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Exploring a Supplemental Educational Service Math Program: The Math Achievement of Economically Disadvantaged Students and Teacher Professional Development

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Abstract

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Dissertation Submitted in Partial Fulfillment

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Abstract

The No Child Left Behind education act mandates that school districts develop supplemental educational service programs for students not demonstrating mathematical proficiency on state standardized math assessments. Yet there is limited understanding of issues related to supplemental educational service math programs. The purpose of this qualitative study was to investigate a local after school math program to offer insight on the low math achievement for economically disadvantaged students involved in the program. Constructivist theories of math reform and education for economically disadvantaged students and English language learners guided this study of 10 teachers and 15 of their students in a diverse urban elementary school in the northeastern United States. Two questions guided this research: One on the mathematical achievement of economically disadvantaged students in the local after school math program; the other on the nature of professional development for teachers of supplemental educational service programs. Data from observations and teacher interviews were analyzed using constructivist grounded theory coding procedures. Data revealed themes centered on program structures, student attributes, instructional strategies, professional collaboration, curriculum, and professional development. Findings further revealed educational communities can increase student math achievement through strategic teacher training. The final project addresses social change with the creation of a research supported action plan for teacher professional development within the local supplemental educational math program. This research is significant to school leaders in the advancement of supplemental educational service math programs for academically diverse learners.

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Dedication

"Adelante… Palomita… Adelante"

(Don Jose)

This is dedicated to the first scholar in my life, my father. As you faced the biggest battle of your life, I was blessed to be in the presence of a stoic warrior. When we held hands in your final days, you encouraged me to continue your legacy of overcoming life's obstacles. With God's help, this *palomita* (dove) promises to soar and plant seeds of compassion to reach the farthest corners for those less fortunate.

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Section 1: The Problem

This qualitative instrumental case study focused on two issues related to the local problem: low math achievement of an economically disadvantaged elementary student population; and limited teacher professional development within a supplemental educational service after-school math program. The study site was a socio-economically diverse urban elementary school located within Westchester County, New York situated in the northeastern region of the United States of America.

In this section, I present the rationale for a closer examination of this local problem, and define a collection of special terms associated with the problem. I also outline the theoretical framework that guided my literature review and detail my efforts to find research on the local problem. Furthermore, I share numeric and comparative public data gathered from the New York State Department of Education which reports the mathematical achievement of local economically disadvantaged students. In the final section, I discuss the implications of my work.

Definition of the Problem

The problem that I explored is the low math achievement of local economically disadvantaged elementary students as well as the limited nature of professional development for teachers directly working with low-math achievement fourth graders in a local school-based supplemental educational service after school math program. The local problem started to unfold approximately eight years ago when I served as a district math instructional specialist within the school district. In this capacity, I collaborated

with educational leaders and teachers to design district-based and school-based math professional development opportunities across five elementary schools, an early childhood preschool program, and a transitional program for new immigrant elementary students.

During this time, the local district responded to the United States Department of Education's (USDOE, 2002) No Child Left Behind, Act of 2001 wherein school districts received legislative mandates to demonstrate educational reform efforts that could yield higher rates of academic success for all students. The ultimate objective of No Child Left Behind (NCLB) is to close the minority achievement gap between socio-economically diverse students wherein said students must demonstrate proficiency on state standardized tests by the year 2014 (USDOE, 2007b). During this time, I served in the professional development role of district math instructional specialist. As a district-wide math professional developer, I reviewed, applied, and presented a range of research-tested instructional practices which aligned with field-tested professional teaching and learning standards (National Council of Teachers of Mathematics, 2008; 2000; 1989). The district-wide professional development opportunities that I developed focused on student math achievement and the district implementation of a standards-based mathematics program: Investigations in Data, Space, & Time ® (Pearson Education, 2009). My professional development role as the mathematics instructional specialist was the district's central implementation strategy for addressing curricular issues necessary to promote mathematical proficiency for all students.

Currently, the local problem continues as I serve in the role of a school-based math lead teacher and fourth grade elementary school teacher. Although the local district is in the midst of implementing the standards-based math program, a marginalized population of economically disadvantaged students continues to demonstrate low mathematical proficiency on state and district math assessments (New York State Department of Education, 2009b). As an educator and school-based math lead teacher, the experiences I gained by directly working within the context of this local problem were favorable in conducting a doctoral project case study.

Prior to the launch of the study, I participated in a local district-based and state-mandated initiative wherein testing data were collected and analyzed to report on the quality of math instruction as well as monitor student math achievement (New York State Department of Education, 2009c; 2009d). One of the primary objectives of using this district-wide database monitoring system is to help educational leaders track standardized math testing results from the New York State Standardized Mathematics Assessments for third, fourth, and fifth grade students (New York State Department of Education, 2009b; USDOE 2006a). The longitudinal school testing data for the past three years reveal a significant math achievement gap between economically disadvantaged fourth grade students and students classified as "not disadvantaged" as demonstrated by the New York State Standardized Fourth Grade Math Assessment (New York State Department of Education, 2006b, 2008; 2009b). Statistics collected from successive *New York State School Report Card: Accountability and Overview Reports* focus on different student groups within the local school setting (New York State Department of Education, 2006b,

2008; 2009b). In Table 1, the numeric data reveal that in the past three years, there has been a 10% increase in the number of students demonstrating math proficiency on the New York State Standardized Fourth Grade Math Assessment. However, a significant number of economically disadvantaged students demonstrate low math achievement across a span of three years (New York State Department of Education, 2006b, 2008; 2009b). Economically disadvantaged students are students who are eligible to receive free or reduced school lunch (USDOE, 2009b). In the role of math lead teacher, I reviewed the standardized assessment findings and identified a significant number of economically disadvantaged students not making adequate yearly progress in the learning of mathematics (New York State Department of Education, 2006b, 2008; 2009b).

Table 1

Math Proficiency on the New York State Fourth Grade Math Assessment

Math Proficiency on the New York State Fourth Grade Math Assessment		
Academic Year	Economically Disadvantaged Students (Eligible to receive free or reduced lunch)	Not Disadvantaged
2005-2006	67%	86%
2006-2007	63%	91%
2007-2008	77%	93%

Local school leaders will use the assessment data to (a) identify students that are not demonstrating adequate yearly progress and, (b) cite students in need of academic intervention services (NYSDOE, 2009d). When the elementary students are classified in

need of academic intervention services within the local school setting, school leaders and teachers work to develop short term supplemental educational services. The students who demonstrate need of academic intervention services traditionally attend a remedial extended day math program; two days per week for four weeks (D. Stinchcomb, personal communication, October 2, 2009). The supplemental educational service program is financed with Title 1 federal funds sanctioned by the NCLB education Act (USDOE, 2009a). This form of a local accountability mechanism facilitates the identification and enrollment of students in need of math intervention services.

This local problem also involves inconsistencies in the level of professional development for teachers directly working in the supplemental educational service after school math programs. The district took steps to advance teacher professional development throughout the traditional school day infrastructure (via the use of five school-based math instructional specialist assigned in the 2008-2009 school year). However, a professional development plan does not exist for teachers directly working with the economically disadvantaged students in the supplemental educational service after-school math program (G. Peluso, personal communication, October 30, 2009). Elementary school teachers have access to district data for their traditional day students, but the teachers of the supplemental educational service program do not participate in data analysis of recent standardized testing data; hence they may not be aware of common patterns of math deficits within the marginalized population of low-income and struggling math learners (Cabán-Vázquez, 2007). Further examination of the local problem reveals that the supplemental educational service program teachers do not follow

an instructional scope and sequence of key math lessons (G. Peluso, personal communication, October 30, 2009). Consequently, there is a lack of curriculum coherence for students receiving remedial math support within this supplemental educational service after school math program (T. Klemm, personal communication, September 30, 2009). The systemic properties of the local school-based supplemental educational math program are in sharp contrast to the professional development and curriculum initiatives present within the local school's traditional day (T. Klemm, personal communication, September 30, 2009). The misalignment between local professional development work and the curriculum focus the math program, brings up unexplored factors that can be explored within a qualitative instrumental case study.

In a broader examination of supplemental educational service programs, I discovered how the local problem unfolds into the larger national educational setting. Many school districts across the state and nation face obstacles that prevent them from complying with all of the facets of NCLB's supplemental educational service regulations (Alexander, 2006; Burch, Steinberg & Donovan, 2007; Sanders, 2008; USDOE, 2008). Almost a decade after the enactment of NCLB and close to 5 years after the ratification of supplemental educational service mandates, many urban and socio-economically diverse districts are not serving the educational needs of a diverse student body (Miller, Kerr & Ritter, 2008; Sanders, 2008; Sunderman, 2008). Numerous school districts note that limited federal monetary allocations present the largest obstacle in the development of supplemental educational services (Center for Evaluation and Education Policy, 2005; Fusarelli, 2007; USDOE, 2009a). Coupled with limited funding, school districts must

address the complex nature of planning, administering, and evaluating complementary service programs (Ascher, 2006; Fuller, Wright, Gesicki & Kang, 2007; Manna, 2006; National Education Association, 2008; Sunderman, 2006; The Century Foundation, 2008; Weiss, 2005; Yinger, 2004). Educational findings demonstrate how school and district leaders face budgetary and infrastructural obstacles and as a result many districts are not in compliance with all of the components of NCLB educational sanctions (USDOE, 2009a). The local problem of limited compliance of NCLB's supplemental educational service mandates is evident within the national educational setting.

Rationale for Choosing the Problem

When I sought evidence from the body of professional literature to examine a local problem, my awareness was raised concerning (a) the low mathematical achievement among economically disadvantaged students and (b) the limited nature of teacher professional development of supplemental educational service programs are undeniably a New York State and national problem (Hao & Pong, 2008; Hill & Lubienski, 2007; Planty, et al., 2009; USDOE, 2009a). Research findings report that the limited implementation of supplemental educational services for economically disenfranchised students continues to directly affect mathematical achievement in many local school communities (Miller, Kerr & Ritter, 2008; Muñoz, Potter, & Ross, 2008; USDOE, 2009a). In the interest of nationally addressing math educational inequities, a majority of school districts have (a) adopted standards-based instructional math programs, (b) aligned district math curriculum to reflect professional teaching and

learning standards, and (c) proposed differentiated professional staff development (Nasir & Cobb, 2007; National Council of Teachers of Mathematics, 2008; Sherblom, Marshall, & Sherblom, 2006; Slavin & Lake, 2008). A substantial number of district and school leaders recognize the need for strategic action plans that can yield educational math reform and offer extended learning opportunities (Park, 2009; USDOE, 2007; Yeh, 2007). The legislative call for equitable math learning for all students is prompting multifaceted educational reform to reach educational leaders, teachers, and students.

The NCLB federal regulatory guidelines sanction the need for school-based supplemental educational services to address the issues of educational inequities. The U.S. Department of Education (2005; 2007; 2008; 2009b) defines supplemental educational services as remedial academic instruction received outside of the traditional school day. School districts must meet legislative sanctions develop supplemental educational programs that are consistent with state learning outcomes, and provide high quality research-based supplemental education service instruction tailored to promote student academic achievement (The U.S. Department of Education, 2005; 2007; 2008; 2009b). School communities are mandated to address inequities in math education by striving to meet multiple supplemental educational service guidelines.

Educational leaders may be surprised to learn that the use of supplemental educational service programs is not a novel approach for addressing the math achievement gap among marginalized populations (USDOE, 2007a). The proposed framework of supplemental educational service programs is an analogous component of the formerly sanctioned Title 1 programs under the Elementary and Secondary Education

Act (ESEA) of 1965 (States Impact on Federal Education Policy(SIFEP), 2006). The United States Department of Education (2005; 2006a; 2008, 2009a) affirms that supplemental educational service programs can offer students valuable opportunities to deepen their understanding of concepts that initially might be challenging.

A closer review of the literature reveals that when school communities offer supplemental educational service programs, they extend learning support that can steer struggling students from failure to success (Slavin & Lake, 2008). Likewise, Lauer et al. (2006) report that several decades of research reveal how complementary-learning structures such as early childhood education, school and home-based family support programs, and after-school programs, promote higher academic achievement for at-risk students. Supplemental programs present quality experiences that affect learning and academic success (USDOE, 2007b; Farbman, 2006; Weiss, 2005). Similarly, the Forum for Youth Investment (2009) stated that quality out-of-school opportunities can make a difference in promoting academic achievement because they can complement environments shaped by schools (p.3). When a school provides supplemental educational service programs, disadvantaged students receive extended learning opportunities that address the educational needs of this marginalized population.

Districts and schools are obligated to use a set of eligibility criteria to determine student access to supplemental educational service programs (USDOE, 2009a). The United States Department of Education (2009b) has developed a reporting system in which school districts must submit a summary report that describes the district's program configurations. Under Title 1, Section 1116(e), the criteria for supplemental educational

service program eligibility included all students from low-income families attending Title 1 funded schools and those and not making adequate achievement gains required by Section 1111 of the Elementary and Secondary Education Act (USDOE, 2008, 2009a). When school districts prepare for the implementation of supplemental educational service programs, they must identify the marginalized group of students who demonstrate a need for this extended and remedial learning opportunity.

Based on this set criteria, a local school may have a significant number of students eligible to receive access to supplemental educational service remedial programs (Hamilton, Stecher & March, 2007; Miller, Kerr & Ritter, 2008; USDOE, 2009b). In a report for the National Center for Children in Poverty, Chau and Douglas-Hill (2008) reported approximately 15 million American children (18% of the national average) living in families with incomes below the federal poverty level (p.16-17). According to a population report released by the United States Census Bureau (2008), 21.5 % of the children that live in poverty are of Hispanic origin (p. 15). It is probable that the combination of two marginalized population groups—low-income and Hispanic students— can comprise of over one-third or a quarter of a school's population (NIOST, 2006; USDOE, 2006a; 2008). As schools use the mandated federal and state supplemental educational service eligibility criteria formula, school leaders may face a significant number of students eligible for supplemental educational service school-based programs.

When educational leaders address a high number of students in need of supplemental educational services, they may need to consider an assortment of resource

allocation strategies to implement supplemental educational service programs (USDOE, 2007a). District administrators need to factor in alternative times for offering supplemental educational service programs, for example before or after school, on a Saturday, or on a vacation day (USDOE, 2007b). Recently, the United States Department of Education (2009b) and the New York State Department of Education (2009c) offered resources to enable districts to implement and evaluate district and school-based supplemental educational services. The development of supplemental educational service programs requires a staff focused on managing the multi-faceted operational program systems that offer quality-based opportunities for eligible students (USDOE, 2009b; 2008). District and school leaders must mull over a variety of program design and allocation strategies to develop and administer successful supplemental educational service programs.

In summary, my goal in conducting a project study was to address the local problem and provide greater insight in solving it. As noted earlier, regardless of the enforcement and accountability measures of NCLB, research suggests that many school communities are not in compliance of developing, administering, and evaluating supplemental educational services (Sanders, 2008; USDOE, 2009a). It has been close to ten years since the release of the NCLB educational mandate, and standardized testing trends reveal that an academic achievement gap still exists among socio-economic subgroups (Gamoran, 2007; Guitiérrez, 2008; Schoen & Fusarelli, 2008; Sunderman, 2008). School learning communities must take more innovate steps toward educational reform in to eradicate educational inequities marked by a minority and socio-economic

achievement gap (Beecher & Sweeney, 2008; James, Milenkiewicz & Buckman, 2008; Ketterlin-Geller, 2008; Lubienski, 2007; USDOE, 2007b). Consequently, this project study was designed to address this local problem.

Definition of Special Terms

I offer the following definitions of key terms associated with the local problem. The educational community is in the process of grappling with the following key concepts that underpin the principles of educational policy and spark educational reform.

Differentiated instruction (D.I.): a responsive and instructional approach to a range of learning needs and abilities of students within a class structure (Baska et al., 2008; Thomlinson & McTighe, 2006). A teacher that effectively differentiates instruction recognizes that students come to the learning community with a broad scope of background knowledge, particular learning preferences, and varying degrees of readiness, language, and interests (Hall, 2002, p.2). The aim of D.I. is to meet the immediate learning needs of students by assisting in the learning process as well as to help students' capitalize on their own academic growth and individual achievement (Hall, 2002; Strickland, 2009).

Economically disadvantaged student: "Low-income" (economically disadvantaged) students recognized by the United States Department of Health and Human Services (2009) as students who are eligible to receive free or reduced lunch (p.4200).

Math Equity: having high expectations that are "free from bias" for all students and offering equitable and rigorous math instruction with a range of resources that demonstrates value and respect for all students. Gutiérrez (2007) asserts that "Equity means fairness, not sameness" (p.2). The National Council of Teachers of Mathematics (2000) distinguished between equity and equality within its *Principles of Standards for School Mathematics* by stating that "reasonable and appropriate accommodations be made to promote access and attainment for all students" (p.12). Similarly, Hiebert (1997) described math equity as the belief where "every learner—bilingual students, handicapped students, students of all ethnic groups, students who live in poverty, girls and boys—can learn mathematics with understanding" (p. 65). In order for teachers to effectively offer equitable math learning for all students (math equity), a range of theoretical perspectives and insights must be examined and adjusted to ensure effective use of socio-culturally sensitive instructional strategies that promote math success for all students (Nasir & Cobb, 2006).

Standards-Based Math Instruction: type of instruction that subscribes to a set of teaching and learning principles or standards delineated by the international and professional organization—The National Council of Teachers of Mathematics (2009). This ambitious and comprehensive set of teaching and learning standards can offer a guide for educational leaders, educators and policy makers (NCTM, 2008). The central purpose of using a standards-based math instruction is to offer "…a common foundation of mathematics to be learned by all students" (NCTM, 2000, p.5). It puts forth a full-scale plan that can offer access to rigorous and rich math instruction. Standards-based math

instruction delineates an explicit set of educational learning outcomes which can enable students to pursue educational, professional, and lifelong pursuits (NCTM, 2009).

Supplemental Educational Services: a service that offers standards-based learning experiences outside of the traditional academic structure of a school day expressively designed for the promotion of academic success pursuant to the USDOE's (2009a; 2005) No Child Left Behind Act (USDOE, 2002).

Teacher Leadership: an educator who demonstrates teacher leadership engages in the capacity-building process of designing collegial circles centered on instructional problem-solving strategies and professional decision making (Crowther, Ferguson & Hann, 2008; McEwan, 2002). Collegial interactions led by a teacher leader can (a) begin and guide study groups, (b) link teacher networks within and across the school site, (c) encourage collegial mentoring, (d) arrange grade level or team meetings, (e) introduce lesson study methods among a team of teachers, and (f) facilitate or direct site-based workshops (Cress, 2003; Crowther, Ferguson & Hann, 2008; Fullan, 2001). Teacher leadership can be demonstrated within several professional domains of an educational setting.

Significance of the Problem

This qualitative doctoral project case study —exploring the professional development of supplemental educational service math teachers and the math achievement of low-income students—may raise awareness of the local problem. I intend to share findings with the local school district. Within the past five years, research

findings suggest that many educational leaders and educators are unsuccessfully directing the design, function, and evaluation of supplemental educational service programs (Burch et al., 2007; Sunderman & Kim, 2004). Many school districts are not comprehensively meeting the math educational needs of economically disenfranchised youth (Burch et al., 2007; Sunderman & Kim, 2004). As a result, millions of eligible low-income and struggling math learners do not gain access to quality extended-day math programs (Herman & Dietel, 2005; Lee, 2006; Muñoz, 2008; Owens & Sunderman, 2006). In some cases, students acquire entrée to supplemental educational services, but the students may not participate in high-quality, research-based, and standards-based math programs aligned to state academic standards (Bathon & Spradlin, 2007; Sunderman, Kim & Orfield, 2005). Research findings describe how some students who receive supplemental educational services may not be exposed to sound, research-based supplemental educational programs aligned to state academic standards (Hamilton, Stecher, & March, 2007; Lubienski, 2007; USDOE 2009a). This doctoral project case study may help address the local problem by exploring the issues within a local supplemental educational service math program. Within the structure of a qualitative instrumental case study, I conducted an in-depth analysis by collecting and analyzing multiple forms of qualitative data pertaining to the local strategies for the design, administration, and evaluation of a supplemental educational service math program.

Problem Statement

Research is needed to examine the low math achievement among economically disadvantaged elementary students. In addition, research is needed to understand the nature of professional development for teachers working with students in supplemental educational service math programs.

Almost a decade after the enactment of NCLB and close to 5 years after the ratification of SES mandates, many urban and socio-economically diverse districts are not serving the educational needs of a socio-economically diverse student body (Burch et al., 2007; Lee, 2006; Sanders, 2008). Educational leaders and teachers need insight into the nature of supplemental educational service programs. Professional development for supplemental educational service teachers is needed (Hamilton et al., 2007). The data gathered in an instrumental case study will offer details on the math achievement of economically disadvantaged students in the supplemental educational service math program.

Research can offer valuable markers for educational communities searching for practical solutions (Creswell, 2008). An examination into this problem may help address the gaps between the professional literature and educational practice. In retrospect, when the NCLB sanctions first began to impact school communities, educational leaders had a limited pool of research findings which focused on the implementation of supplemental educational service programs (USDOE, 2004). At the onset of this new educational sanction, there existed a narrow body of research centered on research-based and field-tested solutions (Farbman, 2006; Landsverk, 2004). A literature review reveals that,

within the first few years after the educational mandates of NCLB's supplemental educational services, educational leaders faced research findings primarily highlighting the minority achievement gap (Holloway, 2004; Hanushek & Raymond, 2005; Lee, 2006; Lubienski, 2006; Sunderman & Owens, 2006). When the USDOE (2005) shared guidelines and expectations for the call and implementation of supplemental educational service programs, school districts across the country continued to face obstacles that prevented them from complying with the multifaceted components of NCLB regulations. Instead educational leaders had access to research findings illuminating the rate of low mathematical proficiency between minority students and their White counterparts (Alexander, 2006; Burch et al., 2007; Sanders, 2008). The limited nature of the professional literature may have contributed to the slow development of effective NCLB—sanctioned supplemental programs. My aim from this study was to bridge the gap between the professional literature and educational practices.

Literature Review

In the first phase of this literature review, I establish the theoretical framework for this study by reviewing literature on the constructivism theory as it relates to math education as well as social and educational reform. In the next phase, I report findings from NCLB policy briefs as well as interim and final reports related to the national and state level launch of supplemental educational services. This examination will lead to a review of the United States Department of Educations' (2009) accountability reports concerning the national and state level math achievement of low- income students. In the

final phase of the literature review, I share results from peer-reviewed professional journals centered on extended-day programs, professional teaching and learning standards, and the role of teacher leadership in mathematics instruction.

The sources for the literature review searches include ERIC, EBSCO, SAGE, and PROQUEST databases which connect researchers to current full-text copies of research findings related to education and educational policy. Using these professional literature databases, I used various search terms and Booleans database search engine queries on Academic Search Premier and Education Research Complete. Professional databases assisted me in seeking a variety of peer-reviewed literature. The search terms I used included *No Child Left Behind, supplemental educational service programs, student math achievement, economically disadvantaged students*, *extended day programs, math professional development, math equity,* and *standards-based math instruction*. Furthermore, I gathered primary sources from the Walden University Library's multimedia professional online "E-book" service with offers full-text access to over 13,000 books that are available in the Walden Library (Walden, 2009b). Finally, I was able to gain access to other primary sources from my personal professional library.

