Spring 5-12-2018

The Challenges of Newly Adopted Mathematics Curriculum in Title I Schools: A Mixed Methods Study

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THE CHALLENGES OF NEWLY ADOPTED MATHEMATICS CURRICULUM IN TITLE I SCHOOLS: A MIXED METHODS STUDY

by

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Presented to the Faculty of the Graduate School of

Stephen F. Austin State University

In Partial Fulfillment

of the Requirements

For the Degree of

Doctor of Education

STEPHEN F. AUSTIN STATE UNIVERSITY
(May 2018)

THE CHALLENGES OF NEWLY ADOPTED MATHEMATICS

CURRICULUM IN TITLE I SCHOOLS: A MIXED METHODS STUDY

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Carmen Cruz, B.A, M.Ed.

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ABSTRACT

The purpose of this mixed methods study was to examine the early impacts of the newly adopted mathematics TEKS (Texas Essential Knowledge Skills) introduced in 2014 by TEA (Texas Education Agency) that detail the curriculum standards for all students across schools in Texas schools, for grades K-12. The study examined the challenges that teachers and administrators have had to overcome to meet federal legislation educational compliance. Additionally the study examined how schools and districts were professionally developing their teachers on new curricular standards. Five Title 1 schools in four school districts were used in the study. Schools were selected from a TEA campus comparison group from 2015. School districts were located in three different geographical locations in Texas that included north, east, and southeast areas. The researcher utilized the convergent parallel design to make detailed comparisons of both quantitative and qualitative data. Quantitative data consisted of teacher questionnaires generated in Qualtrics and TEA Texas Academic Performance Reports (TAPR). Portraiture was utilized in the qualitative strand. Qualitative data included interviews, observations, and focus groups of both teachers and administrators that were transcribed, coded, and exported into NVivio 11. The findings of the study raise the question of whether schools are adequately training and developing their teachers to meet the needs of students with the implementation of such rigorous standards in mathematics.

ACKNOWLEDGEMENTS

I want to personally acknowledge the numerous individuals that have inspired, encouraged, and motivated me to complete the ultimate quest for knowledge and obtain my doctoral degree. I would like to express my gratitude to my dissertation committee: Dr. Karen Embry-Jenlink, Dr. Pauline M. Sampson, Dr. Kerry Roberts, Dr. Mariela Rodriguez, and my dissertation chair Dr. Patrick Jenlink. I will forever be grateful for all the mentoring and encouragement throughout this memorable experience.

Additionally, I want to also sincerely thank all faculty at SFA that I have had the opportunity to take courses from throughout the last three years. Your knowledge, guidance, and assistance has allowed me to learn and evolve into the intellectual leader I have become: I could not have accomplished completing this degree without you. I want to also thank the University of Texas at San Antonio faculty: Dr. Mariela Rodriguez and Dr. Curtis Brewer who mentored me for two consecutive summers and instilled in me the passion to take my career path into higher education.

I want to thank my cohort XIX members, although we had our differences, I have learned, difference is what makes us unique and gives us our identity. Thank you for all the support during the last three years and I know we will forever be friends.

I want to thank St. Mary's University faculty and staff for being so supportive during my educational journey and giving me the flexibility to complete all requirements

of my degree. I want to thank the amazing staff I work with, coaches, and students for supporting me even during difficult times. I greatly appreciate your friendships!

I want to thank the school districts, schools, administrators, and teachers that participated in my study. I greatly appreciate your genuine commitment to helping me. I hope you know that I greatly enjoyed visiting your schools; they are filled with caring and compassionate staff, thank you for the generous hospitality. Always remember, it is the people inside these buildings that matter, each one of you leaves a lasting imprint on children. As educational leaders, we have each made a commitment to the success of all children. It is each of our responsibility to address the injustices that occur within our educational structures.

I want to thank Washington State University for allowing me the opportunity to attend the university as an undergraduate student. Had it not been for a great institution believing in my ability to succeed, I would not be where I am today. Thank you for being so committed to the success of all of your students, GO COUGS!

To my family, this degree is dedicated to you. To my amazing children: Angelo Jr., Lucas, Amelia, and Layla, I love you very much and I hope each of you realizes that you were my inspiration to complete this journey. Layla, I would have gladly changed places with you this past year, your faith and courage inspired me to remember one should never give up because all things truly are possible. To my husband Angelo, we have spent the last twenty-five years together and each day only gets better, we have the rest of our lives to spend together. Thank you for always being there, I love you. I am truly blessed to be both a wife and a mother of four amazing children!

DEDICATION

To all students who were once told achieving academic success was impossible; this dissertation is dedicated to you. Always remember, there are no boundaries to learning, just like that of a portrait being painted. The only boundaries to learning that one may encounter at times are those that have been placed upon us.

I once thought that I would spend the rest of my life searching for the peak of a mountain that symbolized success, many years later my dedication, commitment, and persistence has given me the strength to reach it. Today, I am extremely excited to say that my portrait is completed and framed. I am proud to be a Hispanic first-generation female student that was able to overcome academic challenges, break barriers, and achieve the ultimate quest for knowledge.

As a future educational leader, my commitment now lies atop of this beautiful mountain repainting the educational landscape for the future leaders of tomorrow, you! The landscape encompasses a rich fabric that has woven threads of opportunity, promise, and academic success. As you go through life, never give up, all dreams truly can come true—sí se puede.

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CHAPTER I

Introduction to the Study

Introduction

In 2015, the National Assessment of Educational Progress (NAEP) reported that only 40% of all fourth graders that tested in mathematics were at or above proficiency levels, while having achieved a national average scaled score of 240 on a 0-500 scale. Unfortunately, fourth grade students that tested in 2015 also experienced a small decline from the previous testing year in 2013 where they had an average score of 242. Fourth grade mathematics scores have significantly increased since 1990 where student average scores were 213 in comparison to 2015 average scores of 240 (NAEP, 2015).

Although fourth grade mathematics academic achievement gains have improved over the last decade, achievement scores continue to indicate that students across the nation are still struggling to meet national proficiency expectations. Fourth grade student scores in 2015 indicated that mathematics academic achievement gaps have narrowed since 1990 for students of racial and ethnic backgrounds, but they continue to lag behind that of their White peers (NAEP, 2015). *No Child Left Behind* (NCLB) (2002) Act was enacted to help address student academic achievement in schools, but also to help close

the academic achievement gap of students with various racial and ethnic backgrounds (Darling-Hammond, 2007, p. 245).

The implementation of NCLB by the federal government was an effort to address the underachievement of student scores across the nation and ensure that all students were learning, especially students that have historically been known as being "at risk" of failure.

> The prevailing theory of action behind accountability ratings and testing is that schools and students who are held accountable to these measures will automatically increase educational output: Educators will try harder; schools will adopt more effective methods; and students will learn more. (Heilig & Darling-Hammond, 2008, p. 75)

When NCLB legislation was enacted, it was also assumed to be a supportive law that would result in academic success for all students throughout America.

NCLB initiatives mandated both districts and schools to meet Adequate Yearly Progress (AYP) annual goals and report them in the form of state standardized testing to be eligible to receive federal funds. Lee and Reeves (2012) declared NCLB policy initiatives were highly dependent upon *high stakes* tests to safeguard that schools were making Adequate Yearly Progress (p. 209). NCLB held schools and districts accountable for the academic achievement of all students, regardless of socioeconomic status. Shulte and Stevens (2015) stated that NCLB initiatives now required schools to report the academic achievement of all students including students "at risk." Schools were required to desegregate data to be included in their annual reporting that consisted of the

following: student performance that are socioeconomically disadvantaged, English Language Learners (ELL's), students with disabilities, and ethnic distribution.

