OF EMPLOYMENT: Ten 10 Months
PAY LEVEL: Teacher Salary Schedule
EVALUATION: Performance in this position will be evaluated annually by the Principal.

April 2006

APPENDIX B:
TARGETED COUNTY SECONDARY MATHEMATICS/SCIENCE COACH JOB DESCRIPTION

TITLE: **Secondary Mathematics/Science Coach**

QUALIFICATIONS:

1. Minimum of a Bachelor's degree from an accredited college or university, (a Master's Degree is desirable) a valid Florida teaching certificate, and certification in 6-12 mathematics or science for high school and/or 5-9 mathematics or science for middle school
2. A minimum of three years successful teaching experience
3. Demonstrated competency in knowledge of the Sunshine State Standards, scientifically-based mathematics/science research, exemplary practices in mathematics/science instruction and data analysis
4. Ability to plan, organize, and direct activities for teachers
5. Ability to establish and maintain effective working relationships with teachers, administration, district staff, and the public
6. Experienced in facilitating adult training

REPORTS TO: School Principal and Director of Secondary Education

POSITION GOAL: This position focuses on student achievement by working with teachers to ensure quality implementation of research-based mathematics and science program(s) and scientifically-based mathematics and science strategies/practices at the secondary school level.

PERFORMANCE RESPONSIBILITIES:

1. Serve as a coach, mentor, and conduct on-going classroom observations of mathematics and science instruction
2. Facilitate implementation of appropriate mathematics and science curriculum by providing technical assistance and on-going support for secondary school teachers as they identify and implement authentic learning activities and materials, implement effective teaching strategies, evaluate student progress, and participate in student screening and progress-monitoring
3. Support and assist classroom teachers in assessing the specific mathematics and science needs of students, develop appropriate, differentiated instruction, and refer students to the secondary school remediation process if necessary
4. Assist the District in implementing the secondary school mathematics and science curricula at the school level
5. Provide opportunities for professional development in mathematics and science components, scientifically-based mathematics and science research, high quality mathematics and science instruction, and data interpretation and management; involving teachers, assistants, administrators, parents, and other stakeholders
6. Coordinate and assist with mathematics and science assessments, student progress monitoring, and training teachers in student data analysis
7. Participate in the selection and/or adoption of textbooks and other instructional materials at the school and/or county level
8. Assist in the preparation and monitoring of the School Improvement Plan/Continuous Improvement Model
9. Inventory and monitor the use of mathematics/science materials
10. Coordinate vertical articulation between grade levels
11. Perform other duties as directed by the Principal or the Director of Secondary Education

PERIOD OF EMPLOYMENT: Ten (10) months
PAY LEVEL: Teacher Salary Schedule
EVALUATION: Performance in this position will be evaluated annually by the Principal

APPENDIX C:
IRB APPROVAL OF EXEMPT HUMAN RESEARCH

University of Central Florida Institutional Review Board
Office of Research & Commercialization
12201 Research Parkway, Suite 501
Orlando, Florida 32826-3246
Telephone: 407-823-2901 or 407-882-2276
www.research.ucf.edu/compliance/irb.html

Approval of Exempt Human Research

From: **UCF Institutional Review Board #1**
FWA00000351, IRB00001138

To: **Beth Davis**

Date: **June 10, 2015**

Dear Researcher:

On 06/10/2015, the IRB approved the following activity as human participant research that is exempt from regulation:

Type of Review:	Exempt Determination
Project Title:	Roles and Responsibilities: Creating a Model for Mathematics Coaches at the School District of [redacted] County, FL.
Investigator:	Beth Davis
IRB Number:	SBE-15-11350
Funding Agency:	
Grant Title:	
Research ID:	N/A

This determination applies only to the activities described in the IRB submission and does not apply should any changes be made. If changes are made and there are questions about whether these changes affect the exempt status of the human research, please contact the IRB. When you have completed your research, please submit a Study Closure request in iRIS so that IRB records will be accurate.

In the conduct of this research, you are responsible to follow the requirements of the Investigator Manual.