Theoretical Framework

The theoretical framework for this study was centered on the theories of constructivism related to math learning and educational math reform. Within the first decade of the 21st century, educational communities are still in the process of constructing meaning and refining instructional math practices to align with the conceptual framework of NCLB. The theoretical framework for my study hinged on the

course or process of educational reform and how this relates to math learning for all students.

The theories of constructivism and educational reform in mathematical pedagogy are interrelated. Constructivism suggests that as learners pursue knowledge, they engage in the ritual of assimilating new concepts and in turn they change their cognitive structures to accommodate new knowledge (Brooks & Brooks, 1999; Fosnot, 1992; Lambert et al., 2002; Shapiro, 2006). Within a constructivist math learning environment, the math educator offers extensive opportunities for students to construct a deeper understanding of math knowledge that can transfer into their daily lives (Engle, 2006). Math learners actively engaged in making meaning of mathematics demonstrate math achievement (McVarish, 2007). Mathematical instruction aligned to the tenets of constructivist theory served as a theoretical construct for my qualitative doctoral project study.

In tandem with the constructivist theory, educators must align their instructional practice to promote educational reform for educators and students (National Council of Teachers of Mathematics, 2008). The modification and refinement of instructional practices or strategies is a multidimensional process involving (a) the use of revised teaching and learning materials, (b) the use of innovative teaching approaches, and (c) the alteration and community alignment of "beliefs" that may trigger the development of educational policies or programs (Craig, 2009; Ferris, Hentschke & Harmssen, 2008; Fullan, 2007; Nasir & Cobb, 2007). I examined how legislative policies pertaining to supplemental educational service programs can promote educational change. In addition,

I explored how equitable access to quality math instruction may promote academic success for low-income students. Literature on this topic suggests the alignment of instructional practices may contribute to the educational reform needed to affect mathematical achievement.

Beginning Steps in Educational Math Reform

Throughout the twentieth century, the educational community examined theoretical and empirical research on didactic techniques for learning math. This evidence helped to pave the way towards math education reform. The paradigm shift towards educational math reform occurred as early as the 1930's when Brownell's (1947/2006) research centered on the importance of providing math instruction that encouraged math learners to reason and problem solve verses the popular methodology of rote memorization and use of numeric facts. Likewise, Pólya's (1957) empirical findings offered instructional strategies which outfitted math learners with a range of problem solving tools. The math reform movement was incited by the math learning theory, holding that learning involves the active construction of mathematical understanding. Learning occurs when math students engage in mathematical discourse and the manipulation of objects to solve problems (Piaget, 1973; Vygotsky, 1962). Constructivist learning theory began to offer a structure for educators to promote math inquiry that was student-centered versus teacher-centered. As the educational community examined a range of instructional techniques, qualitative studies captured the essence of this constructivist pedagogy.

After three decades of providing theoretical scaffolds, the scope of educational research studies shifted from qualitative inquiries to quantifiable forms of learning. Hiebert et al. (1997) reported that by the end of the 1970's educators and educational leaders shifted from the constructivist approach to learning math in favor of a "back to basics" approach of rote memorization and swift computation. During the close of the 1980's, compelling empirical evidence recreated the momentum of math education reform (NCTM, 1989; National Research Council, 1989). The era of standards materialized and educational law and policy would soon follow (Fullan, 2007). Recently, in the interest of addressing inequities in the United States educational system, the legislative act of NCLB called for the use of research-based practices to promote and measure academic success for all students (Ladson-Billings & Tate, 2006; Miller, Kerr & Ritter, 2008; USDOE, 2006; 2004; 2002). The educational research path took a different form and research findings reported quantifiable learning outcomes.

Historic Implications of ESEA Title 1 & NCLB Acts

The legacy of NCLB is rooted in historic educational policy originally intended to create an educational system equipped to extend equitable education to the disenfranchised (States Impact on Federal Education Policy Project (SIFEPP), 2006; USDOE, 2002). The enactment of the ESEA Act of 1965,Title 1, coincided with the civil rights movement in the United States in which social and educational inequities were brought to light (Martin, 2009, 2008; Moses, 2001). Educational policy became the tool to promote fair educational opportunities (Center for Evaluation and Educational Policy, 2007). Under this statute, not only could the allocation of Title I funds be used for the

improvement of educational opportunities (such as building more schools) but programs could be developed to affect educational outcomes for disadvantaged and low-achieving students (SIFEPP, 2006, p.17). After the enactment of ESEA, Title 1 eligible school districts developed fundamental structures to create Title I funded programs in compliance with the ESEA Act of 1965 (SIFEPP, 2006). Current educational policies that address issues of educational inequities for the economically disenfranchised stem from historic legislative actions launched nearly five decades ago.

Yet with the advent of the NCLB Act of 2001, which reconstituted the ESEA Act of 1965, learning communities must utilize a broader use of supplemental educational services for disadvantaged or low-achieving students not making adequate yearly progress (USDOE, 2007; 2005, 2004). Supplemental educational services must be research-based to offer quality programs that improve student academic achievement (USDOE, 2009a, 2008, 2005). In order to ensure adherence to this educational legislation, the USDOE placed a few bureaucratic mechanisms to scrutinize compliance. One such governing entity is The Student Achievement and School Accountability Program (SASA) developed by the USDOE (2005) to monitor and review state education departments. The enactment of the high stakes vehicle of accountability— supplemental educational services— theoretically ensures that educational leaders take stock of the academic progress of marginalized populations.

With the rigorous standards and target outcomes regulated under NCLB, school districts face the charge of utilizing Title 1 funds under Section 1001-Part A across a broad range of expectations set by the USDOE (2009a). Schools districts must ensure that

they are (a) administering state assessments and holding schools accountable by keeping track of student achievement as measured by state standardized tests for third grade through twelfth grade; (b) training teachers on the use of standards-based instructional materials aligned to state curriculum standards; (c) meeting the diverse learning needs of at-risk and low achieving student; (d) targeting educational reform strategies to close the minority achievement gap; and (e) providing families opportunities to actively engage in worthwhile educational activities with their children (USDOE, 2009a; 2008; 2005). Research shows that as school districts strive to comply with educational and legislative mandates, these public educational institutions must spread the use of monetary and professional resources across an expansive range of curricular, academic, and socio-economic needs (USDOE, 2009a).

Current State of Supplemental Educational Services

When educational leaders embark in educational reform, concerns and questions may arise. Fullan (2001b) captured the essence of this irresolute process by stating "All change including progress, contains ambivalence and dilemmas because, when we set off on a journey to achieve significant change, we do not know in advance all the details of how to get there, or even what it is going to be like when we arrive" (p.345). Logically as educational leaders and communities received mandates to develop supplemental educational service programs, these changes prompted questions and concerns by the communities experiencing the reform.

A key concern surrounding NCLB is the varying per-child costs that educational leaders face as they work to meet the 2014 expectation of 100% student proficiency of

state standards. At the launch of supplemental educational service program sanctions, the USDOE (2004) reported that the average district per-pupil expenditures for supplemental educational services comprised of $865 (p. 24). However, there was a range of costs for various sized districts: in one large city district, the per pupil costs were $370 compared to another mid-size central district that had $1,136 (USDOE, 2004, p.23). The range in program expenditures for supplemental service programs was not predictable and ambivalent for educational leaders to develop accurate cost projections (Farmer, 2005). Some urban and socio-economically diverse schools across the country claimed that they needed to spend 20%-35% more to meet NCLB performance goals (Costrell & Peyser, 2004, p.26). In 2006, federal funding gradually increased but many states reported to the SASA that school districts experienced Title 1 funding deficits and therefore faced fiscal challenges in offering supplemental educational services for eligible students (Heise, 2008, p. 148). Recent educational and legislative findings report that the lack of NCLB monetary provisions disproportionately affects low-income students and low-income schools (Burch et al., 2007; Muñoz et al., 2008; Sanders, 2008). There is much speculation surrounding districts' final determinations for the use of Title 1 funding (Gamoran, 2007; Gutstein & Peterson, 2005; Yeh, 2007). Federal funding is a key issue affecting many schools as they work to prepare the 2014 NCLB expectation of academic proficiency.

Aside from per-child spending concerns, district leaders expressed concerns about the need for additional staffing required to successfully implement supplemental educational service programs (Burch et al., 2007; Lee, 2006; Muñoz, Potter, & Ross,

2008). The USDOE (2007) suggests the hiring of extra personnel; such as a full-time coordinator who can serve as the point-person to whom parents, school staff, and external supplemental educational service providers to resolve most supplemental service related problems (p.25). Whether districts act on these recommendations depends on the balance of Title 1 funds used for directing supplemental educational services verses the overhead expenditures involved in providing supplemental educational service programs (Rorrer, Skria & Scheurich, 2008). Depending on how much money is available to hire additional district staff, school leaders may not have the budgetary leverage to hire a program administrator. Therefore, supplemental educational service programs may be affected by the availability of staff necessary to implement and sustain these remedial programs.

After the release of NCLB, the educational community used quantitative and qualitative research to assess what they perceived to be the act's unreasonable demands. When educational leaders received notice regarding the implementation of supplemental educational service programs, the Civil Rights Project at Harvard University (2004) released a report on the actual implementation of NCLB's supplemental educational services across eleven urban districts in the country (Sunderman & Kim, 2004). The geographically diverse school districts enrolled a larger number of minorities and low-income students and only 6 out of the 11 districts provided school-based supplemental educational service programs where as the remaining five districts made arrangements for supplemental educational services with state approved providers (Sunderman & Kim, 2004, pp. 12-23). In many of the states audited, fewer than 18% of eligible students actually requested and received supplemental educational services (Sunderman & Kim,

2004). There was some ambiguity regarding the guidelines on district-organized supplemental educational service programs (Plucker, Spradlin, Cline & Wolf, 2005). The uncertainty sealed off extended learning opportunities for many disadvantaged youth (Sunderman, 2006a). Only a limited number of districts utilized supplemental educational service evaluation plans which were not scientifically based—making the evaluation of these supplemental educational service programs difficult (Fuller, Gesicki & Kang, 2007; Sunderman & Kim, 2004). Numerous districts across the nation expressed concern that these supplemental educational service programs weakened the organizational capacity of their traditional school programs because schools had to redirect funds to meet the program's fiscal and administrative demands (Bathon & Spradlin, 2007; Burch, 2007; Sunderman & Kim, 2004). Some studies demonstrated how many districts were not fully equipped to orchestrate district-wide supplemental educational services (Muñoz, Potter, & Ross, 2008). Although the USDOE (2009a) sanctions the need for such programs to help disadvantaged and low-income youth, millions of children did not receive this vital service (Hamilton, Stecher & March, 2007; Muñoz et al., 2008). Research may help illustrate the problems in meeting the demands of NCLB.

The availability of supplemental educational service programs is a public matter communicated to all community stakeholders. A school not reaching adequate yearly progress (AYP) targets for three consecutive years must inform parents about ways to gain access to remedial supplemental educational services (USDOE, 2009b). A district's notification to parents about supplemental educational services must include (a) brief descriptions of the services, qualifications, and effectiveness of each provider; (b) a list of

state-approved service providers that are reasonably available in nearby districts; (c) information on how parents can request and get help from the school in choosing a provider; and (d) an overview of how fair and equitable procedures are in place if approved providers are oversubscribed and cannot make any more accommodations on their supplemental educational service rosters (USDOE, 2008; 2007; 2005). The notification process of supplemental educational service program availability is a public process mandated by NCLB.

Districts and school leaders struggle to gain traction on refining or developing stronger and effective supplemental educational service programs—closely tracked by high stakes testing (Sanders, 2008). Public schools must comply with extensive communication and accountability descriptors (Council of Chief State School Officers, 2009). Under NCLB, districts and schools must annually provide this information in a language and format that parents can understand (USDOE, 2009). Yet in districts that may have a diverse population of foreign language speakers, translating and effectively communicating detailed information about supplemental educational services may present a great challenge (Manna, 2006; Burmaster, 2004). In some schools the quality of the information going home to parents may be laced with educational jargon and incomprehensible legislative terminology (Martin, 2008). As schools and districts across the nation work on refining and creating successful supplemental educational service programs, standardized testing results will serve as a tool for gauging success (Schoen & Fusarelli, 2008). Results from standardized testing may inform and guide educational reform in the development of supplemental educational service programs.

Noteworthy Findings on Extend Learning Opportunities

Apart from the challenges that educational leaders face in developing supplemental educational service programs, research offers evidence of the effectiveness of extended learning opportunities. Extended day programs can have a significant effect on the achievement of academically high-risk students in reading and mathematics (Forum for Youth Development, 2009; Miller, 2003). In fact, one-on-one tutoring as an early intervention for at risk students can affect student achievement in reading and mathematics (Slavin & Lake, 2008; Thompson, Thompson, & Thompson, 2002). On the eve of receiving mandates for supplemental educational service programs, Lauer (2004) reported that elementary students compared to middle school students benefit more from extended day reading programs, whereas middle school and high school students make achievement gains when enrolled in extended day mathematics programs (p.3). Many educators and educational leaders may not know that the concept of extended day programs dates back to World War II (Halpern, 2002). In the 1940's, as part of a war initiative, thousands of "mid-to low income migrant women" worked in shipyards and the female workers relied on federally funded children centers (Maritime Child Development Centers) to meet the mental, social, and physical needs of their children (Barber, 2001, p.12-16). Although this initiative precedes the ESEA Act of 1965, this historical event sets precedence on how past efforts were made to meet the needs of children and families. Research findings can offer a historical perspective and an innovative direction for reforming extended learning opportunities.

While the nature of current extended learning opportunity programs may differ from the child development centers developed nearly seventy years ago (Maritime Child Development Center), it might be a loss not to investigate the option of federally funded school-based extended day programs (Barber, 2001; Yeh, 2006). As districts continue to examine effective strategies of providing supplemental educational service programs, structuring these services within the infrastructure of after-school programs might be a viable solution for serving at risk or low-income students (Forum for Youth Development, 2009; Halpern, 2002; Lauer et al., 2006; Miller, 2003). Research findings report that educational communities need to extend learning outside of the traditional school day (Lubienski, 2007). The old adage of not having enough hours in the day applies to the need for supplemental educational service programs. The National Council of Teachers of Mathematics (2009) recommends that school districts should increase the amount of time that students engage in mathematical learning. Farberman & Kaplan (2006) pose the analogy "We would never expect a long-distance runner to complete a 10-kilometer race in the same time that she runs a 5-kilometer one, but today's students have essentially been challenged to do just that" (p.5). Students must demonstrate mathematical proficiency within a traditional school structure that was originally designed to teach to basic skills (Beecher & Sweeney, 2008; Ladson-Billings & Tate, 2006). This literature review offers evidence that educational leaders and educators may gain insight from reviewing research findings which cite the significant academic gains of students participating in extended learning opportunities.

Time Configurations for Supplemental Educational Service Math Programs

School-based supplemental educational service math programs may occur within a variety of time configurations such as before school or after school, on weekends, or on vacation days (USDOE, 2007). Due to the diverse nature of potential time configurations, supplemental educational service programs may be an experimental task for several school and district leaders (Sanders, 2008). However, there are elements in the district regulatory guidelines that can conjure a sense of familiarity for school and district educational leaders because prior to the NCLB Act of 2001, schools organized Title 1 learning support programs (Gamoran, 2007: USDOE, 2002). As a result, lessons learned from findings examining traditional school programs may aid in the development of supplemental educational service after school or extended day math programs (Beecher & Sweeney, 2008; National Mathematics Advisory Panel, 2008; Miller, Kerr & Ritter, 2008; Slavin & Lake, 2008, McVarnish, 2007; Ladson-Billings & Tate, 2006). As school districts try to manage the diverse needs of struggling math learners, they may need to consider a broad set of scheduling options as well as lean on research-proven and effective strategies in promoting achievement for struggling math learners.

Standards-Based Curriculum for Supplemental Math Programs

The National Council of Teachers of Mathematics (2008) recommends several professional teaching and learning standards crucial to the promotion of math equity for all students. A standards-based math curriculum identifies student learning indicators where students must engage in learning experiences that are:

1. interconnected math strands (i.e., geometry and number systems);

2. organized and integrated mathematical ideas/concepts;
3. centered on the big ideas of mathematics and mathematically coherent;
4. built upon various lessons where students convey their mathematical thinking and reasoning; and
5. well-articulated within a curriculum map that can assist teachers and students in the identification of the successive levels and strands of mathematics (NCTM, 2008).

If educational leaders use said criteria in establishing a standards-based supplemental educational service math programs, schools will take one step closer to establishing a sound course to meet the needs of students struggling with the learning of mathematics (Burch, 2007; Burch et al., 2007; Manna, 2006; Sunderman & Orfield, 2006; USDOE, 2006a). As educational leaders and educators work to create sustainable and affect supplemental educational service programs, the use of a standards-based math curriculum can guide educators and students in the teaching and learning of mathematics.

Evaluation of Supplemental Educational Service Instructional Materials

As educational partners evaluate supplemental educational service math curriculum options, simply identifying the standards-based 'bottom-lines' of math curricula does not suffice (Schoenfeld, 2006). School districts must be vigilant about evaluating math curriculum programs where publishers offer claims that their remedial instructional materials are aligned to state standards (K-12 Mathematics Curriculum Center, 2009). Some remedial instructional math materials are packaged and advertised as 'standards-based' (i.e., Achieve 3000, 2006). District leaders and educators may need

to review those materials to ensure alignment with NCTM's (2008) professional teaching and learning standards (Rorrer, Skrla & Scheurich, 2008; Schoenfeld, 2006). Educational leaders and teachers may pose the question: Are all math test prep programs, designed by state test publishers, aligned to the curriculum principle set forth by NCTM? The community stakeholders responsible for the success of supplemental education services must bear in mind all of the research-based and field-tested tenets of a standards-based math program.

As a part of my literature review, I examined several remedial test preparation materials that were used in my local elementary school—*Buckle Down Grade 4 New York Mathematics*® (2009) and *Options Publishing's Breakaway Math* (2009) ® (D. Stinchcomb, January 2008, personal communication; M. Vecchiolla, January 2007, personal communication). The remedial test preparation products contained many short question and response booklets as well as software/web-based online practice math assessments (Buckle Down Publishing, 2009). Many of the math curriculum criteria noted in the *NTCM Principles and Standards for School Mathematic* were not evident in this particular publisher's version of test preparation math curriculum (NCTM, 2008). While reviewing another publication's test preparation materials—*Breakaway Math* ®—I observed that the variety of questions contained in the student questions and response workbook were similar to format and questioning structure typically present in state standardized math assessments (Options Publishing Company, 2006). At first glance, educational leaders and educators may consider this test preparation format as a viable supplemental instructional tool. However, Fuller, Wright, Gesicki and Kang (2007) warn

educational leaders and school districts about using materials that coach students to develop math skills for test items on state standardized tests—it may produce results that suggest a racial math achievement gap is diminishing when in fact test results are based on a narrow set of "coached" test questions that are not holistically reflective of students' math proficiency (p. 271). My review of supplemental educational service curriculum resources showed a wide range of resource options. To discern the most effective instructional tool for the administration of a supplemental educational service math program, research reports that educational leaders and educators must stay clear of any resources that are not aligned to research-based standards of teaching and learning.

By conducting a literature review of two commonly used test preparation publications, it was confirmed that there exists a level of uncertainty regarding the use of standards-based in supplemental educational service math programs (Burch, 2007; Sunderman & Orfield, 2006). The prepackaged test preparation programs may supply an attractive and swift solution and the availability to sample questions may convince educational leaders that their school can offer students a stronger advantage. Some supplemental educational service math programs might "teach to the test" in lieu of deepening a better understanding of mathematics (Fuller et al., 2007; Wilson, 2007). If an educator/math facilitator uses "sample questions" out of context—without scaffolding rich math connections and discussion—students may not receive true remedial support in the learning of mathematics (Greer, Mukhopadhyay, Powell, & Nelson-Barber, 2009; Engle, 2006). It is evident that there exists some ambiguity regarding the multiple components needed to successfully launch and sustain supplemental educational service

math programs that are anchored in NCTM math standards (Center for Evaluation and Education Policy, 2007; Hamilton, Stecher & March). The evaluation of supplemental educational service instructional materials is a complex process.

Examining Best Practices through Collegial Interaction

Professional development is a data-supported method to promote math equity and excellence for all students (Garet et al., 2001; Hill, Rowan & Ball, 2005; Martin, 2009; NCTM, 2008; Schoenfeld, 2002). Using research-based strategies, educational leaders can utilize professional development to ratify math reform at a school or district level (Blair et al, 2003; Rorrer, Skria & Scheurich, 2008; Sherblom et al, 2006). When educational leaders allocate resources to endorse professional learning forums, educators can broaden their instructional repertoires to accommodate differences among math learners, thus promoting math equity and excellence (Fullan, 2007; NCTM, 2008). The endorsement of professional learning circles can move a learning community one step closer to closing achievement gaps (Slavin & Lake, 2008). A review of the professional literature reports that collegial interactions centered on math equity and excellence in math learning directly affect math achievement.

Successful professional development requires extended professional inquiry, teacher reflection, and collegial interaction (Gamoran, 2007; Garet et al., 2001; Hill, 2004). Promoting school-based professional learning can involve capacity-building of math teacher leaders (Cress, 2005; Crowther, ; Davidson, 2003; Ferguson & Hann, 2008; Tschannen-Moran & Barr, 2004). There is a direct link between the increase of math teacher leadership and student math achievement (NCTM, 2008; O'Shea, 2005). When

developing circles of professional learning, Hord (2004) recommended that educational leaders provide various structures to support teacher leadership. Within the structure of a study groups or common teacher team planning session, teacher leaders can help steer inquires centered on student learning, curriculum, and instruction (Fullan, 2007; Hord, 2004). Furthermore, professional learning circles led by teacher leaders can set the course for math equity and excellence. Practitioner-researchers can appraise a school's rituals for professional learning and identify areas for continued improvement. Research findings report that an effect way to ensure gains in student math achievement is to develop multi-faceted structures of teacher professional development.

Educational Reform via Teacher Leadership

In the United States, educational reform actions sanctioned under the NCLB Act of 2001 may have propagated teacher leadership within educational communities (USDOE, 2002). The NCLB educational mandate may have served as a catalyst for educational reform related to pedagogy. In response and compliance to this legislative act, educational leaders and practitioners are pressed to research, reflect, and realign existing learning structures and instructional strategies (Craig, 2009; Davidson & Bell, 2003; Rorrer & Scheurich, 2008; Slavin & Lake, 2008). Accordingly, teacher leaders are rising up as agents of change to promote circles of learning not only among their students but in their school or school district community (Fullan, 2007, 2004; Lambert et al, 2002; Lieberman & Miller, 2001; Tschannen-Moran & Bar, 2004). Empirical findings have shed some light on creative strategies employed by these educational change agents. These findings continue to offer teacher leaders the strategies for the advancement,

cultivation, and sustenance of professional learning circles within a school or district (Fullan, 2004; Fullan, Hill & Crévola, 2006; Feger, Woleck & Hickman, 2004; Hord, 2004). In order to release the promise set forth by NCLB, learning communities may need to capitalize on the teacher leadership in schools and school districts. Perhaps within a qualitative doctoral project case study, qualitative data centered on the research questions may aid in the exploration of the type of collegial circles that may or may not exist in the local educational setting.