Under NCLB, school academic expectations increased by having to demonstrate that all students were making yearly progress. Zoda, Slate, and Combs (2011) stated, "Central to AYP was the expectation that students in all subgroups would perform at a proficient level by 2014" (p. 172). NCLB also mandated that schools that failed to meet AYP be given sanctions in the form of loss of funding, school closures, and forced to offer supplemental services to their students. Hursh (2005) stated ". . . every state is now required to develop standards by mandating that students have the option to transfer from schools with low test scores to those with higher test scores . . ." (p. 605). Also under NCLB, schools that failed to meet AYP for two consecutive years were assigned into the *Needs Improvement* category, which therefore stipulated that they send letters home to parents and inform them of school wide failure to meet AYP (2002). Should this occur, the failing school must also make transfer options into schools meeting AYP available to stakeholders.

Every Student Succeeds Act

On December 10, 2015, President Barack Obama signed *Every Student Succeeds Act* (ESSA) to replace the prescriptive measures of NCLB. As a commitment to equitable education, a call was made to revamp the law and initiate a law that fully prepared students for 21st century learning in a global society.

> We're going to have to have our young people master not just the basics but also become critical thinkers and creative problem solvers. And our competitive

> advantage depends on whether our kids are prepared to seize the opportunities for tomorrow. So we need to build on the momentum that has already been established. We've got to learn what works and do more of that, and we've got to get rid of the stuff that doesn't work. And that's exactly what the Every Student Succeeds Act (ESSA) does. (Obama, 2015)

The law "Requires—for the first time—that all students in America be taught to high academic standards that will prepare them to succeed in college and careers" (ESSA, 2015). Under ESSA, closing the achievement gap, progress, and positive student academic outcomes has now become the emphasis.

> With this bill, we reaffirm that fundamental American ideal that every child, regardless of race, income, background, the zip code where they live, deserves the chance to make out of their lives what they will. (Obama, 2015)

All students, regardless of socioeconomic status must have an equal opportunity to be successful in school. Students of low socio-economic backgrounds, also known as students that are economically disadvantaged, have consistently ranked at the bottom of academic achievement and success in all states across the U.S. (Fox, 2011). ESSA encompasses addressing the needs of all learners that can result in breaking down barriers of race, ethnicity, and most importantly status.

Under NCLB and ESSA school districts throughout Texas have been faced with the added pressures of not only standardized testing, but also advocating high academic standards. Torres and Moran (2014) stated, "K-12 standards for English -Language arts and mathematics have been adopted by nearly all US states and territories and aligned to

many states tests" (p. 988). In response to NCLB, Texas initiated academic reform efforts that addressed the achievement of mathematics of all learners. In 2012, new mathematics curriculum was adopted in the state of Texas.

This chapter identifies background information that led to the adoption of the new mathematic TEKS, statement of the problem, research questions, definitions, significance of the research, assumptions, and limitations and delimitations. Adoption efforts included the focus on curriculum resources as new curricula is introduced in schools and the need for teachers to be adequately prepared to teach 21st century learners in a global society.

Background of the Problem

In the spring of 2012, new mathematics Texas Essential Knowledge and Skills (TEKS) in Texas for grades K-8 were adopted (TEA, 2014). Associate Commissioner Monica Martinez at the Texas Education Agency declared "State education officials adopted the revised standards in April 2012 after a regular review of curriculum showed a need to better prepare students for high school and college" (as cited in Smith, 2014). Students in schools need an opportunity to develop a conceptual understanding of the academic content being taught in schools, they must have an opportunity to use cognitive skills rather than simply having rules and procedures of mathematical equations memorized (Asquith, Stephens, Knuth, & Alibali, 2007). The new mathematics TEKS require ". . . teaching advanced concepts intended to promote the mathematical reasoning students need for higher education" (Smith, 2014). The implementation of the new

mathematics TEKS seek to engage students in deeper cognitive learning that further challenges them to delve deeper into the curriculum and understand the process.

The Texas Education Agency (TEA) provided schools and teachers with two years to adequately prepare for the transition of the newly adopted mathematics TEKS (Weiss, 2014). Transition time could also be applicable to book publishers as they tried to ensure that new textbook adoptions were available for school districts. Obara and Sloan (2009) affirmed textbooks play an integral role in curriculum reform efforts as schools look to resources that help guide them through the implementation of new curricula (p. 351). Stein, Remillard, and Smith (2007) declared ". . . the majority of mathematics teachers rely on curriculum materials as their primary tool for teaching mathematics" (p. 327).

Although textbooks are a great resource, school districts still need to take the time to prepare and train their teachers on the newly adopted curriculum. Tschoshanov (2010) stated, "A teacher with content knowledge limited to mathematical procedures only has less opportunity to influence student success than a teacher who conceptually understands the subject" (p. 144). Teachers must have adequate preparation of both content knowledge and the delivery of content that can transpire into rich and meaningful conversations. Dewey (1916) wrote, "When engaged in the direct act of teaching, the instructor needs to have subject matter at his fingers' ends; his attention should be upon the attitude and response of the pupil" (p. 183). Teachers must create engaging lessons that will further encourage students to be more motivated and can result in academic success.

Updates and changes to mathematics curriculum in Texas were greatly needed to ensure that students were given an opportunity to become 21st century learners rather than simply test takers. Dewey (1916) declared "If we teach today's students as we taught yesterday's, we rob them of tomorrow" (p. 167). Levine and Levine (2012) stated, "The emphasis on preparing to take tests corrupts the educational process by subordinating it to test score improvement" (p. 107). Students must be encouraged and provided opportunities to solve complex mathematics problems that also allow them to reflect during the problem-solving process that result in acquiring additional ways of thinking and the ability to apply the skills to other contexts (NCTM, 2017, p. 4).

The discussion above demonstrates that school districts have responded to federal educational policies by using testing and accountability standards to demonstrate their student's mastery and proficiency of mathematics in schools. Raising expectations in academic content areas like that of mathematics beyond merely standards and accountability is greatly needed in schools so that students can demonstrate mathematic success. The National Center for Education Statistics reported mathematics scores for fourth grade students have increased steadily over the course of the last thirteen years, but the gains made have only resulted in 28 points from 1990-2013 (NCES, 2015). Mathematics scores range in scale from 0-500, in 1990 fourth grade students were averaging a scaled mathematics score of 213 and in 2013 students were averaging a scaled mathematics score of 242, with more students scoring at or above proficient in comparison to previous testing years (NCES, 2015).

Educational discourse and increasing pressures to raise state test scores and meet standards and accountability ratings throughout the state of Texas resulted in new mathematics curricula. Binkovitz (2015) explained that the new TEKS had demonstrated to be extremely overwhelming to many school districts in Texas. As school districts continue to try and understand the language written in the TEKS, teachers are also demonstrating to have difficulty in understanding how to adequately prepare their lessons for their students. "Teachers are being asked to teach in ways that are unfamiliar to them, ways that they did not experience as students" (Remillard, 2000, p. 332). Both students and parents have addressed concerns with the rigor of the curriculum that their students are bringing home (Mellon, 2014).

Problem Statement

Although schools throughout Texas were granted a full year of reprieve during the 2014-2015 academic school year, the problem addressed in this study is whether they were given enough time to adequately prepare their teaching staff for the transition. The new mathematics standards have been accelerated and students in elementary grades are now being exposed to algebraic ideas in response to raising academic standards and the implementation of the new mathematics TEKS.

> Introducing algebraic ideas to students earlier, however, presents many challenges, including learning more about the development of students' early algebraic reasoning, designing supportive curricula, and developing teacher knowledge and practice that will enable teachers to foster connections between arithmetic and algebraic forms of reasoning. (Asquith et al., 2007, p. 250)

Whether the curriculum is developmentally appropriate has been at the forefront of educational discourse.

There is a considerable amount of research regarding the old mathematics TEKS in Texas and performance measures of students in primary grades. Mattison (2006) conducted a study on mathematical literacy and standardized mathematical assessments for students in grades 3 through 8 in Texas. The findings indicated that teachers need to be able to provide students with learning experiences that will allow them to process the mathematical language. Teachers must understand that the goal of mathematical literacy encompasses allowing students to understand and communicate ideas rather than merely emphasizing passing a standardized test. The study also alluded that students must have opportunities to reason and justify their logic.