On behalf of Sophia Dziegielewski, Ph.D., L.C.S.W., UCF IRB Chair, this letter is signed by:

Joanne Muratori

Signature applied by Joanne Muratori on 06/10/2015 10:16:13 AM EDT

IRB manager

APPENDIX D:
SURVEY PARTICIPATION EMAIL COMMUNICATION

The following is a copy of email communication that will be sent to Targeted County mathematics coaches asking them to participate in the online survey regarding their roles and responsibilities as a mathematics coach for the School District of Targeted County:

Dear Colleague,

As a doctoral student at the University of Central Florida, I am examining the roles and responsibilities of K-12 mathematics coaches in Targeted County. Presently, in the district, there is no formal model for mathematics coaches. The purpose of my research is to better understand the needs of the district's mathematics coaches and to design a coaching model for K-12 mathematics coaches in Targeted County.

Your name and email was obtained from Targeted County School administration because you were identified by the school district as currently working as a mathematics coach in the district. In order to better understand the needs of coaches in your district, I would like to ask for your participation in completing a brief, four question online survey. The questions are open-ended and your responses will be anonymous. The survey will take approximately ten (10) minutes to complete. Your participation is completely voluntary.

Although your participation is not required, the quality of the data collected can only be strengthened by your input. Please consider taking a few minutes to complete the online survey. You can access the survey via the link below and completing the survey should take only a few minutes.

If you have any questions or concerns about completing the survey or the survey itself, please feel free to contact me at beth.davis@knights.ucf.edu or Dr. Carolyn Hopp, Faculty Supervisor at (407) 823-5771 or by email at Carolyn.Hopp@ucf.edu.

Thank you for your participation!

Beth Davis
Doctoral Student
College of Education and Human Performance
University of Central Florida

APPENDIX E:
PARTICIPANT 1 SURVEY RESPONSES

Q1: Please describe the activities you regularly perform as a coach and how much time you spend each week on each activity.
Morning, afternoon, and lunch supervision duties 8 hours weekly. Classroom learning walks 4 hours. Meeting with teachers regarding resources or planning 1.5 hours. Meeting with administration 1 hour. Looking at and interpreting data 2 hours.
Q2: Please describe your understanding of your roles and responsibilities as a math coach.
Interpreting data and planning accordingly. Increasing scores by any means necessary. Being a part of the STEM initiatives and incorporating math standards into all content areas
Q3: What is/are the biggest challenge(s) you face as a math coach?
Having the time to work with teachers while getting pulled for duties. Differing expectations/demands from different administrators.
Q4: What resources do you feel you need in order to perform your job as a math coach?
Nothing tangible, just the freedom to do what I know is best for students...rewarding success, more one-on-one time

APPENDIX F:
PARTICIPANT 2 SURVEY RESPONSES

Q1: Please describe the activities you regularly perform as a coach and how much time you spend each week on each activity.
Co-teach, model lessons, and provide professional development opportunities, cooperative lesson planning, student small group instruction, analyzing data, and math interventions.
Q2: Please describe your understanding of your roles and responsibilities as a math coach.
Support teachers and students in learning mathematics.
Q3: What is/are the biggest challenge(s) you face as a math coach?
Time.
Q4: What resources do you feel you need in order to perform your job as a math coach?
More professional development and formative assessments.

APPENDIX G:
PARTICIPANT 3 SURVEY RESPONSES

Q1: Please describe the activities you regularly perform as a coach and how much time you spend each week on each activity.
meeting with new teachers, attending plc's observing classrooms 5 hours
Q2: Please describe your understanding of your roles and responsibilities as a math coach.
ensure and assist all teachers to provide students with their needs to teach students to be able to understand the current standards
Q3: What is/are the biggest challenge(s) you face as a math coach?
TIME
Q4: What resources do you feel you need in order to perform your job as a math coach?
Respondent skipped this question