The Value of Sharing Effective Supplemental Service Program Strategies

Districts may need to lean on professional networks in nearby states or counties to survey how other neighboring districts are managing the implementation of supplemental educational service programs (Ketterlin-Geller, Chard, Fien, 2008; Alexander, 2006). As a result, collective knowledge shared in these forums might prove to be helpful to those affected by NCLB regulations. It may be plausible that these forms of colloquies or educational roundtables may hone in on regional lamentations related to budgetary constraints.

Faced with budgetary limitations, districts may need to use more cost effective methods of developing supplemental educational service programs. Many district leaders may begin to realize that quickly exhausting a small pool of funds (to address the multi-faceted issue of directing and evaluating said programs) can be detrimental to the education of students in dire need of extended learning opportunities. In reviewing recent research findings, coined as NCLB toolkits or supplemental educational service guideposts, educational leaders may begin to draw lessons learned from scholarly

researchers and practitioners. In one early publication, the New Jersey Department of Education (2004) offered an extensive collection of sample correspondence among superintendents and school leaders, parent letters from school leaders and additional informational pamphlets or brochures that parents can use as simple reference tools regarding supplemental educational services. Districts with limited staffing now have access to a variety of multilingual communiqué templates that assist schools with the charge of communicating details about supplemental educational services (USDOE, 2009b). With the use of the correspondence templates, districts can save a substantial amount of money by not having to purchase costly translations, or hiring translation staff to produce correspondence templates for the district (Burch, 2007). The common clichés "time is money" and "why reinvent the wheel" speak to these cost effective supplemental program strategies.

Since the inception of the NCLB Act of 2001, district and school leaders are beginning to outline a supplemental educational service course of action. Early resources included the USDOE (2004) report that showcase a variety of district efforts within the first few years of implementing NCLB. Aside from surveying how districts handled the parent notification of NCLB SES mandates, this report examined how a district case study sample targeted services for students eligible for supplemental educational services. Examples of ways in which sampled districts prioritized the allocation of supplemental educational services included; (a) contacting parents of students performing two levels below AYP targets and encouraging them to enroll in school-based supplemental educational service programs; (b) priority levels were assigned according to subject area

in descending order (reading, math, science and language) and; (c) students in schools on probation and scoring in the lowest quartile received highest priority, followed by students in schools on notice (USDOE, 2009b; 2008). Several additional resources summarized effective supplemental educational service strategies employed by other school or district communities (Burch et al., 2007; Miller, Kerr & Ritter, 2008; Sanders, 2008). Recently the Council of Chief State School Officers (2009) offers a list of articles specifically geared for educational leaders in aiding them to develop supplemental educational service programs. Within my literature review, I comprehensively reviewed these resources on their effectiveness of supplemental educational math programs for economically disadvantaged students.

Conclusion of Literature Review Findings

The review underscored the importance of supplemental educational service programs for students not making AYP. The review of recent findings illustrated the current state of affairs for supplemental educational services in a range of school communities across the United States, and highlighted the benefits of extended learning opportunities outside of the traditional school day for low-income and under-achieving students. The review also illustrated the potential of standards-based supplemental educational service programs on improving math achievement and how remedial programs can offer math equity for economically disadvantaged students. This body of professional literature also revealed the potential of educational reform via teacher leadership, and collegial interaction. Success may lie on creating professional educational

forums centered on sharing effective strategies for implementing, administering, and evaluating supplemental educational service programs.

Implications of the Study

There are severe social and economic implications for the country if the mathematics achievement gap is not addressed. Nationally, the majority of children not making AYP in math comprise of economically disadvantaged students (Martin 2009). A subgroup of the low achieving population includes Black and Hispanic children (Gutiérrez, 2008Heise, 2007, 2006, 2004; Martin 2008; NCES, 2007). For nearly a decade after the release of the NCLB act, researchers made projections regarding the student minority achievement gap and population growth in various subgroups. Kober (2002) projected that by 2010 Black and Hispanic children will comprise 34% of the American school age population (p.30). As a financially viable partner in the global market, the United States cannot afford to unsuccessfully meet the educational needs of a third of the constituency and the vitality of the country's economic structure requires a trained workforce (National Science Foundation (NSF) 2008; 2000; The National Mathematics Advisory Panel (NMAP), 2008). The ramifications of not addressing the socio-economic educational inequities will directly affect a significant number of academically and economically disenfranchised students.

Today's students will become tomorrow's citizenry and their full economic access and success strongly hinges on math and science literacy (NSF, 2008; NCTM 2008; Moses, 2001). Without equitable access to math education, a significant number of

potential workers may be ill-equipped to manage the complex mathematical and technological demands of the work place (NSF, 2008). Schools must offer standards-based and rigorous math instruction to promote personal and professional success (Hiebert et al. 1997; NCTM, 2009). Mathematics education is a civil rights issue (Lee, 2006; Martin, 2009; Moses, 2001; Schoenfeld, 2002). This study offers practitioner-researchers an avenue for promoting positive social change for economically disadvantaged students.

Summary

Section 1 of this study addressed a variety of issues related to math achievement for economically disadvantaged students. A rationale was presented which justified an examination of this local problem. A variety of terms were identified and defined as they related to the problem which led to the theoretical framework and literature review related to the local, regional, and national problem. In this section, I demonstrated evidence that saturation was reached within the literature review and outlined my efforts to explicate the local problem within a local educational setting. In this section, data were reported centered on the mathematical achievement of local economically disadvantaged students.

In Section 2, I offer an outline of my methods. I also outline the study setting, participants, data collection procedures, study instruments and the steps of data analysis. Subsequently, I discuss the assumptions, limitations, scope, and delimitations of this instrumental case study. Finally, I share findings from data analysis.

In Section 3, I explain the project and the goals of the project, along with my rationale for selecting the project. I also present a literature review that will offer a critical analysis of how the project is aligned to sound research-based theories. In this section, I describe how saturation was reached in the implementation of this project. Finally, I discuss the social change implications of this project.

In Section 4, I discuss the strengths and limitations of the project's ability to address the local problem: the low math achievement of economically disadvantaged students and the limited professional development for teachers working with educationally and economically disadvantaged math students in an extended day after-school math program. In the final section, I present my recommendations centered on different approaches for addressing the problem. In the final component of Section 4, I will include my personal reflections related to lessons learned from this research process.

Section 2: Methodology

In Section 2, I describe the various components involved in this qualitative research project study. I address my intent and rationale for using an instrumental case study and how this form of research design draws from the local problem and research study questions (Creswell, 2008). As practitioner—researcher, I offer a detailed description of the particular form of qualitative research design utilized to collect and analyze qualitative data. In this section, I justify why an instrumental case study is more effective than other designs. In this justification, I provide my criteria for participant selection and sample size; procedures for gaining access to participants, and methods for establishing working relationships with participants and protecting participants' privacy. I also explain my systems to generate, gather, and record multiple forms of qualitative data. As a final point in section 2, I describe my data analysis and validation procedures.

Description of the Qualitative Tradition

To address the local problem, I employed a qualitative instrumental case study. Based on Creswell's (2008) characterization of a qualitative instrumental case study, the researcher—practitioner should explore a local problem to develop a deeper understanding of a central phenomenon wherein understanding is limited; in this case the understanding of supplemental educational service math programs was limited.

The primary objective of the instrumental case study is to explore a case that can provide insight into a related issue (Creswell, 2008; Stake, 2008). Hatch (2002) asserts that the use of case study research in educational settings falls within the "constructivist

research paradigm" because the researcher intends to make sense of the participants' world as well as offer rich narrative descriptions of the participants' reality and perspectives (p. 16). The qualitative tradition of a case study is an interactive and sensitive examination because extensive qualitative data are primarily gathered from a small number of participants in the form of observations, structured interviews, and bounded time focus groups (Rubin &Rubin, 2005). Researchers who conduct a case study choose to focus on separate or grouped individuals involved in a specific activity, event, or program (Creswell, 2008). Consequently, a wide range of qualitative data can be gathered to obtain various perspectives by conducting multiple interviews and observations (Creswell & Plano Clark, 2007). An in-depth analysis of qualitative data involved both inductive and deductive reasoning processes that brought to light a series of general themes that gradually emerged (Charmaz, 2000; Creswell, 2007). As a result, through the use of a traditional qualitative inquiry within the structure of an instrumental case study, I examined a series of issues related to a local phenomenon.

Research Questions

This instrumental case study addressed the following research questions:

1. How does the local school and district utilize math achievement data to inform program structures of a Title 1 funded elementary supplemental educational after school math program?

2. What can be learned about the economically disadvantaged students within the supplemental educational after school math program located in an elementary school setting?
3. What can be learned about the instructional practices within the supplemental educational after school math program?
4. What role does the use of instructional technology play within a supplemental educational after school math program?
5. What can be learned about the professional learning for educators teaching within a supplemental educational service program?
6. What recommendations can be made to further cultivate community and school partnerships that support the local elementary supplemental educational service program?
7. What recommendations can be made to further cultivate research-based professional learning for teachers of the supplemental educational math program?

Opened-ended research questions can guide a deeper inquiry into the local phenomenon of supplemental educational services programs (Rubin & Rubin, 2005). Using a series of research questions to steer the qualitative study, I examined a local supplemental educational service math program as a facet of local educational reform. Using a qualitative method afforded me the opportunity to partake in a participatory, transformative, and constructivist approach to research (Janesick, 2004, p. 10). The use of a qualitative doctoral project case study served as a vehicle for exploring educational change within my local school setting.

Justification for Choice of Research Design

When a researcher tries to discern and select the best research design for his or her particular study, a comparison of the various research methodologies can help the researcher make a final determination (Denzin & Lincoln, 2008; Stake, 2008). As I considered alternate research designs different from a qualitative instrumental case study, I also thought about conducting a quantitative study. However, if I chose to use a different researcher methodology within a quantitative research design, the finer details of the participants' experiences may not come to the forefront with numeric data (Corbin & Strauss, 2008). Denzin and Lincoln (2008) state that the term "qualitative" within the structure of a qualitative study implies that the researcher is focusing on the qualities of the phenomenon under investigation and that these qualities are not measured in experimental studies (p. 14). The traditional use of quantitative data is to test hypotheses of known variables, whereas the use of qualitative data is used to focus on a particular concept or phenomena (Creswell, 2003, p. 19). Based on findings from my literature review, little was known about the local phenomenon that was under examination, and as a result qualitative data gathered can help create a richer understanding of this broad and ambiguous topic (Burch et al., 2007; Lee, 2006; Sanders, 2008). The key rationale for selecting the tradition of qualitative instrumental case study is anchored in exploring and developing a deeper understanding of the mathematical achievement of economically disadvantaged students and the limited professional development for teachers of supplemental educational programs.

Description of Participants

The participants of this instrumental case study were located in an urban and socio-economically diverse elementary school with a student roster of approximately 700 elementary students. The study site was one of five elementary schools in the school district with Grades kindergarten through 5. I gathered observation and interview data from a sample of participants partaking in the educational service after-school math program. The observation study participants were a homogeneous sample of 15 economically disadvantaged elementary fourth grade students identified as not making adequate yearly progress in the learning of mathematics (Creswell, 2008). The interview group of participants was a criterion sample that included 10 instructional staff members of an extended day supplemental educational service math program (Hatch, 2002). The data gathered for this instrumental case study came from two sampling groups of participants.

Justification for Participant Selection: Homogeneous Sampling

As lead researcher of this qualitative instrumental case study, I conducted observations of a homogeneous sample size of 15 students enrolled in the extended day after-school math program. The study sample of 15 participants can be characterized as a homogenous sample because it is a set of selected participants belonging to a specific unit or subgroup (Onwuegbuzie & Leech, 2007), and who possess a similar trait (Creswell, 2008). By observing a small number of students participating in the extended day program, I gathered and analyzed rich audio, text, and alternative forms of visual data

that yielded broader perspectives and experiences of students enrolled in the local extended day math program.

Merriam (2002) reports that detailed data gathered from observations can offer a firsthand account of the phenomena rather than a diluted secondhand account from data gathered from interviews (p. 13). Based on the meta-analysis on past research sample sizes and sampling designs, Onwuegbuzie and Leech (2007) recommend that qualitative researchers consider using a sample size representative of the population (p. 106). Consequently, I gathered data from a homogeneous sample of 15 students enrolled in a local supplemental educational service extended day math program which helped me harvest rich and detailed qualitative data for further analysis of this local phenomenon.

Justification for Participant Selection: Criterion Sampling

Another purposive sampling technique that I used was a criterion sampling. A criterion sample size of 10 participants contributed to one-to-one teacher interviews wherein said participants had a predetermined criterion: teachers who had previous experience teaching in the extended day math program (Hatch, 2002). Qualitative data gathered from interviews can be described as rich and structured conversations wherein this researcher followed up on questions posed after an observation (Creswell, 2008; Rubin & Rubin, 2005). In order to elicit qualitative data on historical practices and program structures, Rubin and Rubin (2005) recommend the use of qualitative interviews to help the researcher reconstruct events that the researcher did not directly participate in

(p. 3). For these aforementioned reasons, I gathered a richer set of qualitative data by conducting one-to-one interviews structured and directed by an interview protocol.

The primary objective of using two forms of sampling techniques—homogeneous and criterion sampling—was to explore detailed findings that helped me understand a local phenomenon. A cross section of a limited number of participants aided me in presenting "the complexity of a site" (Creswell, 2008, p.217). With the use of different sampling methods, I conducted a qualitative inquiry that yielded multiple forms of audio and visual data for further data analysis.

Access to Participants

First, I sought access to the study participants by obtaining permission from the institutional review board (IRB) of Walden University who evaluated my research project proposal to ensure that it reflected the highest standards of research quality and integrity (Walden, 2009). After receiving permission from my university's institutional review board, I obtained permission from the school authorities or "gatekeepers" (Creswell, 2008, p. 219). Hatch (2002) recommends the careful review of the school institution's written policies (p. 45). Subsequently, I obtained written permission (Appendix B) from the district officials and school principal.

Researcher-Participant Relationship

The relationship between the researcher and the participant is a vital component in the development of a qualitative project (Denzin & Lincoln, 2000; Hatch, 2002; Stake,

2008). The qualitative researcher should take necessary steps to gain access to the setting and obtain permission and approval from the gatekeepers (Creswell, 2003, p. 184). My experience within the local school setting helped me set a course for establishing a researcher-participant relationship.

Currently, I am an elementary fourth grade teacher and the school-based math lead teacher in the study field site. With 17 years of teaching experience within the local school district, I have served as an elementary Kindergarten through Grade 5 teacher (Appendix K). Nine years ago, I served as a district professional math staff developer for teachers and teaching assistants. In this former three year district appointed role of mathematics instructional specialist I was able to develop professional relationships with classroom teachers as well as with educators involved in the after school extended day math program. Many of the teachers in the school have participated in multiple district-wide or school-wide math workshops that I have planned and facilitated. The relationship that I have with the participants is two-fold: I am a fellow teacher and a local resource for math instruction.

Measures for Ethical Protection of Participants

The U.S. Department of Health and Human Services (2005) mandates that IRBs adhere to the ethical code of "federal regulations for the protections of human subjects" (p. 11). Institutional Review Boards and researchers are mandated to protect the rights of human research participants (National Institutes of Health, 2009). In preparation for conducting research with student and teacher participants, I took measures to ensure the

ethical protection of the participants. Prior to conducting research, the National Institutes of Health (NIH) Office of Extramural Researcher granted me a certificate of completion for successfully completing the NIH training course –"Protecting Human Research Participants" (Appendix C). This certification process prepared me to take extra measures to protect the children in my proposed research site.

Due to the physical and intellectual limitations, children are considered a vulnerable research population and researchers must take steps to seek the agreement from parents or guardians as well as the assent of participation by the child (National Institutes of Health, 2006, p. 1). Therefore, the students and families in this study received information about the nature of my study along with a parent consent form (Appendix D) and the student assent form (Appendix F). Families, students, and teachers were informed of the key reasons why I needed to collect data as well the data collection procedures. Furthermore, the teacher consent form (Appendix E) noted that the duration of the student and teacher participant observations, and the nature of the one-to-one teacher interviews. Creswell (2008; 2003) claims that this signed consent form helps the participants and the researcher acknowledge that the participants' rights and privacy are protected during and after the data collection process. In order to ensure that participants feel that their rights and privacy are protected, I signed a confidentiality agreement (Appendix G). While recording field study notes, I used pseudonyms to protect the identity of the student and teacher participants (Janesick, 2004). With the purpose of securing the privacy of the participants, all of the field notes and other visual data gathered were secured in a locked file cabinet located away from the study site. With

diligent adherence to the federally regulated institutional review board guidelines, I ethically gained access to a set of participants for conducting qualitative instrumental case study.

Data Collection Procedures

As I conducted this study, there were a series of decisions made to ensure that all data collection procedures aligned with the traditional research design of a qualitative study. The key decisions that I made helped to bring forth a body of data that aided in my understanding of the local phenomenon. The use of an instrumental case study decision best suited the nature of this examination.

Justification or Data Collection Choices

The nature of this qualitative inquiry required that I serve as a researcher and as research instrument (Janesick, 2004; Schwandt, 2001). As a qualitative researcher I used data collection methods to observe and document various forms of qualitative data (Richards & Morse, 2006). Denzin and Lincoln (2008) explain that within the research tradition of a qualitative study, the researcher must … "deploy a wide range of interconnected interpretive practices, hoping always to get a better understanding of the subject matter at hand" (p. 5). As a qualitative researcher, I sought to holistically understand the relationships, culture, and the social interactions within a social setting (Janesick, 2004, p. 6). When a researcher uses a combination of data collection strategies, the researcher raises the level of rigor, complexity, and detail that offers a broader perspective (Flick, 2002, p. 229; 2006; Stake, 2008).The employment of various data

collection procedures helped this researcher triangulate data as well as secure a stronger understanding of the local phenomena (Denzin & Lincoln, 2008, p. 7). As researcher and research instrument of various observations and structured interview structures, my goal was to present qualitative findings about a local supplemental educational service extended day math program.

The ultimate goal for my proposed project study was to plan and develop a teacher professional development action plan for the extended day math teachers. In order to inform the production of a professional development project, I sought to gain a deeper understanding of the local supplemental educational services. As a result, I wished to observe and interview a team of school stakeholders. My research study procedures were in compliance with regulations established by the governing instructional review board (Creswell, 2008; Hatch, 2002; Janesick, 2004; and Rubin & Rubin, 2005). Data collected from observations and interviews offered me a stronger understanding of the local phenomenon as well as inform the development of a professional development series specifically geared for extended day math teachers.

Qualitative Data Collection Methods: Instrumental Case Study

Data collected from observations and interviews can serve as a reflective tool for educational leadership and in turn create a "…community of practice involving a wide variety of stakeholders in the improvement of educational practice" (James, Milenkiewicz & Bucknam, 2008, p. 10). In support of collecting a wide range of qualitative data, Creswell (2007) asserts that the collection of a rich data from various

resources helps to ensure that the researcher is triangulating findings. “Triangulation is the process of corroborating evidence from different individuals, and types of data within themes will arise” (Creswell, 2008, p.648). Throughout the initial planning and development stages of the professional development series, an educational team offered professional insight via the use of one-to-one interviews. Furthermore, I sought participant feedback on my findings. The participatory collaboration and participant feedback team included the:

1. School administrators: — principal and assistant principal;
2. School appointed K-5 math instructional specialist;
3. Two K-5 math lead teachers; and
4. Ten supplemental educational service math teachers.

Educational research can improve practice by offering educators new ideas and strategies for evaluating approaches in an educational setting (Creswell, 2008, p. 5). The key objective of my research was to offer practical findings that can support effective educational reform within my local study site.

As educators and educational leaders face growing concerns regarding the school-based implementation of supplemental educational services, this qualitative doctoral project study may offer empirical findings that may or may not demonstrate how the professional development of supplemental educational service math teachers may or may not offer math equity for disadvantaged youth (Burch et al., 2007; Sunderman, 2006). Within the model of a qualitative case study, I collected and reported on qualitative data with the intent to better understand the educational inequities and needs of a marginalized

population (Creswell 2008, p. 51). Similar to Denzin and Lincoln (2005), I believe that it is my "civic responsibility" to engage local district and school leaders in a "moral dialogue" centered on the local implementation of a supplemental educational service program (p.1049). Creswell (2008) describes how this form of advocacy research has emerged in the last decade based on "…an impassioned concern for the inequity and needs of individuals in lower social classes" (p. 50). Research findings from this instrumental case study may bring about educational and professional change that may directly affect the nature of professional development for the supplemental educational service math teachers.

Specific Data Collection Plan: Observation Process & Protocol

Creswell (2008) defines an observation as … "the process of gathering firsthand information by observing people and places at a research site (p. 643). I gathered qualitative data for the instrumental case study by preparing to conduct 10 observations (for the duration of 45 minutes per observation) of a homogeneous sampling of 15 participants in a fourth grade extended day math program (a local supplemental educational service program).

Crabtree and Miller (1999) assert that within the framework of a case study, the interactive nature between researcher and participants offers a strong advantage for the researcher to better understand the participants' point of view. While observing students participating in the extended day math instructional session, I wanted to learn more about their interactions by participating in the activities. As a "participant observer" I was able

to develop experiential knowledge from the participants' point of view as well as record information that helped me develop a deeper level of understanding (Creswell, 2008, p.222). In my role of qualitative researcher and observation instrument, I recognized the importance of fine-tuning my observation skills to conduct and record detailed observation data (Janesick, 2004, p. 2). In preparing for this observation process, I extensively reviewed research-proven observation techniques that helped refine my observation skills. With the intention to accurately record observation data, I used the structure of Janesick's (2004) observational protocol (Appendix H) to ensure the legitimate and quality recording of descriptive field notes and reflective notes (Creswell, 2008, p. 224). The use of an observation protocol helped me contextually study the participants in "greater depth and breadth" (Janesick, 2004, p. 32). An observation protocol served as a key structure for conducting and recording my qualitative research study observations.

While observing the students working in the after school supplemental educational service math program, I recorded field notes and reflective notes (Creswell, 2008; Stake, 2008). In addition, I collected unstructured data from observation drawings and pictures taken of the student participants in the homogeneous sample (Creswell, 2003; Hatch, 2002). This additional visual data helped me reflect on the finer details of participate interactions (Corbin & Strauss, 2008). I conducted multiple observations over the course of the extended day program to develop a "broad-to-narrow perspective strategy" of the participants' experience (Creswell, 2008, p. 225). Throughout the use of multiple observations, I was able to record rich observational data that aided in

developing a richer understanding of the local problem. After the observation process, I had several questions that I posed within the format of teacher one-to-one interviews. Interviews with the observation participants helped me further understand the meaning of various interactions that I observed within the after school supplemental educational service math program.