Teachers must not only understand mathematics content, but they must also demonstrate a strong sense of self-efficacy in their ability to teach and deliver effective mathematics lessons to their students. Self-efficacy has materialized in research as "beliefs in ones capabilities to organize and execute the courses of action required to produce given attainments" (Bandura, 1977, p. 3). Administrators on campuses must be able to provide teachers with the needed mathematics professional development that will strengthen a teacher's self-efficacy.

> Efficacy expectations determine how much effort people will expend and how long they will persist in the face of obstacles and aversive experiences. The stronger the perceived self-efficacy, the more active the efforts. Those who persist in subjectively threatening activities that are in fact relatively safe will gain

corrective experiences that reinforce their sense of efficacy, thereby eventually eliminating defensive behavior. (Bandura, 1977, p. 194)

Very little research on the newly adopted mathematics TEKS and the impacts exists, as the transition to the new TEKS has just begun. Weiss (2014) stated that the new TEKS have shifted and much of what students are now having to learn, was previously presented in later grades and has resulted in teachers having to cover a greater deal of content in shorter periods of time. Will students be lost in classrooms as they transition into new mathematics TEKS? Will schools know how to effectively respond to new curricular changes?

The Purpose Statement and Research Questions

Understanding curriculum standards in elementary schools is vital to the future of our students. Teachers must demonstrate both knowledge and adequate training to fully prepare the youth of tomorrow. The adoption of new curriculum standards in mathematics in Texas brings up many concerns. The purpose of this mixed methods study was to examine the challenges that administrators and teachers face at Title 1 schools with the implementation of the newly adopted mathematics Texas Essential Knowledge Skills (TEKS). The study sought to address to what extent the curriculum changes have impacted elementary schools throughout Texas.

The guiding questions that used for the research are as follows:

1. How do teachers in Title 1 schools perceive professional development opportunities of the new mathematics TEKS?

2. How is professional development of the new mathematics TEKS being offered by administrators in Title 1 schools?
3. How are professional learning communities in Title 1 schools addressing training of the new mathematics TEKS?
4. To what extent, if any has the implementation of the new mathematics TEKS impacted the pedagogical practices of teachers in Title 1 schools?

Definition of Terms

This section defines key concepts and terms that will be used throughout this study. For the purpose of this research, the following conceptual definitions are provided for the key concepts and terms to inform the reader of the meaning used throughout the study. In particular, when concepts and terms are operationalized for the quantitative portion of the mixed methods design.

AYP.

Under *No Child Left Behind,* schools were required to make Adequate Yearly Progress that used the criteria of three measures: reading/language arts, mathematics, and graduation rates for secondary or attendance for elementary grades (TEA, 2016).

DI.

Differentiated instruction is a teaching philosophy that is student-centered and allows learners to be provided different brain-based strategies, ideas, and activities to learn while using a variety of methodologies, but ultimately reach the same goals (Stoehr, Banks, & Allen, 2011, p. 39).

ESEA.

Education legislation known as the *Elementary and Secondary Education Act* that was initially enacted to achieve equity in schools by providing schools with the needed financial resources to address the instructional needs of underprivileged students to achieve grade-level proficiencies (Thomas & Brady, 2005, p. 51).

ESSA.

Federal education legislation known as *Every Student Succeeds Act* that was enacted in 2015 to replace *No Child Left Behind.* New legislation still requires states to administer standardized testing, but has shifted away from imposing making AYP and instead using multiple measures to measure growth of learners in schools (Franquiz & Ortiz, 2016).

NCLB.

Federal educational legislation historically known as the *No Child Left Behind Act of 2001* that was enacted into law in 2002, which subsequently initiated standards and accountability to close the academic achievement gap of all learners by demonstrating to meet Academic Yearly Progress (U.S. Department of Education, 2002).

PD.

Professional development (PD) is collaborative learning among teachers resulting in strategies that assist them in adapting practices that will assist their learners (Darling-Hammond, Bullmaster, & Cobb, 1995).

PLC's.

Professional learning communities help create and establish relationships among teachers as colleagues within educational structures while focusing on professional development that will improve and support student learning (Little, 2006, p. 15).

RTI.

Response to intervention written into the Disabilities Education Act in 2004 to help educators meet the needs of all learners through early intervention. It helps schools identify students that may need additional assistance outside the classroom and uses a multi-tiered level approach from Tier 1 intervention through tier 3 intervention (Stoehr, Banks, & Allen, 2011, p. 69-70).

STAAR.

State of Texas Assessments of Academic Readiness that includes reading assessments in grades 3-8, writing assessments in grades 4 and 7, science assessments in grades 5 and 8, social studies assessment in grade 8, End of Course (EOC) assessments for English, Algebra, Biology, and U.S. History (TEA, 2016).

Subgroups.

Subgroups include students that are economically disadvantaged, students from major racial and ethnic backgrounds, children with disabilities, and English language learners (ESSA, 2015).

TAPR.

Texas Academic Performance Reports from the Texas Education Agency that provide archival student data on STAAR assessments for individual schools and districts

in the state of Texas. Reports also desegregate student data by race, ethnicity, and programs within the school district, socioeconomically disadvantaged status, student mobility, and faculty demographics (TEA, 2017).

TEA.

Texas Education Agency that oversees primary and secondary education in Texas schools and ensures that students' educational needs are met (TEA, 2016).

TEKS.

Texas Essential Knowledge Skills adopted by the state board of education as state standards that students should be able to do for each grade level and teachers are to teach their students (TEA, 2016).

Title I.

Supplemental funding to state and local education agencies assist funding resources in schools with a high concentration of students from low-income families (TEA, 2017).

Significance of the Research

The significance of this study is the contribution to existing STAAR research and addresses the challenges that teachers and administrators face when implementing new mathematics curriculum without adequate preparation and support. The study seeks to help provide information to schools and districts that will make the transition of new curricular standards more effective for all stakeholders, especially their students. This mixed methods study may also provide valuable information to educational leaders with regards to professional development opportunities that can be provided to teachers to

further enhance their mathematics content knowledge and understanding. Subsequently, the study could also assist in improving the delivery of mathematics content in classrooms and further the goals of academic achievement of all learners in educational settings.

Assumptions

The assumptions regarding this study include:

1. The participants will have awareness of and/or experience with the newly adopted mathematics TEKS.
2. The participants will answer the questions openly and honestly.
3. The participants will complete teacher questionnaires and answer all questions openly and honestly.
4. The archival data retrieved from TEA is true and accurate.

Limitations

The limitation for this study is the potential for bias because of the professional background of the researcher. The researcher is a former mathematics teacher who has taught both grades three and four at the elementary level for two large school districts, and both at Title I schools. The researcher has written formal and informal curriculum for mathematics in grades three and four at the campus and district level. The researcher is also an independent math and science curriculum consultant. This issue will be addressed in the Role of the Researcher in Chapter III.

Delimitations

The first delimitation that was utilized by the researcher for this study is to provide only the perspective of teachers and administrators at five Title I elementary schools in grades three and four, while excluding the perspective of students and paraprofessionals. The second delimitation was to make school comparisons using a campus comparison group that may not represent the entire population. Additionally, the study is also delimited due to four school districts utilized in the study that may not be generalizable to all other school districts due to the regional location and/or demographics of the student populations being utilized within the mixed methods study.

Organization of the Study

This mixed methods study sought to examine the challenges that administrators and teachers face at Title 1 schools as they transition into new mathematics curriculum that will be tested and used in their school's accountability ratings for the first time since the adoption of the new TEKS. The study is organized into five chapters. Chapter I introduces mathematics proficiency levels of fourth grade students indicating that students are struggling to meet national standards. Education initiatives require that states adequately prepare all students by emphasizing higher academic standards in schools. Through the synthesis of literature, the researcher sought to ground the study by identifying the contextual factors surrounding the new mathematics TEKS in Texas.