APPENDIX H:
PARTICIPANT 4 SURVEY RESPONSES

Q1: Please describe the activities you regularly perform as a coach and how much time you spend each week on each activity.
Model lessons - weekly (grade level varies by need) Professional Learning Community - weekly (each grade level once per week) Professional Development - at least one per month Data Analysis & Testing schedules - ongoing throughout the entire year New teacher mentor - ongoing throughout year Lesson planning/resource search - ongoing throughout year Curriculum training - ongoing throughout year District & leadership meetings - ongoing all yr. MTSS meetings/review - at least one per week with team & parent meetings as scheduled * Any other duties as needed by administration
Q2: Please describe your understanding of your roles and responsibilities as a math coach.
To assist with implementation of district, state, and school based initiatives as needed within the areas of curriculum, lesson design, and data analysis to increase student achievement. Coaches also provide support to teachers through modeling best practices within the classroom and by searching for resources needed to design quality lessons aligned to state standards.
Q3: What is/are the biggest challenge(s) you face as a math coach?
Teacher turnover is a challenge - starting with 10-15 new teachers or teachers moved to new grade levels & finding time to implement and train all teachers in accordance with district mandates & schedules.
Q4: What resources do you feel you need in order to perform your job as a math coach?
District support is needed to ensure we are on track with initiatives & funding for much needed supplies to provide quality instruction in a real world setup.

APPENDIX I:
PARTICIPANT 5 SURVEY RESPONSES

Q1: Please describe the activities you regularly perform as a coach and how much time you spend each week on each activity.
Modeling Classes, assisting teachers and administrators, curriculum revisions and recommendations. Other duties as assigned by the administrator
Q2: Please describe your understanding of your roles and responsibilities as a math coach.
My priority is to assist the teachers in any way or form that I can, from lesson plans to discipline and classroom management.
Q3: What is/are the biggest challenge(s) you face as a math coach?
Time is always a factor.
Q4: What resources do you feel you need in order to perform your job as a math coach?
A more organized planning in general to maximize the time we have to assist the teachers

APPENDIX J:
PARTICIPANT 6 SURVEY RESPONSES

Q1: Please describe the activities you regularly perform as a coach and how much time you spend each week on each activity.
Observing teachers (2-4), analyzing/creating data reports for administration (2-4), review teacher created assessments (2-4), attend PLC meetings (1), look for/modify activities and formatives for new FSA standards (5-10), meet with Administration (2), work with teachers during their planning time (5-8), from March to May I am assigned as a test administrator for state assessments. Duties given by administration as required.
Q2: Please describe your understanding of your roles and responsibilities as a math coach.
My role is to increase student achievement in the area of mathematics. This broad statement requires that I mentor my colleagues, provide teachers with new instructional strategies and resources, ensure teachers have the necessary materials to successfully implement strategies and activities, mentor new teachers, participate in PLC meetings to ensure that teachers remain focused. Help PLC's identify power standards and discuss ways to ensure the students are exposed to rigorous performance tasks/activities to teach these standards. Analyze data in order to identify opportunities to reteach material. Collaborate with other math coaches to discuss ways to improve my relationship with my teachers and/or ways to be more efficient.
Q3: What is/are the biggest challenge(s) you face as a math coach?
Resistance from teachers who are not interested in implementing new strategies or working collaboratively on common assessments/activities
Q4: What resources do you feel you need in order to perform your job as a math coach?
Support from Administration (which I currently have), daily common planning time for PLC's (in addition to Wednesdays or PLC time), coverage for teachers within the same PLC's to observe each other teaching similar lessons. More structured outline from Administration exactly what the goals are of each PLC (i.e., common summative assessments for a unit must be summited two weeks prior to giving the assessment, etc.).

APPENDIX K:
PARTICIPANT 7 SURVEY RESPONSES

Q1: Please describe the activities you regularly perform as a coach and how much time you spend each week on each activity.
It's very difficult to allot time to any particular activity. -Coaching -Modeling -Assessing -Planning for teachers, with teachers, for assistants -Creating activities -Taking PD, and giving it as well -Teacher conferences -Student conferences -Parent training -parent Conference/ information sometimes -Coordinating and running a math night -Coordinating and running a science night -Running data reports -Sharing data reports -MTSS committee member (Multi-tiered Support System) -Retention committee member -Parent Training: Standards information -Small group support -Purchasing resources -Organizing resources -Organize tutoring groups -Organize Intervention groups -Oversee intervention and it's data -Run the math & science committee meeting -Preview resources or websites to be used by teachers and/or students as well as parent -Attend district meetings and trainings
Q2: Please describe your understanding of your roles and responsibilities as a math coach.
My roles and responsibilities are to support the teachers, parents, and administration in a way to impact student achievement. Student learning is the end goal.
Q3: What is/are the biggest challenge(s) you face as a math coach?
My biggest challenges are all the tests students have to take and teachers have to administer. I think it takes too much time away from the teaching and learning.
Q4: What resources do you feel you need in order to perform your job as a math coach?
I'm very blessed here at this district. We are given much resources, especially technology and training which is crucial to perform my duties and responsibilities.