Specific Data Collection Plan: Interview Process & Protocol

Creswell (2008) defines an interview as recorded and structured conversation between the researcher and participant(s) wherein the researcher asks general or open-ended questions (p. 641). Face-to-face interviews can offer a source of audio data valuable for understanding participants' experiences and various events (Rubin & Rubin, 2005). Consequently, after conducting participant observations of students in the supplemental educational service extended day math program, I conducted the interview process to further explore issues related the research study questions. I conducted 10 one-to-one 45 minute interviews with teachers who had at one point or another taught within the supplemental educational service extended day math program. In order to accurately gather data, I recorded approximately 450 minutes of data from the one-to-one interviews using an Olympus Digital Voice Recorder (Olympus America, 2009a). Qualitative data gathered from structured participant conversations helped me gather rich data to develop a stronger understanding of the local phenomenon.

An interview protocol offered the framework necessary to steer a series of interviews with participants. In the interviews, I posed a set of open-ended questions and

recorded the participants' responses (Appendix I). Creswell (2008) asserts that participants can best express their experiences with open-ended questions. Data collected from interviews helped this researcher "…uncover the meaning structures that participants use to organize their experiences and make sense of their worlds" (Hatch, 2002, p.91). Accordingly, I posed a range of open-ended, probing, and follow-up questions. After an examination of questioning strategies within different interview forums, H.J. Rubin & I. S. Rubin (2005) assert that the use of "probing questions" and follow-up questions help the interviewees share extensive details that may aid in developing a richer understanding of the phenomenon under investigation. The preliminary questions answered in the teacher interviews served as helpful leads for finding answers to the sub-questions directing this study (Creswell, 2008, 1998; Stake, 2000). Throughout the interviewing process, I collected audio data and transcribed the information from one-to-one interviews. Creswell (2008) described the transcription of audio data as the process of "…converting audiotape recordings or field notes into text data" (p. 246). The text data from one-to-one interviews assisted me in expanding my understanding of the phenomenon under investigation.

Organizational Systems for the Qualitative Data

As a qualitative researcher, I recognized the importance of developing and maintaining systems for organizing data gathered from the research site (Creswell, 2008; Denzin & Lincoln, Hatch 2002; Janesick, 2004). Data gathered with a digital voice recorder was stored as audio/media files using a computer software program (Olympus

America, 2009b). This technique ensured that the data gathered was properly labeled, organized, and stored (Hatch, 2002). The one-to-one interviews helped me collect a richer set of audio and text data that were useful in further comprehending issues surrounding a supplemental educational service after-school math program.

Procedures for Gaining Access to Participants

Prior to conducting the adult one-to-one interviews, I adhered to several data collection strategies that ensured the ethical access to study participants (Creswell, 2008; Stake, 2008). I informed participants regarding the structure and the audio-recorded nature of the interviews (Hatch, 2002). The participants of the one-to-one interviews and focus group interviews received a copy of the interview protocol with the list of interview questions that were presented during the interview (Rubin & Rubin, 2005). All of the interview participants reviewed the list of questions and received a copy of an interview consent form which explained the purpose, research background, and the probable benefits and/or risks involved (Rubin & Rubin, 2005, p. 104). Once the participants signed the consent form, I made flexible arrangements with the participants to conduct the various forms of recorded interviews (Creswell, 2007). This researcher followed a procedural protocol to ensure ethical access to participants and qualitative data.

Researcher's Role

As an educator within the study site, I held various professional roles (Appendix K). Within the study site, I have served as teacher, school-based math lead teacher, and as

the district appointed math instructional specialist. When I served in these various professional roles, I was able to develop positive collaborative professional relationships centered on positive collegial interactions and school project collaborations. With the help and support of the research site teachers, I created several professional development tools produced by the local district which included teacher training videos and summer school curriculum guides (T.Connors, personal communication, October 2007). Recently, as a practitioner-researcher, I served as a professional mathematics presenter and professional educational ambassador within various international professional education conferences; I have presented the same teacher training presentation that reached teachers in Cambodia, Egypt, and Vietnam (People to People Ambassador Programs, 2008; 2009). The central aim of my professional work with the local teachers has focused on developing collegial sharing environments that continually strived to differentiate math learning and meet the needs of diverse students.

The study participants are familiar with my love of teaching and strong desire to help all students. In my past role as practitioner—researcher, professional staff developer, and fellow colleague, the teachers and students have demonstrated a willingness to assist me in past explorations of student learning and math pedagogy. I believe that during student observations, students were comfortable and familiar with my "participant observer role" (Creswell, 2008, p. 222). As a result, I was able to gather qualitative data that genuinely captured the social interactions among teachers and students as they engaged in various math learning activities.

As a practitioner-researcher I recognized my personal biases regarding issues of equitable math learning. Moreover, I was aware of the potential for subjectivity conducting this study. Throughout the "researcher as instrument" process, I recognized the unique role that subjectivity plays in qualitative research and I acknowledged that the attainment of full objectivity is an impossible task (Morrow, 2007, p. 216). I attended to the issue of subjectivity by attaining a median position in the spectrum of subjectivity and objectivity (Morrow, 2007). While conducting observations, one-to-one interviews, I momentarily suspended my own presuppositions. Heshusius (1994) characterizes this "participatory mode of consciousness" as "…the ability to temporarily let go of all preoccupation with self and move into a state of complete attention" (p. 17). As researcher I was aware of my personal biases, and I consistently maintained the participants' perspectives and their experiences as the focal point of this study.

Data Collection Summary

As I gathered information to develop a richer perspective of the local phenomenon, I acquired qualitative data from observation protocols, field notes, reflective notes, photographs, transcripts and perhaps other forms of unstructured text data. Flick (2006) describes how the collection of "multifocus data" is a fruitful strategy to approach institutional routines (p. 272). Ultimately, the goal of collecting this wide range of data was to reach a point of data saturation which meant that participants shared findings pertaining to a set of categories or themes that began to repeat and ultimately this researcher was not acquire any new data (Stake, 2008). With the use of multiple

forms of data, Denzin & Lincoln (2008) describe how qualitative researchers can triangulate findings that help to corroborate data collected from the observation and interview participants. The use of multiple forms of data offered a vital tool for analysis, interpretation, and the trustworthiness of narrative findings.

Data Analysis

After collecting different forms of data, I engaged in the process of analyzing the findings. The process involved three tiers of data analysis. Upon completing these different levels of data analysis, I followed a data analysis protocol that ensured the quality, accuracy, and the credibility of the findings.

Preliminary Stage of Data Analysis: Open Coding

After the qualitative data was gathered and organized, I followed a constructivist grounded theory data analysis approach (Charmaz, 2000; Creswell, 2007). I used this data analysis plan to make sense of the audio data and text data gathered from observations and structured interviews. During the initial stage of recording field notes and reflective notes, I had an opportunity to begin the data analysis process by reading the text data and developing sidebar or margin notes (Hatch, 2002). This traditional form of "hand analysis of qualitative data" is the process of reviewing the data, marking the data, and dividing the data into parts into codes or categories (Creswell, 2008, p. 246). As I engaged in the constructivist grounded theory data analysis process of reviewing a large body of qualitative data, I began the preliminary process of sorting and coding the data

(Charmaz, 2008; 2000). By using an inductive process of organizing the data into initial categories, also known as "open coding", this data consistently fell within topics that were "…extensively discussed by the participants" (Creswell, 2007, 160). This preliminary process of data analysis can helped me begin to see the scope of the data findings.

Second Stage of Data Analysis: Axial Coding

Within the constructivist grounded theory of data analysis, the nature of the themes naturally moved from general to specific categories (Charmaz, 2008; 2000). This helped me identify "patterns of meaning in data so that general statements about the phenomena under investigation can be made" (Hatch, 2002, p. 160—161). Creswell (2007) describes this second stage of the coding process as "axial coding" wherein the researcher reviews the database and seeks to find insight into specific "coding categories" (p. 161). This coding process offers the qualitative researcher "analytic scaffolding" for creating various data categories (Charmaz, 2008, p. 217). In fact, the object of the axial coding process is to make sense of the data and to identify codes that overlap or repeat so that you can collapse these codes into broader categories (Creswell, 2008, p.251). The broader categories can be seen as "themes" that have saturated data to support them (Charmaz, 2000). The researcher can organize these themes and codes within a "coding paradigm" or matrix (Creswell, 2007, p. 161). After I coded the data as well as analyzed the various themes, I began the final phase of the data analysis plan.

Final Stage of Data Analysis: Selective Coding

Charmaz (2000) describes the final data analysis approach of the constructivist grounded theory as selective coding wherein the researcher begins to theorize and develop statements that help to explain the meaning of the findings. After the selective coding of the findings, I reported on the research findings that related to the research study questions (Charmaz, 2000). Although it may seem that the coding procedures of data analysis fell within a linear process, Creswell (2008) describes it as an "ongoing process involving continual reflection about the data, asking analytic questions, and writing memos throughout the study (p. 190). As a qualitative researcher, I engaged in the extensive process of data analysis to ensure that I have triangulated the data and reached a saturation point in the data.

Evidence of Quality, Accuracy & Credibility of Findings

As I followed the ethical guidelines outlined by the Walden University IRB, and the body of literature, I collected and analyzed a body of qualitative data that yielded answers to my research questions. I reviewed the recorded audio data and created transcripts of the interviews (Corbin & Strauss, 2008). In order to ensure that the transcription process was correct, a graduate student from a local university served as a "peer reviewer" of the transcripts to ensure that the text data from the transcripts was consistent with the audio data from the interviews (Creswell, 2007). Since I want to ensure the privacy of the interviewees, I included pseudonyms in the transcript files (Creswell, 2008). Stake (2008) recommends that it is important for the participants to

receive and review a copy of any final write-ups that demonstrate how the participants' contributions are represented as direct quotes or interpretations (p. 140). As researcher, I managed my subjectivity by acknowledging and addressing this limitation with the careful process of conducting structured interviews, and peer auditors to guarantee the accuracy of my findings (Creswell, 2008; Denzin & Lincoln, 2008; Morrow, 2007). With the use of different measures to ensure accuracy, I presented findings that are held to the highest standards of quality and precision.

In order to ensure the credibility of qualitative findings, Stake (2005) recommends that there should be procedures for dealing with data analysis codes that do not fit in the majority of themes and categories. Creswell (2008) describes information gathered from participants as "contrary evidence" which means that it is information gathered that "does not support or confirm the themes" (p. 257). In an effort to ensure a better understanding of the complexity of the themes, I analyzed this "discrepant information" and I presented these findings to offer different perspectives that do not align with the majority of the data findings (Creswell, 2003, p. 196). Consequently, I ensured that procedures were in place for addressing contrary or discrepant data and this will add to the credibility of qualitative findings.

Qualitative Findings

Introduction

This qualitative doctoral project study was conducted to investigate a local school's two-prong problem— the low math achievement of the economically disadvantaged elementary student population, and the limited nature of teacher

professional development within a supplemental educational service after school math program. This instrumental case study examined a supplemental educational service after school math program located in a socio-economically diverse urban elementary school in Westchester County, New York which is situated in the northeastern region of the United States of America.

During the spring semester of 2010, this researcher collected qualitative observation data from a homogeneous sample of students and interview data from a criterion sample of teachers teaching within the supplemental educational service after school math program. The qualitative findings were gathered and analyzed to answer the subsequent research questions:

1. How does the local school and district utilize math achievement data to inform program structures of a Title 1 funded elementary supplemental educational after school math program?
2. What can be learned about the economically disadvantaged students within the supplemental educational after school math program located in an elementary school setting?
3. What can be learned about the instructional practices within the supplemental educational after school math program?
4. What role does the use of instructional technology play within a supplemental educational after school math program?
5. What can be learned about the professional learning for educators teaching within a supplemental educational service program?

6. What recommendations can be made to further cultivate community and school partnerships that support the local elementary supplemental educational service program?
7. What recommendations can be made to further cultivate research proven professional learning for teachers of a supplemental educational math program?

The Findings

As lead researcher, I was able to analyze qualitative findings from observation protocols and one-to-one teacher interviews which also offered a body of supplemental qualitative data such as audio data, image data, and text data from student work samples and professional development documents. The qualitative results from various student and teacher participants revealed a corroboration of findings that fell within a list of themes or categories (Tashakkori& Teddlie, 2003). As this constructivist grounded theory qualitative researcher conducted data analysis, the nature of the findings flowed into several general themes or categories and eventually moved into more specific subthemes or subcategories (Charmaz, 2008). In Figure 2, the data reveals the different themes and subthemes of the findings.

Theme 1. Program Structures

Findings for Theme 1—Program Structures—addressed the following research question: How does the local school and district utilize math achievement data to inform program structures of a Title 1 funded elementary supplemental educational service after

school math program? This category or major theme relates to the different program structures within the local supplemental educational service after school math program.

During one-to-one teacher interviews, data findings for this major theme related to responses from the following interview questions and follow-up questions:

1. Tell me about your experiences teaching within the extended day after school math program.
2. At what point in the academic year, does the after school math program begin? Does it serve all grade levels?
3. How is math achievement measured?
4. Can you tell me more about…?
5. Please explain what you meant when you said…?

In accordance to the axial coding procedures of qualitative data analysis, data findings from interviews and the researcher's observations fell within two subthemes—the use of math achievement data and the instructional grouping of students (Creswell, 2008; Tashakkori & Teddlie, 2003; Miles & Huberman, 2002; Charmaz 2000). The subthemes centered on (a) the use of math achievement data within the supplemental educational service after school math program and, (b) the instructional grouping of students within this extended day program.

Table 2

Themes and Subthemes within the Findings

Major Themes	Subthemes
1. Program Structures	Use of Math Achievement Data
	Instructional Grouping of Students
2. After School Students	Math Achievement
	Student Participation
3. After School Instructional Strategies	Instructional Technology
	Cooperative Learning
	Strategy-Based Learning
4. Professional Collaboration	Instructional Planning
	Collaborative teaching
5. Curriculum	Curriculum Development
	Curriculum Framework
6. Professional Development	Teaching Training for Pearson SuccessNet®
	Data Warehousing® Training
	Differentiated Instructional Strategies for ELL

Use of Math Achievement Data

Testing Results from the New York State Math Assessment

Within Theme 1—program structures—the first subtheme was centered on how the extended day teachers within the supplemental educational service after school math program used testing data from the New York State Math Assessment. The qualitative

findings collected from one-to-one teacher interviews revealed consistent findings. Moreover, findings from personal correspondence from district leaders and instructional leaders corroborated the findings gathered from the teacher interviews. Teachers described how educational leaders gathered and analyzed testing data from the former year's New York State Math Assessments for the third, fourth, and fifth grades. The state math assessment testing results were used to identify students that did not demonstrate math proficiency on the New York State math learning and performance standards. The local educational leaders formally communicated to the school staff that this form of testing data would inform the enrollment of students within the local supplemental educational service after school math program (D. Stinchcomb, personal communication, November 19, 2009). It was noted that the extended day after school math program would serve as an academic intervention strategy for students who needed remedial math learning services.

Based on corroborated data findings gathered from interviews, educational leaders used testing data from the New York State Math Assessment to inform the enrollment of some students not meeting New York State Standards in third, fourth, and fifth grades. The qualitative findings from this instrumental case study reveal that not all of the school's students that demonstrated a level 2 (performing below grade level standards) on the New York State Math Assessments were in the extended day after school math program. One teacher described:

> I do recall that there were children who were on the cusp of passing the fourth grade math standardized test and that these were either children who were 2's and

> we were trying to move them into 3's or they may have been low 3's and we were trying to really move them a little further (Participant F).

Some of the school students who were not mathematically proficient received academic support.

Likewise, there was a group of students, in the supplemental educational math program, who did demonstrate math proficiency on former state math assessments. They were some students in the school that demonstrated a Level 3 on the New York State Math Assessment and they were in the program with the intent to raise math achievement from a Level 3 on the state tests to a Level 4. Participant A described, "Some of the students qualified. From the years past, it's my understanding that if certain kids kind of stood out to get that four that they were chosen by the teachers." Therefore, testing data from state standardized math tests informed the enrollment of some remedial students and proficient students into the local supplemental educational service after school math program.

Using Pearson Success Tracker™

During the 2008-2009 academic year, extended day math teachers were asked by district leaders to develop math assessments using the Pearson Success Tracker (2010). Pearson (2010) describes Success Tracker as an online assessment and remediation system that assists teachers in managing student assessments and directing remediation strategies to promote student achievement in mathematics. Further inquiry into Success Tracker ™ revealed a program endorsement which stated:

> It helps teachers provide personalized remediation for each student and provides you with powerful, disaggregated data analysis of student performance. Students will take online assessments and be provided instant remediation on areas of weakness. Teachers will instantly receive feedback on test results, and get the reporting they need to evaluate students and classes on state standard performance. (Pearson, 2010, "Frequently Asked Questions", para. 1)

Consequently, as a strategy to track student math achievement, the supplemental educational service after school math teachers required the students, in the 2008-2009 extended day after school math program, to take multiple online math assessments using Success Tracker™ (2010) This extended day teacher directive was the district's strategy to gather math data on the extended day math students utilizing this district approved Pearson SuccessNet® website (L. Webber, personal communication, January, 2009). Data gathered from numerous teacher interviews revealed that many teachers felt a sense of frustration because they felt they did not have the proper training to help them use this assessment tool. Participant B stated:

> If we had more knowledge about the Pearson Success Net part, this would have definitely been more helpful. It was a requirement that nobody knew how to work and it ended up becoming more of confusion like someone else said, a frustration, instead of being as beneficial as we had all hoped.

Teachers described that since they had limited training on how to handle the administrative settings of this online resource, they had to contend with several technological mishaps. "I thought the Pearson Success Net® (2010) was a great tool to be

able to use, but then again to have a technically formal way to assess the students, but there were definitely a lot of glitches using the program" (Participant C). In fact, numerous teachers described how they were not familiar with all of the multi-faceted components of managing student data and controlling the remediation or tutorial online programs that were activated once the students finished an online exam. A teacher described that during the 2009-2010 academic year Success Tracker was not in use by all of the supplemental educational service after school math teachers. "Last year, we were given the areas that were the weakest across the district maybe within our cohort of children. This year we weren't given those materials and we weren't in the past familiar with getting that" (Participant I). This researcher wonders if the limited understanding of this data analysis teacher resource contributed to the decline in the district appointed use of this instructional math online resource.

Lower Hudson Regional Information Center Data Warehouse

In 2008-2009 there was a central review conducted by the district statistician wherein math achievement data was gathered from the New York State Third, Fourth, and Fifth Grade Math Assessments. Based on disaggregated data from the Lower Hudson Regional Information Center (LHRIC) Data Warehouse, an item analysis of the New York State Math Assessment for grades three to five revealed some math deficit patterns (D. Dolinko, personal communication, January 16, 2009). The extended day teachers received specific suggestions for a curriculum focus where students demonstrated a lack of proficiency in the areas of:

1. Multiplication and Division;

2. Patterns; and
3. Graphs

During the academic year of 2008-2009, the teachers within the traditional school day received information about the districts' participation and endorsement of an online data analysis user group for district administrators and teachers to examine student achievement on state standardized assessments in English Language Arts and Mathematics. As a result, further inquiry into this matter revealed the informal name for this data assessment resource as "Data Warehousing" (G. Peluso, personal communication, April 15, 2010). The teachers of the local school district have access to this aforesaid data analysis user group that offers data analysis reports for sub-group demographics. The intent in providing teacher access to this data resource is to offer a data analysis resource for "…teachers who are interested in sharing best practices in how the data is interpreted and used for action both instructionally and for student interventions and response to intervention" (Lower Hudson Regional Information Center, 2010, "Data Analysis" section, para. 2).

Based on teacher interviews, this researcher triangulated findings that reveal that the use of the local LHRIC Data Warehouse® online resource is actually an underutilized resource by teachers of the extended day after school math program. Many teachers communicated that obtaining access to the district's data warehousing user group was cumbersome because the data was disaggregated by traditional classrooms so if the extended day math teachers were instructing students who were not in their original homerooms, they did not have access to the student assessment data. Many teachers

lamented that they did not receive adequate training on how to use the Data Warehousing data analysis user group. One teacher described:

> No, we didn't receive anything from central office. It was left basically in our hands. Go to Data Warehousing and that's not easy to do because you don't have access to everyone in the grade level (Participant I).

Consequently, teachers of the supplemental educational service after school math program had limited use of the district's data analysis user group. Qualitative findings reveal that within the program structures of this extended day after school math program, there was limited data analysis of math achievement testing data for students enrolled in this form of academic intervention program.

Instructional Grouping of Students in the After School Math Program

Within Theme 1—program structures—the second subtheme was centered on instructional grouping of students in the supplemental educational service after-school math program. Data gathered from observational protocols and one-to-one teacher interviews offered this researcher a better understanding of the instructional grouping of students within the after school math program.

The collection of triangulated data findings confirms that the students that were in a local community-based recreational youth program actively participated in the site-based supplemental educational service after school math program twice a week during the months of January through April. Some teachers described some uncertainty about knowing the enrollment procedures for both programs. It was described that the community-based youth program received a grant that offered funding for the

intervention academic services. Further inquiry revealed that the students who were identified as students needed academic intervention services were also economically disadvantaged students that were in the community-based youth bureau program.

The class grouping or class size within the extended day after-school math program was maintained smaller than the average traditional class size. The student participants within this local supplemental educational service program were grouped by grade levels ranging from third to fifth grade. There were between 10 to 12 students in each of the extended day after school classrooms.

Depending on the nature of the students' abilities, teachers placed students in small cooperative groups or partnerships during the extended day instruction. The student participants within the extended day after-school program sat together during whole group instruction which would take part during the mini-lesson portion of the math workshop lesson. Some of the students within this supplemental educational service after-school math program received one-to-one tutoring with volunteers from the local university.

Theme 2. After-School Students

Findings for Theme 2—After-School Students—addressed the following research question: What can we learn about the economically disadvantaged students within the supplemental educational service after school math program? This category or major theme relates to the students attending the extended day supplemental educational service math program. During one-to-one teacher interviews, data findings for this major theme related to responses from the following interview question and follow-up questions:

1. Could you tell me about the students that participate in this program?
2. Do you know how students are selected to participate in this program?
3. Can you tell me more regarding what you notice about your students?
4. Is there anything else you would like to add that can help me explore the issues centered on the extended day after school math program?

Using data generated from observation protocols and additional text and image data from student work samples, this researcher was able to disaggregate key findings from the qualitative data.

Qualitative findings from one-to-one teacher interviews were corroborated by this researcher's observations of the students participating in the supplemental educational service after-school math program. The corroboration of findings revealed three subthemes within the general theme of After School Students; (a) economically disadvantaged students, (b) academically disadvantaged students, and (c) the minority achievement math gap.

Economically Disadvantaged Students

Within Theme 2—After-School Students—the first subtheme was centered on the economically disadvantaged students within this after-school math program. The majority of the students in the after-school math program were economically disadvantaged students that qualified for free or reduced lunch. Many of the students in the local Title 1 funded extended day remedial math program also participated in a school-based city recreational after school program. This community service after-school program received a large grant from the local city's youth bureau to serve economically disadvantaged

students. However, all of the qualifying economically disadvantaged students in the school were not enrolled in the local community service program. Several teachers expressed that there should have been a greater number of economically disadvantaged students in the extended day after-school math program. Another participant commented:

> If a school system, a school, a district is serious about making inroads in the area of math in particular to children who may be disadvantaged from the general population whether it's because of the home life or maybe it's an economic reason, there needs to be a commitment (Participant C).