Chapter II begins with federal education mandates that have pressed states to implement standards and accountability to ensure the adequate preparation of all students. Texas introduced statewide assessment known as STAAR that measure both school and

individual student performance. With the adoption of the new mathematics TEKS, teacher expectations have increased and require that they have deeper content knowledge and understanding. The researcher drew upon books and articles that encompassed teacher professional development opportunities to enhance their content knowledge. The literature also contextualized best teaching practices that helped address closing mathematics academic achievement gaps.

Chapter III begins by introducing the convergent parallel research design of the mixed method study. The study will include both quantitative and qualitative data that was collected separately, analyzed independently, and then merged. The researcher described the participants as both teachers and administrators at five of the six initially proposed Title I schools. The role of the researcher as portraitist is also described. The researcher explained the collection of data, data analysis, provisions of trustworthiness, validity, reliability, and a summary of the research.

Chapter IV begins with the findings of the four research questions. Mixed methods integration is introduced first with research question 1. The question includes both a teacher professional opportunities questionnaire and interviews with third and fourth grade teachers. The question is filtered to show data by each of the school districts as well as by individual grade level. The findings are then compared and converged side-by-side. Research questions two, three, and four are explained using qualitative data that includes teacher focus groups, teacher and principal interviews, mathematics classroom observations, and professional learning communities' observations. Also presented are

landscape descriptions of each of the study sites, along with woven threads of educational leadership and illuminating themes.

Chapter V begins with a summary of the mixed methods study. Elements of the research findings for each of the questions is described beginning with question one, the integration of mixed methods that utilized both quantitative and qualitative data. Questions two, three, and four are addressed with findings that are consistent with the literature. Conclusions address how both administrators and teachers continue to need additional mathematics professional development training on new rigorous standards that meet the needs of their learners. Implications, recommendations for future research, and concluding remarks remind Title I schools that the educational landscape is far from finished and teachers need to be supported in mathematics through professional development opportunities both inside and outside their school districts.

CHAPTER II

Literature Review

Introduction

The literature reviewed for this study serves the purpose of providing a history of federal education mandates that gave rise to standards and accountability across the nation's schools to further efforts to address the underachievement of students in academic content areas. The enactment of *No Child Left Behind* (NCLB) (2002) resulted in *high stakes* testing in schools and mandating that curriculum be closely aligned to state tests. Under the new legislation states were required to meet Annual Yearly Progress (AYP). The literature is summarized into four distinct areas that include federal education mandates, mathematics content knowledge for teaching, teacher professional development, and teacher best practices.

This chapter presents an examination of the extent of literature to identify the factors that influenced the adoption of the new mathematics TEKS in the state of Texas. Also addressed are the challenges that the adoption has had on administrators and most importantly on teacher's pedagogical practices. The study sought to examine if children are lost in classrooms as they transition into new mathematics TEKS.

Federal Education Mandates

NCLB legislation brought drastic reform within educational institutions that demonstrated to be even greater than the Elementary and Secondary Education Act (ESEA) passed in 1965. NCLB reauthorized ESEA, but also consisted of stricter initiatives that now included standards and accountability with hope to change the culture within educational institutions at the time (Frey, Manlawitz, & Alvarez, 2012, p. 67). *No Child Left Behind* (2002) legislation forever changed the educational landscape through its passage and growing fears and concerns rose as standardized tests became the emphasis across the nation to appropriately address the academic needs of students. Added pressures to prepare students to acquire 21st century skills while trying to be compliant with NCLB initiatives resulted in additional strain being sensed by administration and teachers as both tried hard to be resourceful and meet AYP (Schoen & Fusarelli, 2008, p. 182).

After NCLB schools and districts tried effortlessly to meet the increasing demands of AYP, the vision of education quickly became shattered as educators tried to conform their educational practices towards the goals of meeting proficiency of all students as mandated by the initiative. The goals as established by NCLB were that all children would be proficient by 2014 on state academic content tests of reading and math to be eligible to receive federal funds (Levine & Levine, 2012, p. 107). The paradigm quickly shifted from teaching the youth of tomorrow, to testing students to memorize knowledge needed to pass a state mandated test that would result in districts continuing to receive federal allocations for education. Hursh (2005) alluded that "Because of the

pressure to raise test scores, particularly in the urban school districts, teachers are compelled to teach the skills and knowledge that will be tested, neglecting other usually more complex aspects of the subject and some subjects altogether" (p. 613).

NCLB changed the American educational landscape by introducing standards and accountability. The landscape has now been replaced with ESSA to help address student achievement gaps and hold schools to higher standards.

Reauthorization of ESEA

In December 2015, *Every Student Succeeds Act* was passed to address the learning needs of our students and close academic achievement gaps in schools across the country, furthermore ensuring that all students succeed.

> The Every Student Succeeds Act (ESSA) that President Obama signs today builds upon the significant success of the President's education policies and represents an important step forward to improve our education system. It replaces the No Child Left Behind Act, which was too often a burden rather than a help to achieving these goals. As President Obama has said, "The goals of No Child Left Behind were the right goals: Making a promise to educate every child with an excellent teacher—that's the right thing to do, that's the right goal. Higher standards are right. Accountability is right . . . But what hasn't worked is denying teachers, schools, and states what they need to meet these goals. That's why we need to fix No Child Left Behind. (The White House, 2015)

The new law was enacted to ensure that all students were provided an opportunity to achieve academic success in American public schools. The legislative initiative

continues to support Title I programs. "The purpose of this title is to provide all children significant opportunity to receive a fair equitable, and high-quality education, and to close educational achievement gaps" (ESSA, 2015). The law allocates funding for education agencies, state assessments, migrant education, prevention and intervention programs for "at risk" children, and federal activities within educational structures. In order to receive allotments, education agencies must be supportive of schools, develop improvement plans, monitor schools, recruit external partners, and align resources to carry out activities. Education agencies shall implement challenging academic standards and assessments (ESSA, 2015).

Under the law, each state is also given the autonomy to implement academic content standards, but the standards must demonstrate alignment with entrance requirements of higher educational institutions. States are also required to embed English Language Proficiency Standards (ELPS) that encompass the following four domains: reading, writing, listening, and speaking. ESSA does not prohibit the revision of curriculum standards within states. The law also mandates that mathematics be tested yearly in grades 3-8 and once during grades 9-12 (ESSA, 2015).

Other provisions by the law include statewide accountability system that complies with the requirements of subgroups of students. Subgroups include students that are economically disadvantaged, students from major racial and ethnic backgrounds, children with disabilities, and English language learners. States are also still required to disaggregate the data of the subgroups, but the state can set minimum limits to ensure that statistical information can be derived (ESSA, 2015). Although the law has been changed,

it continues to challenge states into developing high academic standards for all schools and demonstrate academic achievement through state mandated testing for all students unless exemptions are met. Title 1 schools are still eligible for funding, with subgroup provisions (ESSA, 2015).

As a response to federal education mandates, states responded by adopting statewide academic assessments. The state of Texas adopted State of Texas Assessments of Academic Readiness (STAAR) to monitor school and student academic achievement.

STAAR

In the state of Texas, TEA has adopted STAAR assessments that help schools and districts measure student learning outcomes using academic performance indicators. Additionally, STAAR also measures individual student skills and knowledge using raw score conversions. TEA uses campus comparison groups to compare schools effectively. STAAR student assessments are also used to assess student's content knowledge level and understanding of state curriculum standards, also known as TEKS.

> TEA implemented STAAR in spring 2012 to fulfill requirements enacted by the Texas Legislature. STAAR helps to ensure that Texas students are competitive with other students both nationally and internationally. One important function of STAAR is to gauge how well schools and teachers are preparing their students academically. The test is specifically designed to measure individual student progress in relation to content that is directly tied to the TEKS. Every STAAR question is directly aligned to the TEKS currently in effect for the grade/subject or course being assessed. (TEA, 2016, p. 9)

Students in Texas are assessed in academic content areas to ensure that they have learned the skills and knowledge needed to be successful and continue to succeed in later courses that will help adequately prepare them to compete at both the local and national level (TEA, 2016, p. 9).