APPENDIX L:
PARTICIPANT 8 SURVEY RESPONSES

Q1: Please describe the activities you regularly perform as a coach and how much time you spend each week on each activity.
Preparing lessons, preparing teacher's classroom, assisting substitute teachers and making copies when teachers are absent: 1-2 hours a week STAR Math: up to 10 hours a week (when window is open) Meetings: 3-7 hours a week ELO: up to 5 hours a week Collecting and analyzing data: up to 5 hours a week Math Intervention: 2-4 hours a week Classroom visits: 7-10 hours a week Coaching teachers: 4-5 hours a week Training: 4-8 hours a month Tutoring/mentoring students: 2-3 hours a week Listening to teacher concerns and complaints: 2-3 hours a week Hall duty/bus duty: 3-4 hours a week Dealing with student behavior/dress code/horseplaying in hallways/sending to deans/writing referrals 1-2 hours a week Contacting parents via phone calls, emails, letters/ parent conferences: 2-3 hours a week Training teachers: 1-3 hours a week Providing teachers with materials and resources: 2-3 hours a week Reading and writing emails: 4-5 hours a week Preparing for PLC and Math Department meetings: 2-3 hours a week
Q2: Please describe your understanding of your roles and responsibilities as a math coach.
My roles and responsibilities were clarified during the coaches training during this school year. Unfortunately, theory and practice are not always the same. I believe that administrators should be informed by the members of the school district what are the roles and responsibilities of the math coach and the literacy coach.
Q3: What is/are the biggest challenge(s) you face as a math coach?
My biggest challenges are trying to fill in for Math teachers when they are absent and do not leave lesson plans. In the morning, I need to find a lesson, or make copies of the assignment that may have been emailed to me in the morning. At times, I do have to cover for teachers when they are absent. Time is a big challenge as well. I am divided so much between different meetings, STAR Math, ELO tutoring, etc that it is sometimes hard to get into the classroom and coach teachers. During the state testing window it is impossible to visit any classrooms or coach any math teachers because I am constantly administering tests.
Q4: What resources do you feel you need in order to perform your job as a math coach?
Time and maybe a tablet for when I attend the meetings. It would be so much easier to keep track of so much information if I had a tablet instead of carrying with notebooks. Carrying a laptop affects my back.

APPENDIX M:
PARTICIPANT 9 SURVEY RESPONSES

Q1: Please describe the activities you regularly perform as a coach and how much time you spend each week on each activity.
Teacher conferences - 4or 5 hours each week Planning with teachers - 4 hours per week Managing materials - 5 hours per week Student Assessment - 6 hours per week Data Analysis - 8 hours per week MTSS - 3 hours per week
Q2: Please describe your understanding of your roles and responsibilities as a math coach.
The focus of my role as I understand should be on student achievement and success. The end result of that is data analysis and how to help teachers change their course of instruction or teaching methods to best meet the needs of their students.
Q3: What is/are the biggest challenge(s) you face as a math coach?
Having teachers believe that I am here to serve as their assistant or to teach their classes or pull small groups for them.
Q4: What resources do you feel you need in order to perform your job as a math coach?
More manipulatives would be nice so that I can facilitate workshops for teachers. Resource materials would be helpful to have for research for planning those workshops. More teacher buy in for such things as grade levels without having the teacher contract thrown my way.