When seeking further clarification regarding the participant's comment on a need for commitment, the participant explained that a district must sustain consistent and long term efforts that reach the students facing economic hardships.

As this researcher posed follow-up questions during one-to-one teacher interviews, findings were corroborated that there were several key reasons why there was a small select number of students participating in both the supplemental educational service math program and the community service after school program. Due to the limited nature of Title 1 funding to provide remedial services for a larger set of qualifying students, it was not economically feasible to staff a large amount of extended day after-school math classes (D. Stinchcomb, personal communication, May 11, 2010). Moreover, transportation allocations were not available for this program, so parents were responsible for transporting their child from the school to their homes. One teacher described how there were many economically disadvantaged students who did not have personal transportation and as a result they were dependent on public transportation; having to

deal with mass transit costs would present an economic hardship for the families (Participant F). As this researcher explored the issues centered on the economically disadvantaged students in the extended day after-school math program, it was noted that there was inequitable access to supplemental educational services for economically disadvantaged students in need of remedial math services.

Academically Disadvantaged Students

Within Theme 2—After-School Students—the second subtheme was centered on the academically disadvantaged students within this after school math program. The majority of the students in the after-school math program were academically disadvantaged students who did not demonstrate proficiency on New York State Math Assessments. The student participants within the extended day supplemental educational service math program were a diverse group of math learners with varying degrees of math achievement. Several of the students received additional Title 1 remedial reading services. One extended day teacher described, "They were usually some who were close to getting passing test scores and the parents wanted them to get this extra support for the test and be part of the math program" (Participant E). Some of students who were in this supplemental educational service program received special educational service that was directed by a state mandated individual educational plan.

Minority Math Achievement Gap

Within Theme 2—After-School Students—the final subtheme was centered on the minority math achievement gap evident among the students within this after-school math program. The majority of the students were local Latino or African American

students who did not demonstrate proficiency on the New York State Standardized Test for either third or fourth grade. In a one-to-one teacher interview, Participant C described the nature of the minority student diversity in relation to the school population, "Most of the students in my group are Latino or African American and only one White student—Now that's funny because in our school system in our school district there are not that many African American students". Participant A explained:

> I would imagine that they are not performing with their test-taking skills and their general understanding of math. They might have come into the program not as prepared as they should have been. They may have been pushed up without the kinds of supports that they need, they might have all along needed smaller groupings and they kind of got lost.

Within the Extended Day After School Math Program, there was a subgroup of English Language Learners (ESL) in the Extended Day After School Math Program. One teacher described:

> We have ESL students that are on the cusp, just that they need that extra push. They are on the cusp and we get them over and you see the glimmer in their eyes when they get it and they just need that extra help (Participant J).

Many of the students were Latina students who did not actively engage in large group math discussions. Conversely, this same group of students was actively engaged in math discourse within dyadic partnerships or small groups.

Theme 3. After-School Instructional Strategies

Findings for Theme 3—after school instructional strategies—addressed the following research questions:

1. What can be learned about the instructional practices within the supplemental educational after school math program?
2. What role does the use of instructional technology play within a supplemental educational after school math program?

This major theme relates to the instructional practices or strategies used by the teachers in the extended day supplemental educational service math program. During one-to-one teacher interviews, data findings for this major theme correlated to responses from the subsequent interview question and follow-up questions:

1. What types of instructional materials are used? Do you think they are appropriate or inappropriate? Why?
2. How does a math facilitator of the after school program decide what to teach?
3. Is there anything else you would like to share?

Qualitative findings from one-to-one teacher interviews corroborated the researcher's observations of the teachers' instructional participation within the supplemental educational service after-school math program. The findings from observation protocols and additional text, audio, and image data reveal three subthemes within the general theme of after-school instructional strategies; (a) instructional technology, (b) cooperative learning instructional strategies, and (c) strategy-based math instruction.

Instructional Technology

Within Theme 3—after-school instructional strategies—the first subtheme was centered on the use of instructional technology within the supplemental educational service after-school math program. Throughout all of the observations of this school-based supplemental educational service program, the extended day math teachers utilized various mediums of instructional technology. Some of the teachers used interactive math websites that focused on basic number facts and recall. Many teachers used the InterWrite® board to model problem solving techniques whereas some other teachers used the same technology in conjunction with document cameras to project student work samples or to model a particular problem solving strategy. One teacher described:

> I did a combination of things. One day we had instruction in the classroom and the second session in the week the children practiced in the computer lab through some websites I found with samples of whatever skill that I taught (Participant H).

Several teachers used the Pearson SuccessNet® (2010) website to have students work on various math tutorials or online activities connected with the district's appointed math curricular program—Investigations in Number, Data, and Space®. Some teachers alternated between the use of interactive math websites and instructional math lessons on the InterWrite® board. However, some teachers expressed that they were not familiar or comfortable using the Pearson SuccessNet website. One teacher stated, "If we had more knowledge about Pearson SuccessNet that would have definitely been more helpful" (Participant A). This researcher noted in observation protocols that the use of

instructional technology was evident in all of the extended day after school math classrooms.

Cooperative Learning Instructional Strategies

Within Theme 3—after-school instructional strategies—the second subtheme focused on the use cooperative learning instructional strategies within the supplemental educational service after school math program. Throughout all of the observations of this school-based supplemental educational service program, data findings from observation protocols and one-to-one teacher interviews corroborate that the extended day math teachers utilized various cooperative learning tasks which promoted student collaboration and mathematical discourse. All of the extended day after-school math teachers facilitated small group instruction as well as encouraged large group discussions in which students shared various problem solving strategies for a common math problem. Some of the math facilitators within this supplemental educational service after school math program facilitated small group partnerships by assigning working partners in which students reviewed short math responses. Every extended day math teacher promoted dyadic partnerships through the use of various number sense math games using cards, dice, and other game structures from the NCTM (National Council of Teachers of Mathematics, 2010) standards-based math program Investigations in Number, Data, and Space®.

Strategy-Based Math Instruction

Within Theme 3—after-school instructional strategies—the final subtheme focused on the strategy-based math instructional strategies within the supplemental

educational service after school math program. During numerous observations of this school-based supplemental educational service program, data findings from observation protocols and one-to-one teacher interviews support findings that the extended day math teachers utilized various strategy-based math instructional strategies to help students extend their repertoire of problem solving strategies. The extended day after-school math teachers presented lessons that posed multiple math tasks or problems that incorporated the language structures present within the New York State Math Assessments. One teacher described:

> It's important to have a bridge between the vocabulary that is used in the classroom and the strategies used in the classroom and how those same strategies and vocabulary can be used within a testing structure (Participant J).

Several of the after school math teachers used math children's literature to highlight a math concept connected to the lessons presented in the remedial after school math sessions. One teacher described, "I'm trying to expose them to different literature within math and I'm always trying to start off with some kind of math story that is connected to what we are teaching". A few teachers selected a list of recommended titles of various children's literature that was endorsed by the standards-based math program Investigations in Number, Data, and Space®. These literary selections were used to launch a review lesson on multiplication, division, fractions, and measurement.

It was also noted that several of the teachers within the extended day after-school math program used targeted math vocabulary through the use of math vocabulary visual aids such as word walls and visual organizers that were in use in the traditional school

day. Many of the extended day teachers received some guidance from either an ESL teacher or a special education teacher to generate a list of targeted math vocabulary.

Every teacher in this supplemental educational service after-school math program presented small group math games focused on developing conceptual understanding of number sense through different game strategies. Some teachers divided the extended day after-school math students into small groups to offer targeted math instruction on different problem solving strategies in the area of fractions and measurement. In reviewing different math concepts—multiplication, division, fractions, and measurement—every teacher of the extended day after-school math program used excerpts of released state exams or test samples for the New York State Math Assessments for either third, fourth, or fifth grade. There were a few teachers that presented test preparation strategy-based instructional strategies using commercially prepared test preparation materials such as Buckle Down®.

Theme 4. Professional Collaboration

Findings for Theme 4—professional collaboration—addressed the following research question: What can we learn about the professional learning for educators teaching within a supplemental educational service program? This major theme relates to the different forms of professional collaboration that exists within teachers and other community programs related to the extended day supplemental educational service math program. During one-to-one teacher interviews, data findings for this major theme corroborate the participants' responses for the following interview questions and follow-up questions:

1. Tell me about your experiences teaching within the extended day after school math program?
2. Can you tell me more about…?
3. Please explain what you meant when you said…?
4. Is there anything else you would like to share?

Qualitative findings from one-to-one teacher interviews support the researcher's observations of the different forms of professional collaboration that existed between different extended day teachers which offered direct instructional services to students that qualified for supplemental educational services in math learning. This researcher was able to find supportive findings from observation protocols and additional text, audio, and image data reveals two subthemes within the general theme of professional collaboration; (a) instructional planning, and (b) collaborative teaching.

Instructional Planning

Within Theme 4—professional collaboration—the first subtheme was centered on instructional planning among different extended day teachers within the supplemental educational service after school math program. Throughout all of the observations of this school-based supplemental educational service program, various findings support interview responses shared by the teacher participants of this study. Many of the extended day after-school math teachers collaboratively worked together to plan the extended day math instruction and review various test samples of the New York State Math Assessment for grades three to five.

> We went through the tests and we decided what two or three areas really would be most beneficial. We also asked the teachers on the team for two or three areas that we could do in the after school math program (Participant I).

Some teachers worked together in previewing other test preparation resources that they could use as a form of mentor text or model to create multiple authentic math problems that students may encounter on the New York State math assessments.

While trying to become more familiar with the various components of the district approved internet math resource, Pearson SuccessNet® (2010) and Success Tracker (2010), many of the teachers collaborated to create various online math assessments as well as become more familiar with the software properties of this teacher online resource. Several teachers worked together to find math activities or math games within the traditional day standards-based math program—Investigations in Data, Space and Time®—as a student resource to develop a stronger conceptual understanding of number concepts. Some teachers noted that they did this to help create some coherence between the math instruction within the traditional school day math instruction and the extended day after school math instruction.

Collaborative Teaching

Within Theme 4—professional collaboration—the second subtheme was centered on collaborative teaching among different extended day teachers within the supplemental educational service after-school math program. Throughout all of the observations of this school-based supplemental educational service program, various findings supported interview responses shared by the teacher participants of this study. Several teachers had

a collaborative teaching model within their extended day math class in which a general education, special education teacher or an ESOL teacher delivered differentiated instruction in large or small group instruction. One teacher described:

> We were basically working within a workshop approach where you have a mini-lesson, and they would run off and work in the classroom. The concentration of adults or ratio of adults to children was smaller so it gave them the support to work (Participant B).

Many of the teachers collaborated to provide targeted instruction within small groups or partnerships.

Theme 5. Curriculum

Findings for Theme 5—curriculum—addressed the following research question: What can we learn about the instructional practices within the supplemental educational after school math program? This major theme of curriculum relates to the curricular issues related to instruction in the extended day supplemental educational service math program. Qualitative findings were gathered from the following interview questions and follow-up questions:

1. How does a math facilitator of the after school math program decide what to teach?
2. Please explain what you meant when you said…?
3. Is there anything else you would like to share?

During one-to-one teacher interviews, this researcher was able to triangulate data findings for this major theme with field study observations of the program (Creswell,

2008). This researcher was able to find supportive findings from observation protocols and additional text, audio, and image data which fell under two subthemes within the general theme of curriculum; (a) curriculum development, and (b) curriculum framework.

Curriculum Development

Within Theme 5—curriculum—the first subtheme was centered on curriculum development or curriculum planning designed by various extended day instructional partners within the supplemental educational service after school math program. Throughout all of the observations of this school-based supplemental educational service after school math program, this researcher was able to triangulate observation findings with interview responses shared by the teacher participants of this study (Denzin & Lincoln, 2008).

This researcher noted that the majority of the interview findings depict that there was not a cohesive strategy utilized for curriculum development among the extended day teachers. The extended day after-school program did not have a delineated curriculum framework to guide teachers in their instruction of the remedial math students; instead many teachers offered math instruction with a very general instructional plan. The following teacher responses represent a lack of cohesion regarding the math instruction within the extended day after school math classes. When asked how the math facilitator decides what to teach, the subsequent sample participant responses are as follows:

Participant A commented:

> So a part of what I look is what is going to be assessed on the state test…so I know what they are looking for in the students and based on my experience in

> doing an assessment in the beginning of the first week, I can see what they need and where their strengths are.

Participant B shared:

> Well, we looked at some of the information about how our children did as a group, not individually, but as a group how they did. Some did poorly in problem solving. Some did poorly in measurement that could be with time, centimeters, and rulers. Some did poor in just basic right there questions where there wasn't any difficult subtraction or addition.

Participant C described:

> Hmm…how do I teach what to teach? It's based on what I see their needs are and I work with another teacher and we revise our thinking based on the day.

The lack of cohesion between the different responses denotes that there is a range of instructional math strategies across a range of math topics.

Curriculum Framework

Within Theme 5—curriculum—the second subtheme was centered on the need for a curriculum framework as an instructional guide for the extended day instructional partners within the supplemental educational service after school math program. This researcher was able to corroborate findings from one-to-one teacher interviews and the observations of this school-based supplemental educational service after school math program. A triangulation of the interview and observation findings revealed key issues related to the subtheme of a curriculum framework (Denzin & Lincoln, 2008).

Many teachers expressed a need for a clear vision for the instructional work that should take place with students enrolled within the third, fourth, and fifth grade extended day after school math sessions. One participant candidly expressed some reservation about having an inflexible curriculum framework in place. "A framework is helpful, but what makes me nervous about a framework is that people will only follow the framework and not differentiate" (Participant D). Another teacher said:

> I think that the sense of direction has to be given to teachers. Yes, we can have autonomy and we should have autonomy to work within the needs of what our kids need. However, we need to be using the same *language* and that's what I find is the missing link is gearing towards the vocabulary and the language that the kids will be forced to use within a test structure (Participant H).

Several teachers expressed a need to develop a curriculum framework or curriculum map centered on several key math ideas. Many teachers suggested a need for a curriculum resource to teach fractions, measurement, and number computation. Some teachers expressed a need for developing a curriculum framework to guide a unit that would help students understand decimals with money.

While conducting a one-to-one teacher interview and posing the question on how the teacher made instructional decisions on what content to teach, one teacher shared with this researcher a copy of the professional correspondence that delineate the list of curriculum focus topics and (L. Webber, personal communication, January, 2009). The following teacher describes how information related to a curriculum focus assisted in planning several extended day math lessons.

> The curriculum varies across the years. Certain years we were told the concepts, and we gathered the games that would help them because they were used in the classroom and it would link the math learning. They were games that had those concepts and things we would use in the regular classroom. You know sometimes it was stuff that we didn't have time to get to in the day and we felt that it was something that would really help them.

The aforementioned curriculum focus was based on feedback from the district's New York State math assessment scoring teams (L. Webber, personal communication, January 7, 2009). The selection of the three topics within this curriculum focus was based on student achievement on the 2008 New York State Fourth Grade Math Assessment—They included (a) multiplication and division, (b) patterns and functions, and (c) graphs. Along with a list of the general math topics, there were performance indicators that correlated with the districts' standards-based math program for first through fourth grade—Investigations in Number, Data, and Space® (Figure 3). The performance indicators offered the extended day math teachers a description of the math skill objectives for the math remedial lessons.

In a Pearson SuccessNet training folder developed by the district math instructional specialist and presented to some of the extended day math teachers, it was stated that a packet of all former state math test questions for each of the suggested topics would be provided at a later time (L. Dolinko, personal communication, January, 2009).

Based on teacher interviews, many participants were not aware that a curriculum focus was issued by educational and instructional leaders within the local school district.

A few teachers that were aware of this curriculum focus made use of the preliminary curriculum framework. Moreover, a small number of teachers used the math topic and math unit correlation (Figure 3) to find the appropriate math investigations and activities within the standards-based program. There were a limited number of teachers that did review multiple grade level activities in the form of multi-tiered number concept games. The games helped to reinforce number concept skills in addition, subtraction, multiplication, and division. Additional multi-tiered games and centered on the concepts of fractions and geometry. One teacher noted that within the curriculum focus materials, there was an instructional note shared with teachers about the importance of differentiating instruction using multiple leveled math activities. “The intended use of providing multi-leveled activities presents a strategy to differentiate instruction according to the needs of the students and offer a point of entry in the Pearson SuccessNet computer program (L. Dolinko, personal communication, January, 2009). However, many of the extended day teachers did not receive this essential curriculum focus to inform and steer their math instruction.

Table 3

Fourth Grade Curriculum Focus

Math Topic	New York State Performance Indicator	Unit Correlation with Investigations in Data, Number, and Space®
1. Multiplication and division	Understand various meanings of multiplication and division. Use multiplication and division as inverse operations to solve a problem. Use a variety of strategies to multiply two-digit numbers by two-digit numbers (with and without regrouping). Develop fluency in multiplying and dividing multiples of 10 and 100 up to 1,000. Use a variety of strategies to divide two-digit dividends by one-digit divisors (with and without remainders) Interpret the meaning of remainders	Grade 2: Unit 5 Grade 3: Unit 5 Grade 4: Unit 1 and 3
2. Patterns and Functions	Describe, extend, and make generalizations about numeric and geometric patterns Analyze a pattern or whole-number function and state the rule, given a table or an input/output box	Grade 1: Unit 7 Grade 3: Unit 6 Grade 4: Unit 9
3. Graphs	Represent data using tables, bar graphs, and pictographs Read and interpret line graphs Develop and make predictions that are based on data Formulate conclusions and make predictions from graphs	Grade 1: Unit 4 Grade 2: Unit 4 Grade 3: Unit 2 Grade 4: Unit 2

Theme 6. Professional Development

Findings for Theme 6—professional development—addressed the following research question: What can we learn about the professional learning for educators teaching within a supplemental educational service program? The major theme of professional development relates to several areas of professional development that the extended day math teachers will need to effectively utilize student math assessment data to inform math instruction as well as develop a broader repertoire of instructional strategies to differentiate math instruction. Qualitative findings were gathered from the following interview questions and follow-up questions:

1. Tell me about your experiences teaching within the extended day after school math program?
2. Can you tell me more about the teacher training for Pearson SuccessNet®?
3. Can you tell me more about how teachers have access to the Data Warehousing group share?
4. Can you tell me more about ways you try to meet the needs of your students?
5. Please explain what you meant when you said…?

During one-to-one teacher interviews, this researcher was able to triangulate data findings for the major theme of professional development with data from field study observations of the extended day after-school math program (Creswell, 2008). This researcher was able to confirm data findings from observation protocols and additional text, audio, and image data which fell under three subthemes within the general theme of professional development; (a) teacher training for Pearson SuccessNet, (b) teacher

training for LHRIC Data Warehouse®, and (c) teacher training for extending differentiated instructional strategies.

Extended Day Teacher Training for Pearson SuccessNet®

Within Theme 6—professional development—the first subtheme was centered on teacher professional development training to aid in the use of a math teacher online resource—Pearson SuccessNet®. During field site observations of this school-based supplemental educational service after school math program, this researcher was able to triangulate observation data with interview responses shared by the teacher participants of this study (Denzin & Lincoln, 2008).

Many extended teachers of the local supplemental educational service after-school math program shared their challenges using this online resource, whereas a few extended day math teachers offered suggestions for planning and organizing teacher training sessions centered on the use of Pearson SuccessNet®. Another teacher stated that a group of teachers worked together to better understand the administrative features of the program, but she felt that it was not enough:

> It was nice to at least know that I wasn't by myself in trying to figure this out. We were all kind of trying to join together and create a collective focus and force but frustrated because there wasn't dedicated time for professional development for this group of teachers that are working with this particular population (Participant F).

Another teacher participant expressed how having students only take the Pearson SuccessNet® math test was counterproductive because students did not have a place to

show how they solved the problem; Extended day teachers are working so hard to encourage students to communicate their reasoning (Participant E).

Many participants expressed a need for further professional development to understand multiple features of this online math resource:

1. Online administrative features of the Success Tracker™ tutorial math activities for remedial students;
2. Developing online math assessments;
3. Communicating math testing results using the online parent information resource.

Extended Day Teacher Training for LHRIC Data Warehouse®

Within Theme 6—professional development—the second subtheme was centered on teacher professional development training to aid in the use of a teacher online student assessment data resource— *LHRIC Data Warehouse®.* This researcher was able to triangulate observation data with interview responses obtained from the teacher participants of this study (Denzin & Lincoln, 2008).

Many extended day math teachers expressed that they would like the opportunity to receive more training using the district data resource, *LHRIC Data Warehouse®.* One teacher described how she had printed out instructions on how to use this online resource which filled up a small binder but that she still needed more training support (Participant G). Another teacher commented that using this statistical resource was not easy to use without proper training (Participant H). Another participant expressed that she considered herself to be a statistical person due to the nature of data analysis work within her current

learning facilitator role (Participant E). However this same teacher stated, "You know what and I'm a statistical person, but to go in there and to break down where the kids are having trouble, this is a huge job!" (Participant E). Data findings from teacher interviews reveals that there is potential room for the district to develop professional development training sessions for working with the LHRIC Data Warehouse® online resource.

Differentiated Instructional Strategies for ELL

Within the final Theme 6—professional development—the last subtheme was centered on teacher professional development training to aid teachers in learning a broader range of differentiating math instruction techniques to meet the needs of English Language Learners (ELL). This researcher triangulated observation data recorded on observation protocols with interview responses obtained the teacher participants (Creswell, 2008).

Within this local extended day after-school math program, the majority of students that qualify for this supplemental educational service program are English Language Learners. Many of the teachers recognized that in order to promote higher math achievement, more strategic support must be given to this student population. One teacher explained that for many students who do not have English support at home, the extended day program is a vital remedial resource. Another teacher explained:

> So for some of the students that really need the support, I think it's working wonderfully for them because they are able to stay with two teachers after school, work on the strategies, and the teachers can enforce, you know if a student is doing something incorrectly, the teacher can pick up on it and they can you know

> fix, make the correction. So you know a student is not practicing something the incorrect way. Whereas when they bring something home, the parents may not have time, or they might have other siblings that need other help, or they might be at work and they may not be picking up on the mistakes. In essence, the student is just practicing the same mistake over and over again or you know they are just not doing something correctly. So I think it's very good in helping (Participant D).

The lack of support of instructional support from parents is a common concerned expressed by many teachers of the extended day after-school math program.

Some of the extended day math teachers expressed a need for additional professional development in the area of differentiated instruction specifically geared to meet the needs of ELL students. A few extended day teachers expressed that the teachers need to explore ways of incorporating math vocabulary for ELL students. One participant explained that within the study of multiplication, more work must be done to have students not only memorize multiplication facts, but to understand different representations of multiplications such as an array:

> People think that math is numbers and they forget that if you consistently have those vocabulary words woven to use then it is going to embed that content with that function that they are doing as opposed to just doing the function and not understanding the meaning or what it is really called. What is it that I'm really doing? I'm working with an array? What's an array? (Participant G).

Many teachers expressed that it was not enough to ask students to develop automatic retrieval of number facts, but that students must also develop a stronger conceptual understanding using math vocabulary to communicate their understanding.