For mathematics, STAAR assessments are administered by educators in Texas public schools in grades three through eight (TEA, 2016, p. 9). Academic performance level indicators are used to predict outcomes on STAAR assessments.

Academic performance indicators.

Academic passing and failing performance level indicators on STAAR were defined by TEA to assist stakeholders in identifying the different skills and knowledge students need to be able to demonstrate on state assessments (TEA, 2012, p. 1).

> The Texas Education Agency (TEA), in cooperation with the Texas Higher Education Coordinating Board (THECB), convened a Performance Descriptor Advisory Committee (PDAC) in fall 2010 to recommend performance labels and policy definitions for the performance standards of the State of Texas Assessments of Academic Readiness (STAAR). The purpose of the performance labels and policy definitions is to describe the general level of knowledge and skills evident at each performance level for all grades and subjects. (TEA, 2012, p. 1)

The general STAAR assessments are measured using three academic student performance level indicators as implemented by TEA (TEA 2012, p. 1). Student scores that fall into Level I: Unsatisfactory Academic Performance, indicate that students lack

the content and understanding to be adequately prepared to be successful in the next grade level. Student scores that fall into Level II: Satisfactory Academic Performance, indicate that they have sufficient skills and knowledge to go onto the next grade level. They also demonstrate to have a higher likelihood of success as they have demonstrated the ability to think critically and apply their skills to familiar contexts, but may still need additional intervention. Students that perform at Level III: Advanced Academic Performance, indicate that students have a high likelihood to be independently successful in the next grade level as they have demonstrated both analytical and critical thinking skills that can be applied to a variety of contexts (TEA, 2012, p. 1).

Academic performance level indicators for students in each grade level and content area are determined using multiple score conversions as established by TEA. Multiple score conversions include raw student scores.

Raw score conversions.

STAAR scores are calculated and interpreted using both raw scores (the total questions answered correctly) and scaled scores that help quantify the rigor and difficulty level of each of the test questions (TEA, 2017, para. 1).

> The basic score on any test is the raw score, which is simply the number of questions correct. You can interpret a raw score only in terms of a particular set of test questions. Unlike raw scores, you can interpret scale scores across different sets of test questions. Scale scores allow direct comparisons of student performance between specific sets of test questions from different test administrations. A scale score is a conversion of the raw score onto a scale that is

> common to all test forms for that assessment. The scale score takes into account the difficulty level of the specific set of questions based on the test. It quantifies a student's performance relative to the passing standards or proficiency levels. (TEA, 2017, para. 1)

STAAR assessments administered annually continue to increment the raw and scaled score expectations for each content and grade level assessment by TEA. Incremental measures help ensure that student academic performance is properly aligned with the states 2021-2022 final recommendations of Level II performance indicators (TEA, 2017).

Raw score conversions are also useful to help interpret and compare STAAR student academic performance across schools in Texas. Raw score conversions help generate campus comparison groups that are similar in demographics.

Campus comparison groups.

Each campus in Texas is grouped into a campus comparison group consisting of approximately forty schools within the group that are comparable in size and demographics for each "target" campus (TEA, 2014, p. 119). TEA uses the campus comparison groups to help determine academic achievement in all content areas, closing student performance gaps, and postsecondary readiness on all schools. Demographics used to group schools across the state include the following: campus type (elementary, middle school, high school), size, grade spans offered on each of the campuses, percent of students economically disadvantaged, percent of students identified as English Language Learners (ELLs) and Limited English Proficient (LEP), and percent of students identified as mobile (TEA, 2014, p 119).

In Texas, campus comparison groups are available for all campuses apart from alternative education, juvenile justice alternative education programs (JJAEP), and disciplinary alternative education programs (DAEP) (TEA, 2014, p. 120). Campus comparison groups are generated using uniform linear values, which therefore allows campuses to appear within a campus comparison group more than once if needed to make effective comparisons. Campuses that are in year one and missing the mobility value will have the proxy of their districts average mobility to still be able to interpret the comparison among the group. Campus comparison groups are regenerated annually with STAAR assessments to accurately account for any demographic changes and or shifts (TEA, 2014, pp. 120-121).

STAAR standards and accountability mandates have raised student expectations. Increasing standards and accountability have resulted in increased expectations of teachers' content knowledge in grades K-12.

Mathematics Content Knowledge for Teaching

Without current textbooks and training of technology to incorporate into mathematics lessons, teaching can be challenging for teachers. "Teachers must understand their subjects deeply and flexibly, and skillfully represent them in intellectually honest ways to a wide range of students" (Ball & Forzani, 2011, p. 20). Ball, Thames, and Phelps (2008) asserted that teaching mathematics requires teachers to know more than simply completing a mathematic algorithm. Teachers must be skillful and demonstrate the ability to rapidly see student errors and perform error analysis mentally so that they can engage the learner in dialogue to alternative algorithms,

teachers must therefore be flexible and be able to carry out a variety of tasks while teaching students (Ball et. al., 2008, pp. 397-398). Teaching is complex and requires that teachers have a thorough background knowledge in the subject matter that they teach, but they must also be able to make the language comprehensible for their learners (Ball, et al., 2008, p. 404).

Administrators must seek to challenge teachers into also attaining a great sense of efficacy that will mirror the vision of their schools and allow students the opportunity to be successful.

> Individuals who demonstrate high levels of self-efficacy approach difficult tasks as challenges to be overcome, setting high goals and persisting in efforts to achieve them. Those with lower levels of self-efficacy tend to avoid difficult or stressful tasks, setting lower goals and disengaging when faced with a challenge. (Mintzes, Marcum, Messerschmidt-Yates, & Mark, 2013, p. 1202)

Teachers that demonstrate a high sense of efficacy towards their professional careers of teaching can promote positive student outcomes. Tschannen-Moran and Hoy (2000) asserted that a teachers "Efficacy affects the effort they invest in teaching, the goals they set, and their level of aspiration" (p. 783).

Transitioning into new mathematics TEKS requires teachers that are engaged in the learning process and open to the idea of gaining an understanding of new curriculum to effectively address the challenges of presenting academic content using multiple modalities.

> However, teachers' development of the knowledge and skills necessary to perform the work of the profession to a high degree of quality remains a challenge. The challenge involves not only the preparation of an individual to enter a profession, but also the requisite ongoing learning and mentoring for an individual to remain current with the most recent advances in the field that addresses emerging issues. . . (Hord & Tobia, 2012, p. 11)

Shulman (2013) stated "Since there are no single most powerful forms of representation, the teacher must have at hand a veritable armamentarium of alternative forms of representation, some of which derive from research whereas others originate in the wisdom of practice" (p. 7). Teachers must have the skills to research, adapt, and interpret curriculum materials.

Teachers must also be able to embed their ideas into their own teaching practices that can transpire into positive student learning that results in academic success. Remillard (2000) asserted "Teachers curriculum processes include reading and translating curricular ideals written by others into ideals that teachers intend to enact in the classroom" (p. 335). Teachers must also have a sense of professional agency that will encourage them to delve into the curriculum and motivate their students to be responsible learners.

Several research studies show that curriculum materials play an integral role in the preparation of teachers adequately building the foundational knowledge of mathematics to teach their students. Drake, Land, and Tymminski (2014) conducted a qualitative research study to build upon the work that was previously published by Ball

and Cohen Davis in 1996 and additionally, Krajcik in 2005. The research study by Drake, et al. (2014) encompassed researching how educative curriculum materials such as textbooks can be used to assist prospective teachers (PTs) in obtaining the skills and knowledge to appropriately teach their students. The study addressed the notion of the "good" teacher and how "good" teachers have historically elected to not use textbooks within their instructional practices and instead develop curriculum for their students on their own. The study also discussed how newly introduced curriculum materials into the field of education have shifted and curriculum designers have now embedded curriculum materials that will further the efforts of all teachers including the *novice* teacher by adapting curriculum that not only addresses the standards that students are being challenged to learn, but also promotes positive outcomes of all students by having the *tools* needed to learn the subject matter.