APPENDIX N:
SURVEY QUESTION 1 AGGREGATE RESPONSE

	Q1: Please describe the activities you regularly perform as a coach and how much time you spend each week on each activity.
Respondent #1	Morning, afternoon, and lunch supervision duties 8 hours weekly. Classroom learning walks 4 hours. Meeting with teachers regarding resources or planning 1.5 hours. Meeting with administration 1 hour. Looking at and interpreting data 2 hours.
Respondent #2	Co-teach, model lessons, provide professional development opportunities, cooperative lesson planning, student small group instruction, analyzing data, and math interventions.
Respondent #3	meeting with new teachers, attending plc;s observing classrooms 5 hours
Respondent #4	Model lessons - weekly (grade level varies by need) Professional Learning Community - weekly (each grade level once per week) Professional Development - at least one per month Data Analysis & Testing schedules - ongoing throughout the entire year New teacher mentor - ongoing throughout year Lesson planning/resource search - ongoing throughout year Curriculum training - ongoing throughout year District & leadership meetings - ongoing all yr. MTSS meetings/review - at least one per week with team & parent meetings as scheduled * Any other duties as needed by administration
Respondent #5	Modeling Classes, assisting teachers and administrators, curriculum revisions and recommendations. Other duties as assigned by the administrator.
Respondent #6	Observing teachers (2-4), analyzing/creating data reports for administration (2-4), review teacher created assessments (2-4), attend PLC meetings (1), look for/modify activities and formatives for new FSA standards (5-10), meet with Administration (2), work with teachers during their planning time (5-8), from March to May I am assigned as a test administrator for state assessments. Duties given by administration as required.

	Q1: **Please describe the activities you regularly perform as a coach and how much time you spend each week on each activity.**
Respondent #7	It's very difficult to allot time to any particular activity. -Coaching -Modeling -Assessing -Planning for teachers, with teachers, for assistants -Creating activities -Taking PD, and giving it as well -Teacher conferences -Student conferences -Parent training -parent Conference/ information sometimes -Coordinating and running a math night -Coordinating and running a science night -Running data reports -Sharing data reports -MTSS committee member (Multi-tiered Support System) -Retention committee member -Parent Training: Standards information -Small group support -Purchasing resources -Organizing resources -Organize tutoring groups -Organize Intervention groups -Oversee intervention and it's data -Run the math & science committee meeting -Preview resources or websites to be used by teachers and/or students as well as parent -Attend district meetings and trainings
Respondent #8	Preparing lessons, preparing teacher's classroom, assisting substitute teachers and making copies when teachers are absent: 1-2 hours a week STAR Math: up to 10 hours a week (when window is open) Meetings: 3-7 hours a week ELO: up to 5 hours a week Collecting and analyzing data: up to 5 hours a week Math Intervention: 2-4 hours a week Classroom visits: 7-10 hours a week Coaching teachers: 4-5 hours a week Training: 4-8 hours a month Tutoring/mentoring students: 2-3 hours a week Listening to teacher concerns and complaints: 2-3 hours a week

Respondent #8 (con't)	**Q1: Please describe the activities you regularly perform as a coach and how much time you spend each week on each activity.**
	Hall duty/bus duty: 3-4 hours a week Dealing with student behavior/dress code/horseplaying in hallways/sending to deans/writing referrals 1-2 hours a week Contacting parents via phone calls, emails, letters/ parent conferences: 2-3 hours a week Training teachers: 1-3 hours a week Providing teachers with materials and resources: 2-3 hours a week Reading and writing emails: 4-5 hours a week Preparing for PLC and Math Department meetings: 2-3 hours a week
Respondent #9	Teacher conferences - 4or 5 hours each week Planning with teachers - 4 hours per week Managing materials - 5 hours per week Student Assessment - 6 hours per week Data Analysis - 8 hours per week MTSS - 3 hours per week

APPENDIX O:
SURVEY QUESTION 2 AGGREGATE RESPONSES

	Q2: **Please describe your understanding of your roles and responsibilities as a math coach.**
Respondent #1	Interpreting data and planning accordingly. Increasing scores by any means necessary. Being a part of the STEM initiatives and incorporating math standards into all content areas
Respondent #2	Support teachers and students in learning mathematics.
Respondent #3	ensure and assist all teachers to provide students with their needs to teach students to be able to understand the current standards
Respondent #4	To assist with implementation of district, state, and school based initiatives as needed within the areas of curriculum, lesson design, and data analysis to increase student achievement. Coaches also provide support to teachers through modeling best practices within the classroom and by searching for resources needed to design quality lessons aligned to state standards.
Respondent #5	My priority is to assist the teachers in any way or form that I can, from lesson plans to discipline and classroom management.
Respondent #6	My role is to increase student achievement in the area of mathematics. This broad statement requires that I mentor my colleagues, provide teachers with new instructional strategies and resources, ensure teachers have the necessary materials to successfully implement strategies and activities, mentor new teachers, participate in PLC meetings to ensure that teachers remain focused. Help PLC's identify power standards and discuss ways to ensure the students are exposed to rigorous performance tasks/activities to teach these standards. Analyze data in order to identify opportunities to reteach material. Collaborate with other math coaches to discuss ways to improve my relationship with my teachers and/or ways to be more efficient.