Project Outcome

This qualitative instrumental case study focused on a local school's two-prong problem— the low math achievement of the economically disadvantaged elementary student population, and the limited nature of teacher professional development within a supplemental educational service after school math program. Data findings related to this local problem helped to inform the development of a project to address the issues related to this study.

The main finding for the first part of this question reveals that the low math achievement of economically disadvantaged students is affecting other sub-populations within the school community—English Language Learners as well as other academically disadvantaged students. The main finding for the second part of the research question reveals that extended day teachers have limited access to professional development within the supplemental educational service after school math program. Many teachers are not familiar with the use of the online teacher resources that can help them use student math achievement data to inform remedial instruction with the students in the extended day after-school math program.

For this reason, the outcome of my project study was to develop a professional development action plan for educational school leaders that helped to inform the

development of future teacher training. The local school site has a unique professional development relationship with a local university and it has been identified by district and university leaders as a professional development school (T. Klemm, personal communication, September 12, 2008). As a member of the university and school leadership committee, I was asked by the chair of that committee to propose suggestions for ways that the university and the local professional development school could promote math achievement (J. Connors, personal communication, May 17, 2010). As I served in this fortuitous teacher leader role, I used qualitative findings to inform decisions about potential teacher staff development opportunities—specifically related to broadening differentiated math instructional strategies to meet the needs of English Language Learners.

In Section 3 of this study, I will review the recent body of literature that can inform the development of a professional development project centered on the potential community school partnership between the local elementary school and the local university. Next, I will delineate the implementation process of this project and share an evaluation plan as well as share details related to the implications of this project.

Summary

Future research centered on program design structures and institutional routines may increase the accessibility of this vital service to academically and economically disadvantaged students. The rewards of actively seeking research-proven and unconventional solutions may outweigh the awkward stance that one must take to

implement change (Fullan, 2007). If school leaders and practitioners begin to internalize research findings that advocate for supplemental educational service programs that are meaningful and well designed, they may realize that the potential behind the NCLB Act of 2001 (Beecher & Sweeney, 2008; Craig, 2009; Ascher, 2006; Lauer et al., 2006). The key to ratifying educational reform may involve community stakeholders engaging in nimble problem-solving and the outlining of well-articulated expectations and outcomes for all those involved (Fullan 2001, 2007). Educational communities can benefit from studies that illuminate statistically significant and effective program designs.

In closing, Section 2 outlined the multiple steps needed to conduct this qualitative doctoral project case study. In this section, I shared my intent and rationale for using a qualitative instrumental case study. The research design and research questions presented helped to steer an investigation into a local problem. In addition, I offered details pertaining to the specific form of qualitative research design that I utilized to collect and analyze qualitative data. Furthermore, I proposed a detailed justification and explanation for my decision in conducting an instrumental case study by comparing it with other potential forms of research designs. Next, I presented a delineation of the (a) criteria for participant selection, (b) depth of inquiry pertaining to the number of participants, (c) procedures for gaining access to participants, and (d) methods and measures for establishing researcher-participant working relationships and (e) ethical protection of the participants' privacy, consent, and protection from harm. Afterwards, I offered an explanation and justification for my specific data collection procedures and management systems to generate, gather, and record multiple forms of qualitative data. Moreover, in

Section 2 I presented a description and explanation for the data analysis and validation procedures necessary to guarantee the validity and reliability of the data collection and analysis procedures. Finally, I shared data findings generated from analyzing qualitative data gathered at the field site. Section 2 proposed key details that related to the nature and scope of my qualitative doctoral project case study.

Section 3: The Project

This study centered on two critical elements of the local school's problem: the low math achievement of the economically disadvantaged elementary student population, and the limited teacher professional development within a supplemental educational service after school math program. Findings offered insight into the low math achievement of economically disadvantaged students within a local elementary school. Moreover, findings a stronger understanding on the teacher professional development within the local supplemental educational service after-school math program.

According to Siegle and McCoach (2007), educational communities can increase student math achievement and student self-efficacy through strategic teacher training (p. 279). Consequently, I chose to use the following research questions to guide an inquiry into developing a project study:

1. What recommendations can be made to further cultivate community and school partnerships that support the local elementary supplemental educational service program?
2. What recommendations can be made to further cultivate research proven professional learning for teachers of a supplemental educational math program?

This study offers the local school a professional development action plan that is informed by the local stakeholders, namely, supplemental educational service math teachers and local instructional leadership.

Overall Project Description

The project is a Professional Development Action Plan (PDAP). The design of the PDAP was informed by local teacher feedback gathered in one-to-one teacher interviews, local district initiatives, and empirical research findings and strategies. Upon conferring with the committee chair and the methods specialist on my doctoral research committee, I received guidance on the alignment between the PDAP and the findings gathered in this study. The PDAP is an overview of recommended professional development courses specifically designed to meet the instructional needs of the local supplemental educational service after school math teachers. Furthermore, the development of the PDAP can offer a research-based strategy in sustaining the study site's community partnership with the local university.

Project Goal

The primary objective of the PDAP project was to develop a professional develop action plan that could present strategies to create stronger community and school partnerships within the local school and the local university. The local school is recognized by the school district and the local university as a Professional Development School (PDS) wherein the local school site serves as a partner school with the college in preparation for the next generation of teacher candidates, local faculty development, and the enhancement of student learning and academic achievement (Manhattanville College, 2010). Several goals and standards were established to inform the development of this professional development partnership. Figure 4 delineates the goals and standards that

inform professional development within the local school and the local college's PDS partnership (Manhattanville College, 2010).

Table 4

Goals and Standards of a Professional Development School

Goals	Standards
• Improvement of student learning • Preparation of pre-service teachers • Professional Development for educators • Research and inquiry into the improvement of educational practice	• PDS partners will create a inquiry community which supports professional development of the staff and students. • Sustain a level of accountability and responsibility to maintain professional standards in teaching and learning • PDS partners will collaborate to design and implement a distinctive college and school partnership • Prepare the next generation of future teacher candidates to meet the diverse learning needs of all learners • PDS partners will ensure that specific PDS program structures are in place to provide clearly articulated and effective professional development resources.

Project Rationale

In conjunction with the established PDS goals and standards, I would like to inform the development of local teacher training to best address the needs of the economically disadvantaged students participating in the local supplemental educational service math program. As noted earlier, a large subgroup of this local marginalized at-risk math learner group comprises of English language learners (ELL). Friend, Most and

McCrary (2009) examined teacher perceptions of professional development that specifically geared to meet the unique needs of ELLs and research findings reveal that there is an increasing need to create professional development programs that address this growing public school population (p.54). Consequently, I will present a professional development action plan comprising of research proven practices directly informed by the research literature.

Review of Educational Research and Theory

Throughout the development of this project study, I reviewed the current body of literature that informed the design of a research relevant PDAP. It was imperative that the PDAP address research proven professional development strategies that promote higher math achievement among economically disadvantaged students and ELL. Moreover, I sought to examine copious research findings related to the themes and subthemes of this project study. The goal of this final literature review was to examine themes not presented in the preliminary literature review, prior to the launch of this study. Consequently, I conducted several Boolean searches centered on (a) the use of instructional technology for remedial students, (b) data analysis systems to inform instruction, and (c) effective instructional math strategies for English Language Learners. An evaluation of educational research and theory would yield evidence-based strategies that can promote collegial professional development opportunities centered on students and teachers of a supplemental educational service math program.

Instructional Technology for Remedial English Language Learners

I reviewed the body of literature on instructional technology for ELLs learning math. The findings focused on the instructional technology within my study such as the use of the interactive whiteboard instructional technology, and remedial online and computer-based software products to promote math achievement success for English language learners. These two forms of instructional technology were observed within the local supplemental educational service after-school math program. Moreover, the teacher use of the interactive whiteboard technology and the instructional use of the local program's online and computer-based software (Pearson Success Tracker™) served as key points of discussions within multiple one-to-one formal teacher interviews.

Interactive Whiteboard Instructional Technology

Smart Technologies (2006) defines the interactive whiteboard as an instructional technology that has the capability of:

1. Manipulating various forms of text and images;
2. Making digital notes;
3. Archiving interactive notes that can be used for future instruction;
4. Offering large group visual access to website;
5. Modeling the use of an online or computer-based software program;
6. Developing digital lessons that can offer frameworks or templates that can scaffold images and other forms of multimedia; and
7. Recording notes over educational videos;
8. Presenting other student exemplar or student work (p. 5).

Likewise, Lopez (2010) asserts that the use of the interactive whiteboard technology can significantly increase student math achievement for English Language Learners and in turn help to close the minority achievement gap. The use of the interactive whiteboard during math lessons can improve student performance but there is a strong need to examine the implications for developing continuous teacher professional development (Lopez, 2010). As this researcher observed teachers with varying degrees of interactive whiteboard professional development, it was apparent that was a potential area for future collegial collaboration.

Remedial Online and Computer-based Software Programs

An extensive review of historical research reveals findings for the second subtheme of this researcher's literature review—the use of computer-based software programs as an instructional tool. Computer-based software programs have been in place within educational settings for over twenty years—with limited technological capabilities of the computer software technology the instructional software primarily focused on simple algebraic or geometric math problems (Boers-Van & Monique, 1990; Heid, 1997). However, with the advent of technology, the availability of online and computer-based remedial instructional technology began to flourish near the end of the 1990's into the new millennium (NCTM, 2000). As a result, the NCTM (2000) standards and principles for educational reform established that the math instructional use of technology was a research proven strategy that fosters active student engagement and the student ownership of complex and abstract mathematical concepts (p. 25). Similarly, Huffaker

and Calvert (2004) discovered that active learning on computers can offer students meaningful problem solving experiences that help to solidify math learning concepts.

Recently, Roschelle, Knudsen and Hegedus (2009) advised educational leaders and policymakers to view instructional learning software as a broader instructional tool rather than a narrow-scoped educational intervention (p.304). Means (2010) posited that the means by which a district or school community implements technological practices is central to the math achievement of students in need of this vital instructional technology and that these implementation practices need to be informed by research proven technological studies. Qualitative findings show that the use of "student performance information generated by software products helps teachers target their instruction to the things that students need to learn" (p. 297). Consequently, educational communities may need to consider research proven instructional practices that can bridge the use of this instructional technology and student progress data.

Teachers need professional development and collegial collaboration centered on the inherently complex implementation strategies that ensure the proper use of instructional technology (Means & Penuel, 2005; Roschelle et al., 2009). As such an educational community striving to promote higher math achievement for ELL students must work to offer equitable access to rich mathematical learning via various forms of instructional technology (Ganesh & Middleton, 2006; Huffaker & Clavert, 2004). Similarly, Waxman and Téllez (2002) identified key instructional strategies that are effective in promoting academic success for English language learners which include the development of collegial collaboration and technological instruction. The use of

interactive white board and online or computer-based instructional technology can be an area of collegial study integrated in this research doctoral project—the local school's professional development action plan.

Data Analysis Systems to Inform Instruction

The second subtheme that was reviewed in the body of literature was the use of data analysis systems to inform instruction. Crawford and Ketterlin-Geller (2008) claimed that in order to successfully implement a remedial intervention program, a key element in the success of this program structure is the use of a data-based program evaluation system. When administrators, teachers, students, and parents have access to "progress monitoring data", they are able to evaluate the effectiveness of student learning and "appropriate instructional decisions cannot be made in the absence of valid and reliable data" (Crawford & Ketterlin-Geller, 2008, p.7).

A key strategy in evaluating student math learning and the effectiveness of supplemental educational service or intervention learning programs is the use of "interim assessments" which are defined as an assessment tool that can (a) measure student understanding and use of skills within a narrow span of time; and (b) offer testing results that can be easily collected and examined to give insight into the progress of students within a classroom, school, or district (Oláh, Laurence & Riggan, 2010, p. 227). Many school districts report the use of various assessments to monitor student achievement and they can be described as instructional, evaluative, and predictive (Perie, Marion, Gong & Wurtzel, 2007, p.2). Student learning is directly affected when school leaders use interim assessment results to inform curricular decisions that directly refine curriculum programs

(Brown-Chidsey & Steege, 2005). In tandem with the use of interim assessments, a growing practice in urban school districts is the use of "information management systems" which serve as a central hub for collecting and analyzing student data (Oláh et al., 2010, p. 231). A review of the research literature reveals that the use of data analysis systems can help inform instruction within the traditional and remedial program structures.

Instructional Math Strategies for English Language Learners

The final subtheme of this literature review relates to research proven instructional math strategies for ELLs. Garcia, Arias, Harris-Murri, & Serna (2010) reported on the research proven strategies of developing partnership schools with university school partners and how this collaboration can help to develop strong and responsive teacher preparation programs specifically geared to serve the needs of ELLs:

> (a) Provide student teachers with scholarship opportunities to teacher in culturally and linguistically diverse schools with high ELL student populations;
>
> (b) Offer leadership and teacher leader certification programs; and
>
> (c) Lend community support to students and families (p. 139).

Recent findings were informed by former evidence of best practices for the math instruction that promotes math achievement for ELL students. As educational leaders examine professional development strategies that develop teacher awareness of proven instructional methods, they must also consider the implications of these new findings. Chang, Singh & Filer (2009) conducted a longitudinal analysis that demonstrated a significant negative effect that ability grouping in mathematics has on ELL students

(p.41). In the primary and secondary schools, a mathematics achievement gap exists between ELL students and proficient English students wherein progressively overtime the math student achievement gap becomes wider between the ELL students and their English dominant counterparts (Chang et al., 2009, p.41). As I observed student grouping of remedial math ELL students, it was evident that the class grouping of the supplementary educational service after school program was a homogeneous group of students that did not demonstrate strong math proficiency. When I developed the PDAP, it was important to present opportunities where educational leaders and remedial program teachers can (a) reassess the program structures that support math learning for ELL students and, (b) examine the current program structures that hinder math learning for this subpopulation of students.

Project: Professional Development Action Plan

Introduction

The Professional Development Action Plan (PDAP) focuses on three key areas of teacher training within the local school site. The data findings from this qualitative instrumental study informed the focus of the teacher training action plan for potential teacher training workshops on the use of (a) instructional technology of the Interactive Whiteboard and the Pearson Success Tracker™, (b) the use of the district student assessment data resource—LHRIC Data Warehouse®, and (c) research proven math instructional strategies that promote math achievement for ELL students (Appendix A). The workshops outlined in the project PDAP can be facilitated by either the instructional

leaders (school math instructional specialist, math lead teachers, technology lead teacher) within the professional development school otherwise known as the PDS (study site) or any of the PDS appointed local university professors. A set of goals and standards established between the local PDS and the university aligned well with the nature of the project PDAP.

Within the following project discussion, this researcher discusses two overall components of project PDAP. This researcher shares the essential needed resources, and vital professional development structures. The project discussion describes the various roles and responsibilities of the researcher, school math instructional leaders, and the local university professors directly working with teachers in the study site. Next, the researcher will discuss the potential barriers or obstacles that may impede the use of this project PDAP. Finally, this researcher will share the project implementation timeline for the academic year of 2010-2011.

Project Resources, Structures and Potential Obstacles

The implementation of the PDAP will require the use of several existing resources within the school's utilization of Title 1 funding. The allocation of Title 1 funds has assisted the school district in providing school-based professional development instructional leaders that offer collegial coaching, teacher workshops, and assist in the alignment of math curriculum. Moreover, there existed a collaborative professional development structure between the study site and the local university. Many professional development opportunities have occurred during the school calendar's appointed

professional development dates as well as during various faculty meetings. After sharing key findings from this researcher's study with the school principal and math instructional specialist, the school principal confirmed that the nature of conducting the PDAP workshops would fit well within the school's existing professional development structure. Consequently, the development of this project PDAP capitalizes on this existing professional development infrastructure and resource.

The existing technology professional development structures may present some potential barriers for implementing the project PDAP. Some of the instructional technology workshops proposed in the project PDAP require the expertise of professional developers using the Pearson Success Net® website and the interactive whiteboard. Currently, the school's professional development technology staff is limited; it includes a technology lead teacher and a teaching assistant for the technology laboratory. At this time, the resources that are needed to implement the PDAP would require some additional district training from the district's technology team. Therefore, I will propose to the school leadership a need for a small cohort of math lead technology teachers that can attend some 'train the trainer' workshops that would serve as turnkey training for the after -chool math teachers.

There are several potential obstacles that may impede the facilitation of the PDAP workshops. Depending on the availability of the college professors appointed to the professional development school site and their area of expertise, some of the proposed professional development workshops may need to be facilitated by either the school's math instructional specialists, math lead teachers or this researcher. Based on this

researcher's former international and state level consulting experience as well as former graduate instructor experience, it is highly probable that this researcher may need to facilitate a few of the professional development workshops centered on the use of the data analysis systems to inform math instruction for economically disadvantaged students and ELL students. As a result, the limited availability of staffing all of the professional development workshops presents an obstacle that may affect the nature of the professional development workshops noted in this researcher's project PDAP.

Project Implementation Timeline

The launch of the project PDAP can begin after the completion of this researcher's instrumental case study within the local school. Through the collaborative nature of the school's Manhattanville PDS leadership committee, this researcher is able to develop and present to this committee the PDAP for projected professional development work for the scholastic year of 2010-2011. Based on the local school district's school calendar, the district and school educational leaders have scheduled early release dates twice a month to focus on different professional development objectives that can improve student achievement. The workshops outlined in the PDAP will take place bi-monthly within one of the assigned dates as communicated by the school principal (T.Klemm, personal communication, June 21, 2010). The implementation of this project will be a research-based contribution responsive to the fundamental need clearly communicated by the after school math teachers within the local school site.

Project Evaluation Plan

A project evaluation plan helped to assess the professional development worthiness of the project PDAP proposed by this researcher. The use of a formative evaluation plan helped me (a) assess the strengths and limitations of the educational project within the developmental phase, and (b) seek feedback from local stakeholders to refine the project action plan to guarantee the project's effectiveness (Tessmer, 1993). I conducted a comprehensive review of the body of literature related to the formative evaluation process. Patton (1983) described four central tenets of strong formative evaluations: The evaluation process must be communicated well, realistic, ethical, and offer research participants shared ownership or a stake in the process (p.16). Patton (2010) described the formative evaluation or the developmental evaluation process as a highly applicable tool for designing innovative programs that can impact change within an ever changing educational system (p.5). "Innovations can take the form of new projects, programs, products, organizational changes, policy reforms, and system interventions" (Patton, 2010, p.1). Consequently, the use of a formative evaluation was a sound strategy for evaluating this researcher's doctoral project.

In order to comprehensively evaluate and guarantee the reliability of this researcher's professional development action plan, I utilized Guskey's (2002) five levels of professional development evaluation (p.48). This formative tool naturally shaped the overall goals of my doctoral project. Guskey's (2002) five levels of professional development evaluation is an evaluative tool that can ensure the placement of local professional development structures to impact student learning as well as address the

participants' reactions, learning, implementation support, and new knowledge (p.50). As I designed the PDAP doctoral project, it focused on two key ideas; Helping the local students' math achievement and seeking evidence that demonstrate student achievement (Guskey, 2003, p.15). The goals of this researcher's professional development action plan were clearly communicated to the local school's stakeholders with the intention to provide a research proven and innovative reform strategy.

Project Implications

There are several project implications that arise from this researcher's development and implementation of the project professional development action plan for an urban school. American public schools have experienced an increase in the enrollment of ELL students who demonstrate varying proficiencies of English proficiency as well as academic math achievement (Friend et al., 2009). The public schools are sanctioned by NCLB to offer equitable access to quality and rigorous math learning (USDOE, 2009). However, a growing number of ELL students do not demonstrate math proficiency on state mandated math assessments (Fry, 2008). Esmonde (2009) asserted that within this technologically based society, proficiency in mathematics plays a central role in acquiring higher access to a broader spectrum of careers and quality math education serves as a gatekeeper in promoting academic achievement in high school and college (p. 1008). As a result, educational communities are sanctioned by NCLB and supported by Title 1 funds to examine and develop a strategy action plan wherein research proven instructional practices are used to impact student achievement (USDOE, 2007b). Friend,

Most and McCrary (2009) examined the impact of professional development for teachers working directing with ELL within the mainstreamed general education classroom and they found that there are greater gains in the academic achievement of ELL students when school's engage in extended professional development experiences centered on best instructional strategies for English language learners (p. 67). Therefore, the PDAP can help inform the development of research proven professional development experiences that can present collegial discussions and examinations of best strategies that promote math achievement for ELL students as well as economically disadvantaged students.

Summary

This section offered a discussion of the project rationale for selecting the PDAP project. I explained was how the local school's problem was addressed through the project design. After reviewing the literature, I presented a critical analysis of how the project is aligned with sound research-proven theories. Next, I described the project implementation process and I offered a project evaluation plan. The final component I presented was the project's potential for social change and the implications of the PDAP.

Section 4: Reflections and Conclusions

In this section 4, I reflect on the multi-faceted process of evaluating the final project's strengths and limitations. I share recommendations regarding alternative projects that can address the local problem. Next I examine and reflect on the level of my scholarly development as well as share reflections on the project development process. In this section, I discuss the evaluation of the final project. Furthermore, my reflections are discussed regarding the leadership changes and social changes within the local school. Finally, I conclude with the implications and applications for future research.

Project's Strengths and Limitations

The development of the project study professional development action plan is anchored in several strengths that can help meet the needs of the local school site. The project was developed after I conducted an instrumental case study exploring the issues related to the local schools supplemental educational service after school math program. I explored two key areas within the study: the professional development experiences of the supplemental educational service math teachers and the academic achievement of economically disadvantaged students in the program. Findings from the study informed the development of a customized project that will address the needs of the teacher and student populations within the local school site.

I sought feedback from the community school stakeholders such as the supplemental educational service after school math teachers, instructional leaders, and educational leaders to develop a professional development action plan that would address

key areas of deficit within the local school's professional development structure. Within the use of research proven methods, educational leaders can use professional development experiences to shape the quality of math education for all students (Rorrer, Skria & Scheurich, 2008). Similarly, Hord (2004) recommended the use of professional development experiences to strengthen teacher efficacy in understanding diverse learners, working within curricular parameters, and adjusting instructional techniques that can promote academic success for all students. Martin (2009) asserted that in order for schools to affect positive change that directly promotes math equity and excellence for all students, teachers must receive research-based professional development experiences that are responsive to the needs of diverse learners. The project PDAP was developed with the needs of the teachers working with economically disadvantaged students and ELL students within the local supplemental educational service after-school math program. Teachers receiving the professional development outlined in the project PDAP will learn to expand their use of instructional technology, data analysis software, and several instructional strategies that are more culturally responsive to the needs of ELLs. The key strength of my project is that the PDAP was professionally responsive to the communicated needs of the participants within the local study site and not a prefabricated, generic, or general professional development experience.

Yet there are limitations to note about my work. The project PDAP is limited to the professional development of the supplemental educational service math teachers working with the economically disadvantaged and ELL students within the local program. Although this project has the promise of offering rich professional learning

opportunities to all of the teachers of the schools, the school's current professional development infrastructure lacks the resources to extend this project PDAP to all of the school's teachers and instructional partners (teaching assistants). Another limitation of my study is that it was restricted to one school site due to the customized nature of the project professional development action plan. I recognize that even though there are project strengths, there are also a couple of limitations related to the project.