The results of the study proposed five principles that would further support the efforts of prospective teachers (PTs) and consisted of the following: finding effective ways to become familiar with the educative features embedded, developing a lens that can result in gaining a better understanding of the content, scaffolding the curriculum embedded to accurately interpret the content, learning and understanding the scope and sequence of curriculum and how it is a continuous process that builds upon concepts, and comparing and contrasting the various modalities that can be used to teach the curriculum (Drake, Land, & Tymminski, 2014, pp. 154-160).

Mathematics content knowledge of teachers can also be supplemented with current textbook editions. Textbooks could provide teachers with a deeper understanding of mathematical content.

Textbooks.

Current textbook adoptions that support teachers' mathematical content knowledge is essential so that all students can be successful. Bruhn and Hasselbring (2013) affirmed that meeting the needs of diverse learners in schools is essential and one tool commonly used is textbooks. Additionally, when making textbook selections administrators and teachers must ensure that textbooks are aligned with state standards and examined for both content and instructional analysis (pp. 31-32).

Remillard (2000) conducted a study using a cross-case analysis and examined curriculum resources that included the implementation of a new textbook within two different fourth grade mathematics classrooms. The two schools used in the study were in two different school districts that served a diverse group of learners that came from low to middle class households. Data collection of the study consisted of interviews and classroom observations (Remillard, pp. 331-334). New commercially published textbooks were adopted in both school districts with very few supplemental materials offered as they were still under development. The new textbook adoptions were similar regarding the organization of the mathematical skills, chapters, lessons, and procedural skills. The study utilized a cross-case analysis to examine the patterns of the two teachers and classrooms with regard to the new textbook adoptions (Remillard, 2000, pp. 331-335).

Results of the study indicated that both teachers utilized the textbook as their resource for instruction, but in addition also "read" research on mathematics content. Teachers expressed positive aspects of the textbooks, but also concerns with the depth and complexity of the text that therefore led the teachers to have to research and read on their own. In addition, teachers also had to practice the problems embedded into the curriculum independently to fully understand how to effectively teach the content to their students. The study concluded with asserting that the adoption of textbooks should be inclusive of other curriculum materials, but should not be taught in isolation (Remillard, 200, pp. 335-348).

While current textbooks are great resources for teachers, research also indicates that technology integration in classrooms can also help enhance mathematics instructional delivery. Technology integration can help students increase their problem solving and reasoning skills (NCTM, 2017, p. 3).

Technology.

Newly adopted mathematics curricular standards can also be supported by teachers with technology in classrooms.

> Additionally, it is believed that when technology is used appropriately in classroom instruction, it has a very positive impact on student achievement or success. Moreover, using technology in education or teaching helps teachers provide immediate feedback to students and motivates active student learning, collaboration, and cooperation. It also helps teachers provide individualized

learning opportunities and flexibility for their students. (Eyyam & Yaraton, 2014, p. 32)

Teachers can incorporate technology and media related approaches into their teaching using various types of media. Stoehr, Banks, and Allen (2011) stated that students that learn better using technology are given choices by the teacher. Some of the choices include: interactive media such as search engines, virtual field trips, blogs, wikis, reflection questions, web quests, etc. (Stoehr et al., 2011, pp. 57-58). When learning math, students need real world experiences because "math is an integral part of our lives and it should not be taught as an independent topic without practical application" (Gibson, 2004, p. 16).

Teachers must provide their students with opportunities to engage in classrooms and develop deeper mathematics understanding (NCTM, 2017, p. 3). Finn, Kraft, West, Leonard, Bish, Martin, Sheridan, Gabrieli, and Grabrielie (2014) asserted that "A fundamental goal of education is to equip students with the knowledge and skills necessary to think critically, solve complex problems, and succeed in the 21st century society" (p. 736). Technology can be used in combination with other curricular resources to help support student learning.

> Students can develop deeper understanding of mathematics with the appropriate use of technology. Technology can help support investigation by students in every area of mathematics and allow them to focus on decision making, reflection, reasoning, and problem solving. The existence, versatility, and power

> of technology make it possible and necessary to reexamine what mathematics students should learn as well as how they can best learn it. (NCTM, 2017, p. 3)

Louis (2012) conducted a qualitative case study to explore technology integration in three elementary schools of students in grades two through four, a total of six teachers were used in the study and all schools were within the same school district. The study examined 21st century skills being embedded by teachers within the schools into their classrooms. Data collection consisted of observations and interviews. Interviews were conducted with individual teachers to develop holistic accounts of technology integration. Teachers also self-assessed their technology use with a TSAT, a district technology assessment that helps identify teacher learning needs and technology competencies of teachers. Data was transcribed, coded, and triangulated and the TSAT were analyzed using descriptive statistics. After coding and triangulating the data, three themes emerged about technology integration and they included: increased student motivation, increased teacher motivation, and increased relevance to students' lives.

Louis (2012) found that teachers felt that technology greatly improved their instruction by being able to differentiate for their students. Types of technology integration observed were the following: computers, interactive whiteboards, digital document cameras, iPads, software programs, and websites. Teachers declared that they had learned to incorporate the technology through self-teaching, collaboration, and one-day technology trainings provided by the district. Students were highly motivated, especially when using iPads. Teachers however, demonstrated to have inadequate training on adapting technology into the curriculum to make lessons more meaningful

and often being pressed for time. Technology integration resulted in positive student outcomes. Teachers unfortunately overall lacked the basic understanding of how to incorporate technology into their classrooms that would transpire into best teaching practices. The researcher concluded with recommending more technology training for teachers within the district and that additional time be provided for teachers to collaborate on how to incorporate effective uses of technology.

While teachers' mathematics content knowledge can greatly enhance classrooms, teacher professional development is needed to help improve best teaching practices. Avalos (2011) explained ". . . professional development is about teachers learning, learning how to learn, and transforming their knowledge into practice for the benefit of their students' growth" (p. 10).

Teacher Professional Development

Teacher professional development (PD) encompasses opportunities to collaborate in professional learning communities (PLC's), supportive leadership, and structured time that will deepen their mathematics content knowledge and understanding.

> In the most highly developed PDs, teachers work in teams with each other, with prospective teachers, and with teacher educators, discussing learning and learners from many vantage points; they examine the effects of their practice; they adapt practices based on evolving understandings of learning and learners; and they continually rethink school structures and teaching strategies. (Darling-Hammond, Bullmaster, & Cobb, 1995, p. 90)

Teacher professional development offered to both preservice teachers and teachers must ensure that it assists them in becoming more proactive in understanding how to develop curriculum content for their students (Remillard, 2000, p. 347). Sather (2009) affirmed, "Without professional development focused on enhancing teaching and learning, teachers often teach the way they were taught" (p. 11). As expectations and complexity of mathematical standards continue to rise, ". . . our schools must ready today's students for tomorrow's world beyond the classroom" (Stoehr, Banks, & Allen, 2011, p. 15).

Research indicates that professional development of teachers is a critical educational component so that all teachers can gain the required skills and knowledge needed to teach their students. "Professional development for teachers has been deemed the necessary approach to improving teacher quality, meaning teachers' pedagogical content knowledge and pedagogical practices" (Dash, Magidin de Kramer, O'Dwyer, Masters, & Russell, 2012, p. 2). Ongoing teacher pedagogical content knowledge is essential to enhance teacher quality, Darling-Hammond (2012) declared "We need to arm teachers with the knowledge and skills they need so they can teach students in the way that they deserve" (p. 13). Current rigorous mathematical standards necessitate additional teacher training that can equip students with the needed skills to be successful.