	Q2: **Please describe your understanding of your roles and responsibilities as a math coach.**
Respondent #7	My roles and responsibilities are to support the teachers, parents, and administration in a way to impact student achievement. Student learning is the end goal.
Respondent #8	My roles and responsibilities were clarified during the coaches training during this school year. Unfortunately, theory and practice are not always the same. I believe that administrators should be informed by the members of the school district what are the roles and responsibilities of the math coach and the literacy coach.
Respondent #9	The focus of my role as I understand should be on student achievement and success. The end result of that is data analysis and how to help teachers change their course of instruction or teaching methods to best meet the needs of their students.

APPENDIX P:
SURVEY QUESTION 3 AGGREGATE RESPONSES

	Q3: **What is/are the biggest challenge(s) you face as a math coach?**
Respondent #1	Having the time to work with teachers while getting pulled for duties. Differing expectations/demands from different administrators.
Respondent #2	Time.
Respondent #3	TIME
Respondent #4	Teacher turnover is a challenge - starting with 10-15 new teachers or teachers moved to new grade levels & finding time to implement and train all teachers in accordance with district mandates & schedules
Respondent #5	Time is always a factor
Respondent #6	Resistance from teachers who are not interested in implementing new strategies or working collaboratively on common assessments/activities.
Respondent #7	My biggest challenges are all the tests students have to take and teachers have to administer. I think it takes too much time away from the teaching and learning.
Respondent #8	My biggest challenges are trying to fill in for Math teachers when they are absent and do not leave lesson plans. In the morning, I need to find a lesson, or make copies of the assignment that may have been emailed to me in the morning. At times, I do have to cover for teachers when they are absent. Time is a big challenge as well. I am divided so much between different meetings, STAR Math, ELO tutoring, etc that it is sometimes hard to get into the classroom and coach teachers. During the state testing window it is impossible to visit any classrooms or coach any math teachers because I am constantly administering tests.

	Q3: **What is/are the biggest challenge(s) you face as a math coach?**
Respondent #9	Having teachers believe that I am here to serve as their assistant or to teach their classes or pull small groups for them

APPENDIX Q:
SURVEY QUESTION 4 AGGREGATE RESPONSES

	Q4: **What resources do you feel you need in order to perform your job as a math coach?**
Respondent #1	Nothing tangible, just the freedom to do what I know is best for students...rewarding success, more one-on-one time
Respondent #2	More professional development and formative assessments
Respondent #3	*(Respondent skipped this question)*
Respondent #4	District support is needed to ensure we are on track with initiatives & funding for much needed supplies to provide quality instruction in a real world setup.
Respondent #5	A more organize planning in general to maximize the time we have to assist the teachers.
Respondent #6	Support from Administration (which I currently have), daily common planning time for PLC's (in addition to Wednesdays or PLC time), coverage for teachers within the same PLC's to observe each other teaching similar lessons. More structured outline from Administration exactly what the goals are of each PLC (i.e., common summative assessments for a unit must be summited two weeks prior to giving the assessment, etc.).
Respondent #7	I'm very blessed here at this district. We are given much resources, especially technology and training which is crucial to perform my duties and responsibilities.
Respondent #8	Time and maybe a tablet for when I attend the meetings. It would be so much easier to keep track of so much information if I had a tablet instead of carrying with notebooks. Carrying a laptop affects my back.
Respondent #9	More manipulatives would be nice so that I can facilitate workshops for teachers. Resource materials would be helpful to have for research for planning those workshops. More teacher buy in for such things as grade levels without having the teacher contract thrown my way.