Recommendations

As I reflect on the final approach used in addressing the local problem, an alternative project came to mind on addressing the local problem. Based on the findings from the instrumental case study, I could have developed an after-school math curriculum centered on the topics that presented the greatest difficulty for the ELLs and economically disadvantaged students. Research findings from one-to-one interviews and program observations helped me identify the lack of curriculum cohesiveness among all of the different supplemental educational service after school math programs. Perhaps with the collaborative development of the after school math curriculum, the issues related to the diverse needs of the English language learners could have been addressed. Based on the data gathered from teacher interviews, many of the teachers communicated a need for a curriculum scope to help teachers plan and develop student assessments. However, with the use of this alternative curriculum development project, I could have addressed only a portion of the local schools problem without directly affecting the quality of professional development opportunities within the local school site.

Reflections

Throughout the development of my project study, I continually reflected on the level of personal scholarly growth attained in conducting a qualitative doctoral study, directing the project development and evaluation of this scholarly venture, and observing the process of developing local leadership and social change within this local school setting. Scholarly reflection served as a tool for the development and refinement of a project that would serve the local setting and contribute to promoting positive social change.

Reflections of Scholarly Development

While I was conducting the qualitative doctoral study, I reflected on the level of my scholarly development in conducting a qualitative doctoral study. Using knowledge gained from doctoral coursework and the body of professional literature, my aim was to conduct a study that would reflect the highest standards of quality. Stake (2008) described the collection of qualitative data as a rigorous and time consuming process of seeking understanding of a "complex entity located in a milieu or situation embedded in a number of contexts or backgrounds" (p. 127). The rigor of conducting a qualitative study also required that I triangulate findings from various sources (Creswell, 2003). Within the context of this rich research study, I was able to report a detailed "narrative discussion" of the results that helped to inform the development of a project tailored to meet the needs of the participants (Creswell, 2008, p. 262). Throughout this process the level of my personal scholarly growth grew substantially as I learned to apply research theory to the practice of conducting a qualitative study.

Reflections of Project Development and Project Evaluation

Throughout this study, I reflected on the process of directing and evaluating the project development. Denzin and Lincoln (2008) posited that a qualitative researcher is a "bricoleur and quilt maker" that weaves together multiple resources that are specifically "…fitted to the specifics of a complex situation" (p. 5). Throughout multiple points in the study, I sought opportunities to reflect on and interweave various instructional resources that the teachers and school leaders could use within the local school.

The decisions that I made in the development of the professional development action plan were based on research findings from this study, the needs directly expressed by the teacher participants, and personal consulting expertise in the area of math education. The process of designing a project that would directly address the central issues examined in the narrative findings was important to me. In the interest of honoring the voice of the participants in this study, it was important to share the findings and reflect on how the participants were empowered in this research process (Creswell, 2008, p. 263). The final outcome of my project was directly informed by participant feedback and research-proven evaluation strategies for the design of quality professional development opportunities. Scholarly reflection served as key strategy in developing a scholarly project that could prepare a course for instructional and social change within the study site.

Reflections of Leadership Change and Social Change in the School

As I reflect on the nature of educational leadership reform and social change within the school setting, I have learned that successful planning of professional development involves the collaboration of school leaders, teacher leaders, and other community stakeholders (Supovitz, 2002). In order for professional development to directly affect learning and community learners, the professional development activities must offer ample time and resources for collegial collaboration (Guskey, 2003, p. 15). As I served as lead researcher and math lead teacher, I continually reflected on my role within the school-based professional development school leadership committee. In this role, I was able to witness how school representatives, university program leaders, and school leaders took inventory and examined a number of effective strategies that helped to enhance the professional development experiences within the school site. Moreover, as a member of this community building initiative, I was able to witness the leadership dynamics centered on student achievement. This reflective process allowed me to better understand how the development of my doctoral project can contribute to local educational leadership and social change initiatives.

As I engaged in the reflective process throughout the implementation of the qualitative research design, development of the doctoral project, and the active engagement of collegial collaborations among different community leaders, I was able to identify how reflection is a viable process that can help promote and inform positive social and local educational change.

Implications and Applications for Future Research

The application of this researcher's project will affect the quality of professional development within the local school's extended day after-school program. Based on research findings and a review of the professional literature, the teachers of this form of supplemental educational service program will receive an innovative professional development experience designed to serve as a systemic intervention to improve the quality of math education for economically disadvantage students and ELL students. Patton (2010) asserted that with the use of a systemic intervention or an innovative and developmental project can guide change within a complex learning environment. With the collaborative planning and implementation of the professional development workshops, the stakeholders are vested in creating learning circles that can impact student achievement (Supovitz, 2002). The PDAP sets a course for consistent teacher training that can directly meet the diverse needs of the students in the extended day after-school math program.

Along with the implementation of the professional development action plan, this researcher considered potential areas for future study. This researcher recommends that future research should also focus on the academic achievement of ELL students within supplemental educational service programs specifically on the use of vocabulary development, and the use of additional methods of instructional technology in the learning of mathematics. This form of future research may be helpful for urban school districts facing a growing number of ELL students within their districts. Another area of future study can center on the math achievement of ELL students within rural school

districts wherein a limited set of instructional resources may be available. A comparison on both forms of these areas of study would help to address the quality of math education for economically disadvantaged and ELL students throughout the state or nation. The application of this future research can greatly affect social change within the educational school system and help to inform instructional practice and math learning for teachers and students.

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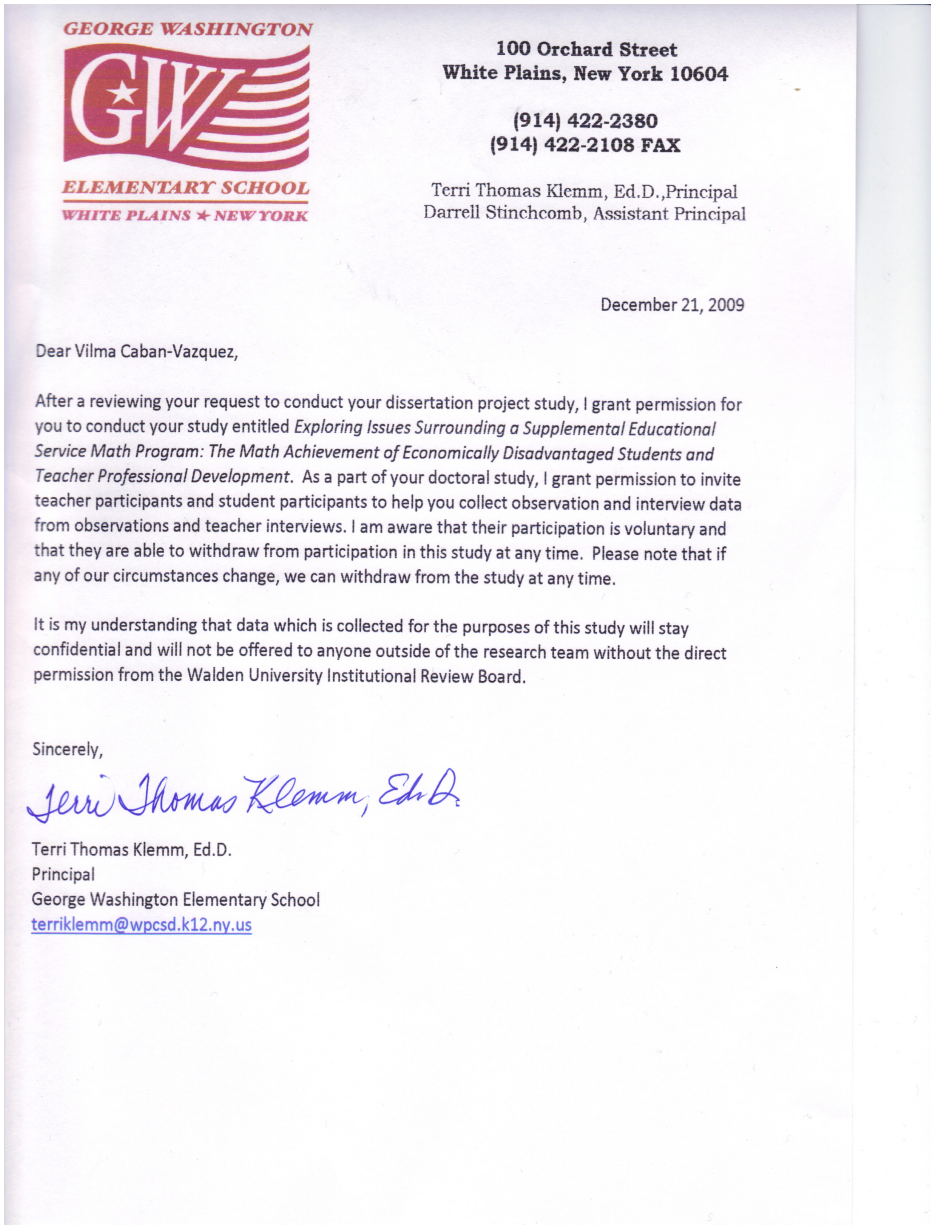
APPENDIX A: PROFESSIONAL DEVELOPMENT ACTION PLAN

Professional Development Workshops for After School Math Program Teachers Overview of Professional Development Workshops			
Professional Development Series	Workshop Title	Workshop Description	Date
Instructional Technology	Examining the Instructional Use of an Interactive Whiteboard to Support English Language Learners in the After School Math Classroom Presenters: ELL teacher and Caban-Vazquez	Workshop participants will examine research proven instructional strategies that promote math academic success for English Language Learners. Strategies discussed focus on : • Sustaining student use of math vocabulary using virtual math manipulatives on the interactive whiteboard • Collaborative student/group partnerships • Student presentations of diverse problem solving strategies	1/26/11
	Using Math Technology Software to Provide Richer Opportunities for Math Inquiry: Using the Pearson Success Tracker Program. Presented by: Technology Lead Teacher	Workshop participants learn techniques for managing the Pearson Success Tracker online software program. Participants learn how to: • Create a class roster on the program • Assign assessments • Activate math tutorial activities • Read class reports on student progress Material: Pearson SuccessNet User's Guide	2/09/11
Data Analysis to Direct Math Instruction	Using Pearson Success Tracker Assessment Reports to Inform Instruction Presenter: Technology Lead Teacher	Workshop participants learn techniques for managing the math assessment features of the Pearson Success Tracker online software program. Participants learn how to: • Create math unit assessments aligned with the districts' math program Investigations in Data, Space, and Time. • Differentiate online math assessments to meet the needs of the students. • Read class reports on student progress completing unit math assessments. Material: Pearson SuccessNet User's Guide	3/09/11
	Informing Practice with Math Data: Using the Lower Hudson Regional Information Center (LHRIC)"Data Warehouse" website Presenter: Technology Lead Teacher and Caban-Vazquez	Workshop participants learn how to navigate the use of the LHRIC data analysis online resource. This district data analysis user group offers data analysis school and class reports. Participants will learn how to: • Use the district login • Navigate tabs for different academic year school reports • Examine student reports identifying student strengths and weakness as demonstrate on the New York State Math Assessments Materials: Data Warehouse Analysis Road Map http://www.lhric.org/files/668/Data_Warehouse_Analysis_Roadmap.pdf Teacher Level Reporting Road Map http://www.lhric.org/files/668/Teacher_Level_Reporting_Roadmap.pdf	3/23/11

APPENDIX B: SCHOOL DISTRICT PERMISSION LETTER



GEORGE WASHINGTON
GW
ELEMENTARY SCHOOL
WHITE PLAINS ★ NEW YORK

100 Orchard Street
White Plains, New York 10604

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(914) 422-2108 FAX

Terri Thomas Klemm, Ed.D.,Principal
Darrell Stinchcomb, Assistant Principal

December 21, 2009

Dear Vilma Caban-Vazquez,

After a reviewing your request to conduct your dissertation project study, I grant permission for you to conduct your study entitled *Exploring Issues Surrounding a Supplemental Educational Service Math Program: The Math Achievement of Economically Disadvantaged Students and Teacher Professional Development*. As a part of your doctoral study, I grant permission to invite teacher participants and student participants to help you collect observation and interview data from observations and teacher interviews. I am aware that their participation is voluntary and that they are able to withdraw from participation in this study at any time. Please note that if any of our circumstances change, we can withdraw from the study at any time.

It is my understanding that data which is collected for the purposes of this study will stay confidential and will not be offered to anyone outside of the research team without the direct permission from the Walden University Institutional Review Board.

Sincerely,

Terri Thomas Klemm, Ed.D.

Terri Thomas Klemm, Ed.D.
Principal
George Washington Elementary School
terriklemm@wpcsd.k12.ny.us

APPENDIX C: NATIONAL INSTITUTES OF HEALTH CERTIFICATION

Certificate of Completion

The National Institutes of Health (NIH) Office of Extramural Research certifies that **Vilma Caban-Vazquez** successfully completed the NIH Web-based training course “Protecting Human Research Participants”.

Date of completion: 10/19/2009

Certification Number: 212302

APPENDIX D: CONSENT FORM (FAMILIES)

Your child is invited to take part in a research study of "Exploring Issues Surrounding a Supplemental Educational Service Math Program: The Math Achievement of Economically Disadvantaged Students and Teacher Professional Development". Your child was chosen to participate in the study because your child is eligible to receive supplemental educational services as per the No Child Left Behind eligibility sanctions. This form is part of a process called "informed consent" to allow you to understand this study before deciding whether to take part.

This study is being conducted by a researcher named Vilma Caban-Vazquez, who is a doctoral student at Walden University. Currently

Background Information:
The purpose of this study is to investigate supplemental educational service after school math programs for economically disadvantaged students.

Procedures:
If you agree to be in this study, you will be asked to:

- Allow the researcher to observe your child while he/she is participating in the extended day after school math program (supplemental educational service).
- Allow the researcher to collect and review your child's student math work that was completed while participating in the extended day after school math program.
- Allow the researcher to review the results of your child's New York State Third Grade Math Assessment.

Voluntary Nature of the Study:
Your participation in this study is voluntary. This means that everyone will respect your decision of whether or not you want your child to participate in the study. No one at George Washington Elementary School will treat you differently if you decide not to be in the study. If you decide to allow your child to join the study now, your child can still change his/her mind during the study. If your child feels stressed during the study he/she may stop at any time. Your child can opt to skip any questions that he/she feels are too personal.

Risks and Benefits of Being in the Study:
There is the potential risk that your child may feel awkward about having an adult observing the class and taking notes about the math lessons in the classroom.

Compensation: There is no compensation for your child participating in the study.

Confidentiality:
Any information your child provides will be kept confidential. The researcher will not use your child's information for any purposes outside of this research project. Also, the researcher will not include your child's name or anything else that could identify your child in any of the reports of the study.

Contacts and Questions:
You may ask any questions you have now. Or if you have questions later, you may contact the researcher via telephone at (845) 430-8914 or via email at vilma.caban-vazquez@waldenu.edu. If you want to talk privately about your rights as a participant, you can call Dr. Leilani Endicott. She is the Walden University representative who can discuss this with you. Her phone number is 1-800-925-3368, extension 1210. Walden University's approval number for this study is 02-17-10-0331808 and it expires on February 16, 2011.

The researcher will give you a copy of this form to keep.

Statement of Consent:

I have read the above information and I feel I understand the study well enough to make a decision about my child's involvement. By signing below, I am agreeing to the terms described above.

Printed Name of Child _____

Printed Name of Parent or Guardian _____

Date of Consent _____

Parent's Written Signature _____

Researcher's Written Signature _____

Adapted from:
Walden University. (2009c). Institutional Review Board for Ethical Standards in Research. Retrieved from http://researchcenter.waldenu.edu/Office-of-Research-Integrity-and-Compliance.htm

APPENDIX E: TEACHER CONSENT FORM

You are invited to take part in a research study that investigates supplemental educational service after school math programs for economically disadvantaged students. You were chosen for the study because you are or in the past have served as a teacher of a supplemental educational service math program (extended day) wherein you gave instruction to students who were eligible to receive supplemental educational services as per the No Child Left Behind, Act of 2001. This form is part of a process called "informed consent" to allow you to understand this study before deciding whether or not you would like to participate.

This study is being conducted by a researcher named Vilma Caban-Vazquez who is a doctoral student at Walden University. Currently, she is a fourth grade teacher at your child's school and she has served as a district staff developer and as a math lead teacher.

Background Information:
The purpose of this study is to investigate a supplemental educational service after school math program and gain insight on the issue of low math achievement for economically disadvantaged students in the program.

Procedures:
If you agree to be in this study, you will be asked to:

- Allow the researcher to observe you while you are teaching in the extended day after school math program.
- Allow the researcher to collect and review student math work that your students have completed.

Voluntary Nature of the Study:
Your participation in this study is voluntary. This means that everyone will respect your decision of whether or not you to be in the study. If you consent, one of the researchers will explain the study to your students and ask them if they want to take part. No one at George Washington School will treat you differently if you decide to not be in the study. If you decide to consent now, you can still change your mind later. Please note that any students who feel stressed during the study may stop at any time. They may also skip any parts they feel are too personal.

Risks and Benefits of Being in the Study:
There is the potential risk that you may feel awkward about having an adult observing the class and taking notes about the math lessons in the classroom.

Compensation: There is no compensation for your participation in the study.

Confidentiality:
Any information you provide will be kept confidential. The researcher will not use your information or any of your students' information for any purposes outside of this research project. Also, the researcher will not include your name or anything else that could identify you in any reports of the study.

Contacts and Questions:
You may ask any questions you have now. Or if you have questions later, you may contact the researcher via phone (845) 430-8914 or via email at vilma.caban-vazquez@waldenu.edu. If you want to talk privately about your child's rights as a participant, you can call Dr. Leilani Endicott. She is the Walden University representative who can discuss this with you. Her phone number is 1-800-925-3368, extension 1210. Walden University's approval number for this study is 02-17-10-0331808 and it expires on February 16, 2011.

The researcher will give you a copy of this form to keep.

Statement of Consent:

I have read the above information and I feel I understand the study well enough to make a decision about my involvement. By signing below, I am agreeing to the terms described above.

Printed Name of Participant

Date of consent

Participant's Written Signature

Researcher's Written Signature

Adapted from:
Walden University. (2009c). Institutional Review Board for Ethical Standards in Research. Retrieved from http://researchcenter.waldenu.edu/Office-of-Research-Integrity-and-Compliance.ht

APPENDIX F: CHILD ASSENT FOR PARTICIPANTS 17 AND UNDER

DIRECTIONS: Read the information script to the child participant.

"Hello, my name is Mrs. Vilma Caban-Vazquez and I am doing a research project to learn about the extended day after school math program. I want to learn about student learning of mathematics and how teachers teach mathematics. I am inviting you to join my project. I picked you for this project because you are eligible to participate in the after school math program. I am going to read this form to you. I want you to learn about the project before you decide if you want to be in it."

WHO I AM:
"I am a student at Walden University. I am working on my doctoral degree. I am a fourth grade teacher in your school and I have worked on different teacher training projects for our school district."

ABOUT THE PROJECT:
"If you agree to be in this project, you will be asked to:

- Let me observe you while you are working on different math investigations or activities.
- Let me see any of your student work to see your understanding of mathematics."
- Let me see information (testing results or scores) that tells how you did on last year's New York State Third Grade Math Assessment.

IT'S YOUR CHOICE:
"You don't have to be in this project if you don't want to. You won't get into trouble with our school principal Dr. Klemm if you say no. If you decide now that you want to join the project, you can still change your mind later. If you want to skip some parts of the project, just tell me.

Being in this project might make you uncomfortable if you are wondering what I am observing. But this project might help others by sharing information that I learned about you as a math learner."

COMPENSATION: You will not receive any gifts or rewards for participating in the study.

PRIVACY:
"Everything you tell me during this project will be kept private. That means that no one else will know your name or what answers you gave. The only time I have to tell someone is if I learn about something that could hurt you or someone else."

ASKING QUESTIONS:
"You can ask me any questions you want now. If you think of a question later, you or your parents can reach me at vilma.caban-vazquez@waldenu.edu. If you or your parents would like to ask my university a question, you can call Dr. Leilani Endicott. Her phone number is 1-800-925-3368, then dial 1210."

"I will give you a copy of this form."

"Please sign your name below if you want to join this project."

Name of Child _____

Child Signature _____

Date _____

Researcher Signature _____

Adapted from:
Walden University. (2009c). Institutional Review Board for Ethical Standards in Research. Retrieved from http://researchcenter.waldenu.edu/Office-of-Research-Integrity-and-Compliance.htm

APPENDIX G: CONFIDENTIALITY AGREEMENT

Vilma Caban-Vazquez:

During the course of my activity in collecting data for this research: "Exploring Issues Surrounding a Supplemental Educational Service Math Program: The Math Achievement of Economically Disadvantaged Students and Teacher Professional Development", I will have access to information, which is confidential and should not be disclosed. I acknowledge that the information must remain confidential, and that improper disclosure of confidential information can be damaging to the participant. By signing this Confidentiality Agreement I acknowledge and agree that:

1. I will not disclose or discuss any confidential information with others, including friends or family.
2. I will not in any way divulge, copy, release, sell, loan, alter or destroy any confidential information except as properly authorized.
3. I will not discuss confidential information where others can overhear the conversation. I understand that it is not acceptable to discuss confidential information even if the participant's name is not used.
4. I will not make any unauthorized transmissions, inquiries, modification or purging of confidential information.
5. I agree that my obligations under this agreement will continue after termination of the job that I will perform.
6. I understand that violation of this agreement will have legal implications.
7. I will only access or use systems or devices I'm officially authorized to access and I will not demonstrate the operation or function of systems or devices to unauthorized individuals.

Signing this document, I acknowledge that I have read the agreement and I agree to comply with all the terms and conditions stated above.

Signature: **Date:**

Walden University. (2009c). Institutional Review Board for Ethical Standards in Research. Retrieved from http://researchcenter.waldenu.edu/Office-of-Research-Integrity-and-Compliance.htm

APPENDIX H: OBSERVATION PROTOCOL

Observational Fieldnotes	
Setting: Observer: Date: Time: Length of Observation:	
Observation Notes	Reflective Notes

Adapted from:

Creswell (2008). *Educational research: Planning, conducting, and evaluating quantitative and qualitative research* (3rd ed.). Upper Saddle River, NJ: Pearson Education

Janesick, V.J. (2004). "Stretching" exercises for qualitative researchers. (2nd ed.). Thousand Oaks, CA: Sage Publications, Inc.

APPENDIX I: INTERVIEW PROTOCOL (TEACHER INTERVIEWS)

1. Tell me about your experiences teaching within the Extended Day After School Math Program?
2. Can you tell me more about...?
3. Please explain what you meant when you said…
4. Could you tell me about the students that participate in this program?
5. At what point in the academic year, does the after school math program begin? Does it serve all grade levels?
6. Do you know how students are selected to participate in this program?
7. What types of instructional materials are used? Do you think they are appropriate or inappropriate? Why?
8. How does a math facilitator of the after school program decide what to teach?
9. How is math achievement measured?
10. Can you share your feelings about whether or not you feel that an after school math program is effective in producing higher math achievement for economically disenfranchised students?
11. Is there anything else you would like to add?