Polly, Neale, and Pugalee (2014) conducted a year-long study that focused on the professional development of teachers in mathematics content. The study used a multi-method approach and included three teachers' pre and post assessments that measured mathematical knowledge with a total of 28 participants that all worked in Title 1 schools within five different elementary schools in one school district. Over the course of the

study participants completed a total of 84 hours of professional development that included standards based content training. Results were positive and indicated a significant difference in teachers' mathematical content knowledge for teaching after having personally obtained ongoing mathematical training. "Professional development continues to be the primary vehicle to trigger the increase of standards-based pedagogies in mathematics classrooms" (Polly, Neale, & Pugalee, 2014, p. 8). Professional development of teachers can positively impact both teachers and students.

Professional development offered through online learning environments can also be supportive and supplement teacher content knowledge and understanding. Dash et al. (2012) conducted a study on 79 fifth grade math teachers that investigated the effects of online math professional development offerings. Teachers were provided three courses in elementary math that challenged their mathematical thinking and knowledge. Teachers enrolled in one course per semester that lasted a duration of six weeks. Each week of online learning consisted of four to six hours of professional development. The course had various learning components embedded that included the following: readings, resources, activities, and peer-to-peer online discussions that ended with a culminating classroom activity led by the teacher. Results of the study positively indicated that teachers that participated in online professional development had an increase in content knowledge juxtaposed to their peers in the control group.

While professional development can help enhance a teacher's content level and understanding, professional learning communities within a school can help further support teaching practices. Professional learning communities provide opportunities to ".

. . foster teacher congeniality and shared accountability" (Buttram & Farley-Ripple, 2016, p. 194).

Professional learning communities.

The development of teachers is a continuous learning cycle that can also improve best practices through professional learning communities (PLC's) (Hord, 2009, p. 40). Doolittle, Sudneck, and Rattigan (2008) declared that a learning community is a partnership that is formed internally within the school structure, but also extends to external community stakeholders (p. 305). Stoehr, Banks, and Allen (2011) described a great benefit of a professional learning community was having a structure that is collaborative among educators where ideas are shared and a collective vision is formed (p. 11). Through the implementation of PLC's, teachers are better supported. "School faculty and leaders are more likely to succeed when creating and supporting high-quality teaching is their utmost priority" (Hallman, Smith, Hite, Hite, & Wilcox, 2015, p. 193).

Student achievement in schools can best be attributed to professionals that are a part of a PLC within a collaborative school structure that has made a commitment to teaching and learning. Formal and informal collaboration of teachers results in successful PLC's within educational structures (Hallman et. al., 2015, p. 195). By participating in learning communities, teachers are provided nonevaluative feedback from their colleagues that allows them to better understand their subject area and establish meaningful educational goals for their students (Hord, 1997, p. 24). Well-developed PLC's can help cultivate a culture that is student-centered. "Teachers have to learn how to successfully interact and it requires initiatives from both teachers and principals to

create conditions for rich dialogue about improvement" (Whalstrom & Louis, 2008, p. 463).

Moore (2010) conducted a mixed methods study on teacher perceptions on PLC leadership practices and sustainability of school climate. Two schools were used in the study, one designated Title I, while the other was not. Qualitative research consisting of interviews, focus groups, and observations. Interviews were recorded and conducted with both teachers and administrators. Quantitative research consisted of an online survey instrument that allowed multiple perspectives to be collected. A total of 44 respondents completed the survey. Qualitative data were examined for emerging PLC characteristics. The researcher found that both schools greatly valued the elements of a PLC environment and that the school district is greatly supportive of the learning conditions. Book studies were also found to be commonly used among both schools. The survey instrument determined that administrators on campuses are greatly reflective of the school vision and are supportive of teachers learning needs. Trust was deemed one of the most important elements from focus groups. The study provided evidence that PLC's are effective within this rural district and leadership is supporting school priorities and promoting student academic achievement.

PLC's are great learning and collaborative tools, but school leaders also play a crucial role in empowering their teachers by sharing leadership (Hord, 2009, pp. 42-43). School leaders must be willing to create a culture that is conducive for both teaching and learning.

Leadership.

School principals play a major role in supporting collaborative cultures (DuFour, 2009, p. 42). Dufour (2012) asserted that school districts that implement the PLC process can effectively help support the learning of their teachers while focusing on student achievement. School district superintendents that implemented the PLC process within their school districts have demonstrated to be successful because of the use of five fundamental core ideas. Superintendents begin the PLC process by establishing trusting relationships that lead to the sharing of knowledge with their principals to formulate the rationale for implementation. They create a coalition in which leadership is shared among their administrators and faculty. Superintendents are active participants in the process and set high expectations to establish a systematic plan that drives both teacher collaboration and student learning. Principals are also trained and developed so that they can adequately lead the process and address district priority goals and challenges. Lastly, school districts place a great emphasis on the process so that PLC's can be sustained and ultimately help increase and promote student academic achievement throughout all district schools (Dufour, 2009, pp. 28-29).

Leadership must promote a positive culture within all facets of their school community. Sather (2009) declared that administrators must be willing to foster positive relationships among the school community. Effective administrators encourage communication in collaborative environments (p. 25).

> We must not only provide the structures (time, support, meeting, protocols, resources, and so on) but also pay attention to promoting a school culture that

> encourages teachers to feel safe enough to share their successes and challenges, and open enough to listen to the counsel of others. (Hord & Tobia, 2012, p. 5)

Leadership culture within schools must continuously promote teaching, learning, and collaboration.

Leadership must also be willing to invest in their professional capital. Hargreaves & Fullan (2012) explained professional capital assumes that our education system is a long-term investment, the focus is shifted to authentic high quality teaching. Professional capital encourages leaders to hire teachers that are committed to their practice, dedicated to professionalism, and open to being professionally developed. Instructional components in schools are intended to maximize learning, but also empower teachers to use their judgement for the collective good of all students. Leaders must invest in the professional development of their teachers by adequately training them on curriculum resources that could help them improve their teaching. "Professional capital is not an end in itself. It is a means of developing the profession as it effectively increases learning and the life chances of all children" (Hargreaves & Fullan, 2012, p. 168).

Leaders must understand that steering the course to academic achievement is shared. "We need leaders whose expertise is more invested in helping a group create the shared knowledge necessary for sustained improvement . . ." (Wagner et al., 2006, p. 209). Administrators along with their teachers are learners and power is shared, while decisions are made collectively (Stoehr, Banks, & Allen, 2011, p. 20). Sather (2009) defined shared leadership as being inclusive of all members of the community. Teachers are empowered to become leaders and encouraged to help spearhead school priorities by

being a part of the planning and decision making process (p. 37). "Shared instructional leadership involves the active collaboration of principal and teachers on curriculum, instruction, and assessment" (Marks & Printy, 2003, p. 371). Administrators that promote shared leadership in their schools empower their teachers to take ownership of their learning.

Collaborative cultures in schools can adequately address school priorities. School leaders should be attending professional learning team meetings so that they can engage in the learning process with their teachers and offer suggestions, but they should not be directing the meeting (Sather, 2009, p. 54). The use of study groups is another method that school leaders could use to engage and encourage faculty collaboration.

> Study groups act both as a foundation of the PLC and a strategy to support school reform efforts. As a means of job-embedded professional development that infuses teacher learning into daily practice, study groups allow teachers to work together to evaluate their own learning and that of students. Supported by adult learning principles, study groups provide teachers with the structure and time to facilitate meaningful learning. The grouping of teachers provides a means of distributed leadership and shared decision making that collectively move a school forward. (Mullen & Hutinger, 2008, p. 283)

Study groups are often composed of teachers that research effective teaching and learning strategies (Sather, 2009, p. 17). Study groups allow administrators to disseminate information for teachers in safe environments, but also be immersed in the learning process.

Educational leaders must also create time for teachers to meet collaboratively (Dufour, 2009, p. 42). Principals must solicit teachers' participation and find time for learning (Hord, 2009, p. 42).