APPENDIX R:
RESULTS FROM ALIGNING RESPONSIBILITIES FROM WALPOLE PROGRAM AND ROLES FROM CHVAL'S PROGRAM

Coaching Responsibilities from Walpole Program	Roles (Chval - Relationship to Needs of Stakeholders)
Planning and/or providing intervention	Teacher, Student
Working with teachers individually	Teacher
Working with teachers in groups	Teacher
Providing PD	Teacher
Organizing materials and resources	School
Demonstrating instruction inside classroom	Teacher
Conducting observations	Teacher
Working with data	School
Managing curriculum	School
Promoting fidelity of curriculum and assessment	School

APPENDIX S:
RESULTS FROM ALIGNING RESPONSIBILITIES FROM VIRGINIA PROGRAM AND ROLES FROM CHVAL'S PROGRAM

Coaching Responsibilities from Virginia Program	Roles (Chval - Relationship to Needs of Stakeholders)
Collaborate with individual teachers, teams of grade level mathematics teachers, and with vertical teams across grade levels through co-planning, co-teaching, and coaching	Teacher
Assist administrative and instructional staff in interpreting data (both formative and summative) and designing approaches to improve student achievement and instruction	School
Collaborate with teachers and teams of teachers to ensure that the school's instructional practices are aligned with state and national standards, as well as their school division's mathematics curriculum	Teacher
Assist teachers with delivery and understanding of the school curriculum through collaborative long-range and short-range planning	Teacher
Facilitate teachers' use of successful, research-based instructional strategies, including differentiated instruction for diverse learners, and appropriate use of technology	Teacher
Provide job-embedded professional development focused on both mathematical content knowledge and mathematical pedagogy	Teacher
Assist teachers in fostering partnerships with parents/guardians and community leaders to foster continuing home/school/community relationships focused on students' learning of mathematics	School
Collaborate with administrators (in and outside of the mathematics community) to develop a vision and to provide leadership through professional development and for a school-wide mathematics program	School

APPENDIX T:
RESULTS FROM ALIGNING RESPONSIBILITIES FROM DICKENSON PROGRAM AND ROLES FROM CHVAL'S PROGRAM

Coaching Responsibilities from Dickenson Program	Roles (Chval - Relationship to Needs of Stakeholders)
Advocate for quality mathematics teaching and learning as well as high expectations and opportunities for all students to learn mathematics	Teacher, Student
Help teachers identify professional goals to improve the teaching of mathematics and strategies for achieving those goals	Teacher
Strengthen teacher knowledge related to teaching number, geometry, algebra, measurement, and statistics at the K-8 level	Teacher
Facilitate professional development as well as collaboration meetings (e.g. grade level meetings, vertical team meetings, etc.)	Teacher
Help teachers design effective mathematics lessons that align with national, state, and district standards	Teacher
Teach and co-teach lessons in individual classrooms for the purpose of improving the teaching and learning of mathematics	Teacher
Observe lessons for the purpose of discussing mathematics and student thinking with teachers	Teacher
Assist teachers with issues that specifically pertain to their classrooms such as curriculum planning, classroom management, assessment, and technology	Teacher
Work with teachers to identify and address the needs of individual students including, but not limited to, special education, gifted, and students whose first language is not English	Teacher
Collaborate with teachers to analyze student work to determine student understandings and misconceptions	Teacher
Analyze student achievement data and work with teacher teams to design instruction that addresses areas that need improvement	Teacher
Provide resources related to improving teaching and learning of mathematics	Teacher
Build teacher leadership capacity at the school level	School
Lead district initiatives	School
Facilitate opportunities for teachers to observe other teachers teach mathematics in their school or other schools	Teacher
Assist teachers to design school improvement efforts such as math clubs, tutoring, intervention initiatives, etc.	School
Facilitate communication among teachers, parents, and administrators	School
Help create a school environment where the importance of mathematics is evident	School

APPENDIX U:
DISTRIBUTION OF ALL RESPONSIBILITIES ALIGNED TO ROLES FROM CHVAL'S PROGRAM

Chval's Roles	Walpole Responsibilities	Virginia Responsibilities	Dickenson Responsibilities
Teacher	6/10 or 60%	5/8 or 64%	13/18 or 72%
Student	1/10 or 10% (dual coded with Teacher)	0/8	1/18 or 6% (dual coded with Teacher)
School	4/10 or 40%	3/8 or 37%	5/18 or 28%
Learner	0/10	0/8	0/18

APPENDIX V:
RESULTS FROM ALIGNING RESPONSIBILITIES FROM WALPOLE PROGRAM AND ROLES FROM SPOKANE PROGRAM

Coaching Responsibilities from Walpole Program	Roles (Spokane - Task Oriented Approach)
Planning and/or providing intervention	Instruction
Working with teachers individually	Resource
Working with teachers in groups	Resource
Providing PD	PD
Organizing materials and resources	Resource
Demonstrating instruction inside classroom	Instruction
Conducting observations	Classroom
Working with data	Data
Managing curriculum	Curriculum
Promoting fidelity of curriculum and assessment	Curriculum