APPENDIX J: SUMMARY OF DATA FINDINGS

Past & Present After School Program Structures

Use of Math Achievement Data

- The educational leaders used testing results from the former year's New York State Math Assessments to identify students that did not demonstrate math proficiency on New York State Math Standards for the third, fourth, and fifth grades.
- The educational leaders used testing results from the former year's New York State Math Assessments to identify students that demonstrated math proficiency on New York State Math Standards for the third, fourth, and fifth grades.
- Some of the school's students that demonstrated a Level 2 on the NYS Math Assessments were enrolled in the Extended Day After School Math Program with the goal to raise math achievement.
- Some of the school's students that demonstrated a Level 3 on the NYS Math Assessments were enrolled in the Extended Day After School Math Program with the goal to raise math achievement.
- Some of the third, fourth, and fifth grade teachers recommended students to the Extended Day After School Math program based on class performance and the district math report card grades.
- During some years that the Extended Day After School Math Program was servicing students not meeting New York State Math Standards, the school district's statistician reviewed math achievement data from the New York State Third, Fourth, and Fifth Grade Math Assessments and the Extended Day teachers received suggestions for math concept wherein students demonstrated a lack of math proficiency.
- In 2008-2009 math achievement data from Math achievement data from the New York State Third, Fourth, and Fifth Grade Math Assessments were centrally reviewed by the district's statistician and the Extended Day teachers received specific suggestions for a curriculum focus where students demonstrated a lack of proficiency:
    - Multiplication and Division
    - Patterns
    - Graphs
- During the year 2008-2009 the Extended Day After School Math teachers had student participants of the program take multiple online math assessments using the Pearson SuccessNet®.
- During the academic year 2008-2009 the Extended Day After School Math teachers had student participants of the program take multiple hard copy math assessments that came from the Pearson SuccessNet®.
- During the academic year 2009-2020 teachers communicated that obtaining access to the district's Data Warehouse was cumbersome.

APPENDIX J: SUMMARY OF DATA FINDINGS (Continued)

Past & Present After School Program Structures
Grouping of Students for Instruction: • The class grouping within the Extended Day After School Math Program was maintained smaller than the average traditional class size. • The student participants within the Extended Day After School Math Program are grouped by grade level—from third to fifth grade. • There were between 10-12 students in the Extended Day After School Math programs. • Depending on the nature of the students' abilities, teachers place students in small cooperative groups or partnerships. • The student participants within the Extended Day After School Math Program sit together during whole group instruction during the Mini-lesson portion of the Math Workshop lesson. • Some of the students within the Extended Day After School Math Program have received one-to-one tutoring with volunteers from the local university. • Students enrolled in the 2009-2010 Extended Day After School Math Program also participate in the Project Excel program led by the White Plains Youth Bureau.
Student Participants within the Extended Day After School Math Program: • There was a diverse group of math learners enrolled in the program. • There is a subgroup of economically disadvantaged student participants enrolled in the program. • There is a subgroup of English Language Learners enrolled in the Extended Day After School Math Program. • Some students receive special education support that is led by an I.E.P. (individual educational plan). • The majority of students are either Latino or African American. • The majority of female student participants were Latina girls. • The majority of students demonstrated active participation in various math learning tasks. • Some Latina students did not actively participate in large group discussions. • Many Latina students were actively engage in math discourse within dyadic partnerships or small groups.

APPENDIX J: SUMMARY OF DATA FINDINGS (Continued)

Current Community and After School Partnerships
Project Excel: • The White Plains Youth Bureau received a grant for the after school program Project Excel. • The idea behind the program was to serve economically disadvantaged kids who live in public or subsidized house. • Some of the students that participated in the Project Excel program also participated in the school-based Extended Day After School Math Program. • Students that participate in the Project Excel program have working parents that do not pay for this after school program. • Teachers perceive that there is a different selection process for the kids who come into the Extended Day After School Math Program due to their enrollment into the Project Excel enrollment. • Teachers perceive that the students that participate in the Project Excel project are selected to participate because they are students who are not academically meeting standardized benchmarks. • Students that participate in the Project Excel program are not transported by the district's school buses, but in fact picked up by parents or guardians.
Manhattanville Tutors: • A few Manhattanville undergraduate and graduate School of Education students have volunteered within the school to tutor students that are involved in the Extended Day After School Math Program. • Several Extended Day After School Math teachers have discussed the value of working with a student teacher or math tutor that has worked with students not demonstrating math proficiency.
Student Math Achievement: • Some students demonstrated difficulty reading and understanding various math problems. • Students demonstrated the use of various math problem solving strategies within large group lessons. • Students demonstrated the use of various math problem solving strategies within small group work. • Many of the students did not have math proficiency in the area of number sense. • Many of the students did not have math proficiency in the area of fractions. • Many of the students did not have math proficiency in the area of measurement.

APPENDIX J: SUMMARY OF DATA FINDINGS (Continued)

After School Instructional Strategies
Technology: • Some teachers used interactive websites that focus on basic number facts and recall. • Some teachers used the InterWrite® Board to model problem solving techniques. • Some teachers used different types of document cameras to project other student work. • Some teachers used the Pearson SuccessNet website to have students work on the various math tools and tutorials. • Some teachers used the online activities (OLA's) located on the Investigations Program within the Pearson SuccessNet® website. • Some teachers expressed that they were not familiar or comfortable using the Pearson SuccessNet website. • Some teachers gained access to test samples and former state tests located with their states department of education. • Some teachers utilized the Data Warehousing® link to gain access to an item analysis of the state's multiple choice answers for the New York State Math Assessment. • Some teachers expressed that they were not familiar or comfortable using the Data Warehousing website to gain data analysis information on their students. **Cooperative Learning:** • Extended Day After School math teachers facilitate small group instruction. • Extended Day After School math teachers encourage large group sharing using the InterWrite® Board wherein two or three students share various problem solving strategies for the same math problem. • Some teachers facilitate partnership work among the students by assigning working partners to review math short responses. • The Extended Day After School math students work in partnerships playing various number sense math games using cards, dice, and other game structures from a NCTM (National Council of Teachers of Mathematics, 2010) standards-based math program—Investigations®

APPENDIX J: SUMMARY OF DATA FINDINGS (Continued)

After School Instructional Strategies
Strategy-Based Learning: • Teachers incorporated the language structures within the New York State Math Assessments within problems presented for the Extended Day After School Math lessons. • Some teachers use math children's literature that highlights a math concept connected to what the Extended Day Teachers are teaching. • Some teachers used targeted math vocabulary through the use of math vocabulary visual aids that were used within the traditional school day. • The use of small group math games was used to target conceptual understanding of number sense so that students can develop conceptual understanding of numbers within various math problem structures. • Some teachers divided the groups into small groups to focus on different math problem solving strategies in the area of fractions. • Some teachers divided the groups into small groups to focus on different math problem solving strategies in the area of fractions. • All of the teachers used excerpts derived from the New York State Math Assessments for either third, fourth, or fifth grade. • Some teachers used math test preparation tools developed by Buckle Down®

After School Teacher Collaboration
• Many of the Extended Day After School Math teachers worked together to plan and review test samples of the New York State Math Assessment. • Some teachers worked together in previewing other test preparation resources that they could use as mentor text to create authentic math problems that students may encounter on the New York State Math Assessments. • Several teachers collaborated to explore the use of the Pearson SuccessNet website to create online math assessments. • Some teachers co-taught with a special educator and/or ESOL teacher to help differentiate instruction. • Several teachers worked together to find math activities or math games within in the traditional school day math program to help create consistency in math construction. • Many of the teachers collaborated to provide targeted instruction in small groups.

APPENDIX J: SUMMARY OF DATA FINDINGS (Continued)

Potential Curriculum Development

- Many teachers expressed a need for a clear vision of the instructional work with students within the third, fourth and fifth grade classes within the Extended Day After School Math Program.
- Several teachers expressed a need to develop a curriculum framework or guideline centered on several key math ideas.
- Many teachers suggested a need for a curriculum resource to teach fractions, measurement, and number computation.
- Some teachers expressed a need for a developing a unit to understand decimals within money.
- Based on feedback from the district scoring teams, curriculum development is needed in three topics for the 4th Grade After School Math Program:

  Topic 1: Multiplication and Division

  NYS Standards:

  4.N.16 Understand various meanings of multiplication and division
  4.N.17 Use multiplication and division inverse operations to solve problems
  4.N.18 Use a variety of strategies to multiply two-digit numbers by one-digit numbers (with and without regrouping)
  4.N.19 Use a variety of strategies to multiply two-digit numbers by two-digit Numbers (with and without regrouping)
  4.N.20 Develop fluency in multiplying and dividing multiples of 10 and 100 up to 1,000
  4.N.21 Use a variety of strategies to divide two-digit dividends by one-digit divisors (with and without remainders)
  4.N.22 Interpret the meaning of remainders

  Topic 2: Patterns

  NYS Standards:

  4.A.4 Describe, extend, and make generalizations about numeric and geometric patterns.
  4.A.5 Analyze a pattern or a whole-number function and state the rule, given a table or an input/output box

  Topic 3: Graphs

  NYS Standards:

  4.S.3 Represent data using tables, bar graphs, and pictographs
  4.S.4 Read and interpret line graphs
  4.S.5 Develop and make predictions that are based on data
  4.S.6 Formulate conclusions and make predictions from graphs

APPENDIX J: SUMMARY OF DATA FINDINGS

Potential Professional Development

- Many teachers expressed a need for professional development in the use of the Pearson SuccessNet teacher/student website.
- Many teachers expressed that they would like the opportunity to receive more training using the Data Warehousing data analysis online teacher resource.
- Several teachers mentioned that they would like professional development on various forms of methodological strategies for teaching mathematics.
- Some teachers expressed a need for training for differentiating instruction for English language learners.

Potential Community-School Partnerships

- The local school is a professional development school with Manhattanville College and several school-based graduate courses are available to graduate students.
- Teachers recommended that methodological math courses be available for the extended day teachers.
- Graduate students enrolled in Manhattanville and required to complete practicum hours be assigned to the Extended Day After School Math Program.
- It was recommended that student-teachers seeking to broaden their teaching experiences sign up to work in the Extended Day After School Math Program.
- It was recommended that graduate students enrolled in a math methods course be assigned a case study assignment with a small group of Extended Day After School Math students to provide small group remedial support.
- It was suggested that instructional math leadership should be in place to ensure that there are sharing systems for teachers working within the Extended Day After School Math Program.
- It was recommended that instructional math leadership should be in place to ensure that student teachers and practicum students receive pedagogical feedback on direct service work with the students enrolled in the Extended Day After School Math Program.

Curriculum Vitae

Vilma Cabán-Vázquez
vilma.caban-vazquez@waldenu.edu
Contact Number: (845) 430-8914

PERSONAL INFORMATION:

Date and place of birth: July 3, 1969, NY, New York

EDUCATION:

2006-Present:	Walden University, Minneapolis, MN. Pursuing doctorate of education: Specialization in Teacher Leadership.
1995-1998:	Bank Street College of Education, NY. Master of Science Education: Math Leadership Program.
1987-1992:	State University of New York—College at New Paltz, NY. Bachelor of Science Education. Permanent Teaching Certification, N-6.

CONSULTATION EXPERIENCE:

4/07 — **New York School for the Deaf. White Plains, NY.**
- Designed and presented a workshop for educators and parents centered on best strategies for offering an inclusive learning environment for students with special needs.

5/06 -6/06
5/05, 4/04 — **Coachman Family Shelter. White Plains, NY.**
- Developed and facilitated a series of evening family math workshops for economically disenfranchised and homeless families.

2/05, 2/03 — **Newcomer Center. White Plains, NY.**
- Produced and presented Spanish family math workshops for recent immigrant families.

12/01 — **Citizens for Citizens Inc. Fall River, MA.**
- Developed a training curriculum for volunteer program directors of the Retired Seniors Volunteer Program: *"Connecting Families with Literacy"*.

3/01-8/01 **CHP International Inc. Oak Park, IL.**
Corporation for National Service: AmeriCorps/America Reads
- Collaborated with a former AmeriCorps VISTA (Volunteers in Service to America) training facilitator to create Pre-Service Orientation Workshops for literacy volunteers in Virginia Beach, VA; Atlanta, GA; and Washington, D.C.
- Presented the aforementioned Pre-Service Training workshops at various VISTA Pre-Service Orientation conferences:
  - Effective Volunteer Recruitment Strategies
  - Community Asset Mapping
  - Diversity Issues

6/00-2/01 **L.E.A.R.N.S**. (Linking Education and America Reads through National Service) NY, NY.
- Developed and presented a training module "Understanding the Bilingual Child" presented at the VISTA (Volunteers in Training to America) Early Service Training in Yukon, OK.
- Presented the LEARNS training curriculum to VISTA literacy volunteers in Tuskegee, AL and Orlando, FL.

2/00; 4/00 **Bank Street College of Education: Continuing Education. NY.**
- Developed a three hour training session for The After School Corporation (T.A.S.C.) program directors and program staff; *"Using Children's literature as a Springboard to Math Investigations"*
- Produced and presented a professional development workshop for the Wyandanch Public Schools, Wyandanch, NY.

ADJUNCT PROFESSOR:

1/07-5/07 **Manhattanville College. Purchase, NY.**
Graduate School of Education
- EDU55707 *Children's Literature in the Reading & Writing Classroom*

6/98, 7/00 **Bank Street College of Education. NY, NY.**
Graduate School of Education
- TE530 *Math for Teachers of Diverse & Inclusive Settings*

TEACHING EXPERIENCE:

9/93-Present **White Plains Public Schools. White Plains, NY.**
George Washington School [9/99-6/01 & 9/03-Present]
Church Street School [9/93-6/99]
- Directed a professional development DVD Project *"Illuminating Effective D.I. Classroom Practices for Math Learning"* with the White Plains Television Production Specialist.
- Member of the district's *Undoing Racism Committee* and contributor to the district newsletter.
- Served as a case study participant for the Education Development Center & Bank Street College in a *"Math for All"* video series—

funded by the National Science Foundation and published by Corbin Publishers.
- Co-launched the district's first *Dual Language Kindergarten Program* and featured in the White Plains Public Schools Newsletter (March 2008).
- Piloted the George Washington *"Hola Español"* foreign language program for kindergarteners & fourth grade.
- Mainstreamed hearing-impaired students from the New York School for the Deaf.
- Co-authored primary writing rubrics with anchor papers aligned with four different writing genres—Personal Narrative, Authors as Mentors, Poetry and Informational Writing.
- Co-authored the *White Plains Nonfiction Reading Curriculum Outline* and sample reading lessons.
- Developed remedial math curriculum for an after-school fourth and fifth grade math program.
- Served as site-based Math Lead Teacher.
- Taught kindergarten, third and fifth grades in a Special Education Inclusion model.
- Chaired the Church Street Staff Development Committee.
- Participated in the New Standards/NCREST program in the development of literacy portfolios.

9/01-8/03 **White Plains Public Schools. White Plains, NY.**

K-5 District Math Instructional Specialist

- Served as educator on a special assignment—organized and implemented district-wide staff development opportunities for approximately 200 elementary school teachers within the district schools, Newcomer Center and Pre-Kindergarten Program.
- Planned and developed a series of instructional training videos promoting district staff development for grades K-5.
- Led demonstration math lessons and grade level instructional planning meetings within all elementary and program sites.
- Organized a *"Math Equity Conference"* for K-5 administrators, math lead teachers and community partners (Youth Bureau).
- Chaired a committee of 11 Math Lead Teachers in the district that contributed to the alignment of K-5 Math curriculum.
- Led a district A.I.S. (Academic Intervention Strategies) taskforce to develop K-5 Trimester Math Assessments.
- Developed several 4th Grade Math Test Conferences for a core group of 4th grade teachers; Shared assessment statistics and research-based strategies for promoting success on the 4th grade NYS Assessment.
- Co-authored and supervised the team writing project of a *PreK-5th Grade Summer School Math Curriculum*.
- Ordered and organized summer school math instructional materials.

PRESENTATIONS:

"Math Scoring of the New York State Grade 4 Mathematics Assessment". *Lead trainer for the White Plains District teachers preparing to score the fourth grade math assessments. 2010 Math Scoring, Rochambeau School, White Plains NY. May 17, 2010.*

"Preparing Tomorrow's Teachers: A Professional Development School". Presentation produced and aired by the White Plains Cable Access Television Commission, Inc. in cooperation Manhattanville College and The Educational Access Channel for the White Plains Public Schools. White Plains, NY. May, 2010.

"Creating Strong Community Partnerships between Manhattanville College and A Professional Development School". *Presentation Manhattanville College to graduate students, teachers, and educational leadership: Spring 2010 Professional Development School Conference, Manhattanville College. Purchase, NY. April 20, 2010.*

"Differentiated Instruction: A Tool for Promoting Math Equity". Presentation at the People to People Ambassador Program: US-Cambodia Education Forum, Royal University of Phnom Penh, Hun Sen Lecture Hall. Phenom Penh, Cambodia. December 9, 2008.

"Differentiated Instruction: A Tool for Promoting Math Equity". Presentation at the People to People Ambassador Program: US-Vietnam Education Forum with the Ministry of Education Teacher Training, Ho Chi Minh University of Pedagogy. Ho Chi Minh, Vietnam. December 4, 2008.

"Promoting Equity and Excellence in Math Education". Presentation at the Bank Street College Math Conference: Math Leadership Program. New York, New York. November 11, 2008.

"Pursuing Doctoral Studies to Promote Positive Social Change". Presentation for the Open House Orientation Meeting for Walden University's Doctor of Education Program: The Richard W. Riley College of Education and Leadership. Marriott Hotel. New York, New York. February, 12, 2008.

"Differentiated Instruction: A Tool for Promoting Math Equity". Presentation at the People to People Ambassador Program: US-Egypt Education Forum, SemiRamis Intercontinental Hotel. Cairo, Egypt. November 30, 2007.

"The Inclusion of Hearing Impaired Students". Presentation at the New York School for the Deaf. White Plains, NY. April 25, 2007.

"Family Math: Playing with Numbers". Presentation at the Coachman Family Shelter in conjunction with Family Math & Literacy Event: No Child Left Behind Initiative. White Plains, NY. June 6, 2006.

"Family Math: Geometry Rules!". Presentation at the Coachman Family Shelter in conjunction with the Family Math & Literacy Event: No Child Left Behind Initiative. White Plains, NY. May 2, 2006.

"Teaching/Learning Strategies for Hola Español". Presentation using video footage of various language lessons that were produced by the White Plains Television Production Department. White Plains, NY. February 21, 2006.

"Components of the Hola Español Kindergarten Foreign Language Program". Presented at a parent information event on September 29, 2005.

PRESENTATIONS:

"Using Ten Minute Math Routines from the Investigations in Number, Data & Space Program". Presentation as a part of the Superintendent Conference. White Plains, NY. September 6, 2005.

"Matemática para la Familia". Presentation at the Newcomer Center's Family Math Event. White Plains, NY. February 1, 2005.

"Educación, La Llave Del Exito: Math in Kindergarten". Presentation produced and aired by the White Plains Cable Access Television Commission, Inc. in cooperation with The Educational Access Channel for the White Plains Public Schools. White Plains, NY. October 10, 2004.

"Using Math Investigations in Summer School". Presentation at the Summer School Teacher Training Conference. White Plains, NY. June 2, 2004.

"Number Mania". Presentation at the Coachman Family Shelter: "Coachman Family Math Series". White Plains, NY. April 29, 2004.

"Money Games". Presentation at the Coachman Family Shelter: "Coachman Family Math Series". White Plains, NY. April 22, 2004.

"Taking a Chance with Probability". Presentation at the Coachman Family Shelter: Coachman Family Math Series". White Plains, NY. April 15, 2004.

"Moving Towards Standard-Based Math Instruction". Presentation at a Math Leadership Conference at Church Street School. White Plains, NY. April 9. 2003.

"Meaningful Math Experiences in Pre-Kindergarten". Presentation at the White Plains Pre-K Center Professional Development Conference. White Plains, NY. October 24, 2002.

"Aligning Math Instruction to Assessment". Presentation at the White Plains Staff Development Center for 4th grade teachers. White Plains, NY. February 5, 2002.

"Connecting Families with Literacy". Presentation at the Retired Seniors VolunteerTraining Conference. Fall River, MA. December 8, 2001.

"Volunteer Recruitment for America Reads Programs"; "Community Asset Mapping"; and "Diversity Issues". Presentation at the Corporation for National Service Early Service Training Conference. Orlando, FL. July 10, 2001-July 12, 2001.

"Volunteer Recruitment for America Reads Programs"; "Community Asset Mapping"; and "Diversity Issues". Presentation at the Corporation for National Service Early Service Training Conference. Atlanta, GA. 2001. June 25, 2001-June 27, 2001.

"Volunteer Recruitment for America Reads Programs"; "Community Asset Mapping"; and "Diversity Issues". Presentation at the Corporation for National Service Early Service Training Conference. Atlanta, GA. March 14, 2001-March 16, 2001.

PRESENTATIONS:

"Literacy Core": LEARNS Early Service Training workshop. Presented at the AmeriCorps/ America Reads Early Service Training Conference in Orlando, FL. February 21, 2001-February 23, 2001.

"Literacy Core"; "Integration"; and "Leadership": L.E.A.R.N.S. (Linking Education and America Reads through National Service) Early Service Training workshops. Presented at the AmeriCorps/ America Reads EST Conference at the Tuskegee Conference Center. Tuskegee, AL. August 15, 2000 to August 18, 2000.

"Understanding the Bilingual Child". Presentation at the AmeriCorps Vista Early Service Training Conference. Yukon, OK. June 29, 2000.

"Writing in Mathematics Grades 5-6". Presentation at the Superintendent's Professional Development Conference. Wyandanch, NY. April 14, 2000.

"Using Children's literature as a springboard to math investigations". Presented at Bank Street College as a part of the T.A.S.C. (The After School Corporation) In-Service Training. NY, NY. February 12, 2000.

"Math Problem Solving Grades 3-5" and "Elements of a Balanced Math Program". Presented at the Lower Hudson Leadership Dewey Conference in the Crown Plaza Conference Center. White Plains, NY. October 9, 1998.

PROFESSIONAL DEVELOPMENT:

- ***Columbia University Teacher's College Reading and Writing Project***
  - ◊Mini-Institute Non-Fiction Reading and Writing
  - ◊Mini-Institute: The Writing Institute

- ***Math for All: Facilitator's Training [Education Development Center]***
  - ◊Featured as a case study for an inclusion class
  - ◊ Differentiation strategies for inclusion of all students in standards-based mathematics

- ***Children's Literacy Initiative***
  - ◊Development and Implementation of Literacy Centers
  - ◊Intentional Read Alouds
  - ◊Message Time Plus®

- ***White Plains District-Based Professional Development Seminars***:
  - ◊ Interactive SMART Board in the Classroom
  - ◊ Using Microsoft Front Page to create a website
  - ◊ Using United Streaming in the Classroom
  - ◊ Instructional Technologies: User Group
  - ◊ Summer Technology Workshop: Microsoft Power Point & Microsoft Publisher

PROFESSIONAL ORGANIZATIONS:

- Member of the *National Council for the Teachers of Mathematics*
- *Las Comadres Professional Women's Organization*
- *People to People Ambassador Program*, Alumni
- Executive Board Member of the *Walden International Corp: Social Changers without Borders*