APPENDIX W:
RESULTS FROM ALIGNING RESPONSIBILITIES FROM VIRGINIA PROGRAM AND ROLES FROM SPOKANE PROGRAM

Coaching Responsibilities from Virginia Program	Roles (Spokane -Task Oriented Approach)
Collaborate with individual teachers, teams of grade level mathematics teachers, and with vertical teams across grade levels through co-planning, co-teaching, and coaching	Instruction
Assist administrative and instructional staff in interpreting data (both formative and summative) and designing approaches to improve student achievement and instruction	Data
Collaborate with teachers and teams of teachers to ensure that the school's instructional practices are aligned with state and national standards, as well as their school division's mathematics curriculum	Curriculum
Assist teachers with delivery and understanding of the school curriculum through collaborative long-range and short-range planning	Curriculum
Facilitate teachers' use of successful, research-based instructional strategies, including differentiated instruction for diverse learners, and appropriate use of technology	Instruction
Provide job-embedded professional development focused on both mathematical content knowledge and mathematical pedagogy	PD
Assist teachers in fostering partnerships with parents/guardians and community leaders to foster continuing home/school/community relationships focused on students' learning of mathematics	School
Collaborate with administrators (in and outside of the mathematics community) to develop a vision and to provide leadership through professional development and for a school-wide mathematics program	School

APPENDIX X:
RESULTS FROM ALIGNING RESPONSIBILITIES FROM DICKENSON PROGRAM AND ROLES FROM SPOKANE PROGRAM

Coaching Responsibilities from Dickenson Program	Roles (Spokane - Task Oriented Approach)
Advocate for quality mathematics teaching and learning as well as high expectations and opportunities for all students to learn mathematics	School
Help teachers identify professional goals to improve the teaching of mathematics and strategies for achieving those goals	Resource
Strengthen teacher knowledge related to teaching number, geometry, algebra, measurement, and statistics at the K-8 level	PD
Facilitate professional development as well as collaboration meetings (e.g. grade level meetings, vertical team meetings, etc.)	PD
Help teachers design effective mathematics lessons that align with national, state, and district standards	Curriculum
Teach and co-teach lessons in individual classrooms for the purpose of improving the teaching and learning of mathematics	Instruction
Observe lessons for the purpose of discussing mathematics and student thinking with teachers	Instruction
Assist teachers with issues that specifically pertain to their classrooms such as curriculum planning, classroom management, assessment, and technology	Classroom
Work with teachers to identify and address the needs of individual students including, but not limited to, special education, gifted, and students whose first language is not English	Classroom
Collaborate with teachers to analyze student work to determine student understandings and misconceptions	Data
Analyze student achievement data and work with teacher teams to design instruction that addresses areas that need improvement	Data
Provide resources related to improving teaching and learning of mathematics	Resource
Build teacher leadership capacity at the school level	Change
Lead district initiatives	Change
Facilitate opportunities for teachers to observe other teachers teach mathematics in their school or other schools	Resource
Assist teachers to design school improvement efforts such as math clubs, tutoring, intervention initiatives, etc.	School
Facilitate communication among teachers, parents, and administrators	School
Help create a school environment where the importance of mathematics is evident	School

APPENDIX Y:
DISTRIBUTION OF ALL RESPONSIBILITIES ALIGNED TO ROLES FROM SPOKANE PROGRAM

Role	Walpole Responsibilities	Virginia Responsibilities	Dickenson Responsibilities
Classroom	1/10 or 10%	0/8	2/18 or 11%
Instruction	2/10 or 20%	2/8 or 25%	2/18 or 11%
Curriculum	2/10 or 20%	2/8 or 25%	1/18 or 5.5%
Data	1/10 or 10%	1/8 or 12.5%	2/18 or 11%
Change	0/10	0/8	2/18 or 11%
Learner	0/10	0/8	0/18
PD	1/10 or 10%	1/8 or 12.5%	2/18 or 11%
Resource	3/10 or 30%	0/8	3/18 or 17%
School	0/10	2/8 or 25%	4/18 or 22%

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