Structured time.

Finding the time to professionally develop teachers within schools is often a factor for many administrators. Effective PLC's within schools allocate the needed time for teachers to be professionally developed. According to Darling-Hammond (2014), teacher opportunities to collaborate within schools requires that they be provided sufficient time to collaborate with their colleagues.

> Teachers need regularly scheduled time to meet together in their teams to accomplish their agreed upon work. Ideally, they meet for at least 90 minutes twice a month or 60 minutes weekly. It is important that this time is protected to ensure that PLT members have the time to be successful in changing their practices. If PLT time is frequently co-opted for other uses, the work of the teams will be diluted in ways that diminish intended outcomes . . . Quality time requires a commitment by both administrators and teachers. (Sather, 2009, p. 38)

Teachers should be provided regular scheduled times that are embedded into their jobs and allow enough time for in depth discussions to take place, and time should be dedicated to the professional learning community of teachers. Leadership must develop a plan that allows teachers the opportunity to collaborate with the benefit of improving student academic achievement (Sather, 2009, p. 39).

Professional development of teachers in mathematics is a responsibility of educational leaders. Osborne (2015) declared, "The time to embrace current best practices for teaching mathematics is now" (p. 24).

Teacher Best Practices

Closing academic achievement gaps of students in schools requires teachers to be professionally trained to implement best teaching practices. Best teaching practices include: differentiation strategies, assessment tools, response to intervention, and addressing the challenges that result in effective learning environments in mathematics classrooms.

Lui and Bonner (2016) declared "Congruent with practice, teachers need to be able to design instructional plans that fluidly incorporate multiple strategies, including inquiry-based strategies as well as traditional ones" (p. 9). When teachers deliver content knowledge to students without any prior considerations, real authentic learning is unlikely to occur (Brown, 2015, p. 12). Teachers must have the skills and knowledge to adapt their instruction in meaningful ways to enhance their students' academic understanding. By being able to adapt instruction in classrooms, teachers will provide their students the opportunity to make real-world connections. Teachers can allow students to discover mathematics connections by providing them the opportunity to visually see and recognize the influence that mathematics has on our lives, our surroundings, and how it helps shape our world and in addition helps us become critical thinkers and problem solvers, both of which are vital components to teaching and

learning the application of mathematical skills (Turner, Gutiérrez, Simic-Muller, & Diez-Polomar, 2009, p. 137).

Teachers must provide students active learning opportunities that include using manipulatives to make visual connections to abstract mathematical concepts (Uribe-Florez, & Wilkins, 2016, p. 2). Allowing students, the opportunity to utilize manipulatives to formulate meaning and understanding using visual representations helps them better develop problem solving skills that can result in making connections to real-world classroom situations (Moch, 2002, p. 83). Providing manipulatives in math allows students to apply concrete critical thinking and problem solving skills that help them gain a deeper understanding of the content.

Teaching is multifaceted and requires that teachers have the needed skills and knowledge to differentiate their instruction to effectively reach all learners. Tomlinson (2000) explained in differentiated classroom ". . . teachers make vigorous attempts to meet students where they are in the learning process and move them along as quickly and as far as possible . . ." (p. 25).

Differentiation.

Addressing the needs of diverse learners by teachers through the implementation of differentiated instruction (DI) in the classroom also assists students in overcoming academic barriers. In schools, classrooms are becoming more culturally diverse and differentiated instruction has become imperative to address the needs of all learners (Cox, 2008, p. 52). The educational landscape of current classrooms consists of a diverse group of learners and being able to differentiate instruction based on multiple students learning

abilities, is crucial to their success. Dixon, Yssel, McConnell, and Hardin (2014) alluded to the concept of differentiation as a teachers' ability to adapt content instruction based on their individual student needs while taking into consideration the multiple ways that their students learn and respond. It is the teachers' ability to modify content that allows learners to maximize their learning (p. 113).

Cox (2008) stated that differentiation helps teachers respond to the needs of all learners. Engaging students in academic content significantly increases intrinsic motivation that results in increased academic achievement. By allowing teachers the autonomy to begin where students are with regards to the academic curriculum, results in positive outcomes. Teachers are more responsive to the needs of their learners. Differentiation allows teachers to use flexible grouping in their classrooms based on readiness and interests of their students. The teacher is also able to tier assignments based on their students learning styles. Tiered assignments consist of the teacher having the students learn the same skills and concepts, only the teacher provides students with multiple "routes of access" that are based on the learners' readiness, learning style, and interest (pp. 52-54).

Teachers having the knowledge and skills to differentiate their instruction in classrooms helps bridge the academic achievement gap of all learners and ensures that students are engaged, learning, and being challenged. Stoehr, Banks, and Allen (2011) explained that students need multiple opportunities to use their senses when making connections to content. Teachers could differentiate for multiple intelligences in their classrooms by activating prior background knowledge, giving students access to

manipulatives, tools, and workstations (p. 51). Teachers must be trained to differentiate their instruction using multiple representations.

Teachers must also be trained to assess and analyze student content and skill mastery using a variety of tools. Hord (2009) asserted that teachers must learn how to review, interpret, and analyze data (p. 42).

Assessments.

With increased mathematics standards and accountability, teachers must be trained on how to analyze and use student generated data to inform their teaching practice. Sather (2009) explained how interpreting data can be a challenging task for teachers and without proper training of data analysis, teachers may experience *downshifting.* Downshifting could unfortunately result in teachers feeling helpless and threatened (p. 43). Rather than create threatening environments for teachers, leaders must encourage them to use assessments to inform their practice. "Assessment should inform and guide teachers as they make instructional decisions" (NCTM, 2017, p. 2).

Teachers must be trained on assessment tools that allow them to address their students' needs. "Two tools that teachers commonly use to assess student learning of new material and knowledge of state standards are formative and summative assessment" (Dixson & Worrell, 2016, p. 156). Black and William (2010) defined formative assessment as interactive engagement of learners in classrooms that allow teachers to determine a student's understanding of content and mastery of concepts with classroom observations, oral discussions, and work samples. Teachers use this evidence to adapt their instruction to meet the needs of their learners (p. 82).

> Using formative assessments teachers are also providing their students with feedback, they are giving them additional opportunities to master skills and concepts. As teachers, we can give students a way to press the reset button by using formative assessments. Formative assessments are typically ongoing evaluations that inform teaching decisions. When used appropriately, they give us a tool to guide the design and implementation of learning activities and lessons. (Dirksen, 2011, p.26)

Dixson and Worrell (2016) explained that unlike formative assessments, "Summative assessments are almost always graded, are typically less frequent, and occur at the end of segments of instruction" (p. 156). Shoenfeld (2015) also described summative assessment as an individual exam such as an end-of-course exam, SAT, or a state standardized test that provides both students and schools individual student knowledge scores (p. 184). Summative assessments can help schools examine data using year-to-year and cohort analysis to help teachers understand student mastery of skills and knowledge in content areas and in addition to being able to make yearly comparisons (Sather, 2009, p. 44).

Dixon and Worrell (2016) explained that teachers must be mindful when assessing their students and clearly define goals and outcomes that they seek to achieve so that they can adequately choose the best assessment tool for their students (p. 157). Through the collection and analysis of student assessment data, teachers are better able to identify students that may need intervention.

Response to intervention (RTI).

Teachers must be professionally developed in RTI to identify struggling students. Johnson and Karns (2011) stated "Every teacher in America will benefit from intervention strategies that meet the needs of their students" (p. 4). Fletcher and Vaughn's (2009) professed response to intervention (RTI) was rewritten after the reauthorization of the Individuals with Disabilities Act (IDEA) in 2004. Districts were allowed to formally adopt measures that would respond to the behavioral and academic needs of students (p. 30).

> RTI offers a system for planning, instruction, assessment, and intervention that helps schools identify and help struggling students earlier than they would normally get help in a teaching situation. Through appropriate instruction and interventions, educators can increase the likelihood that more students will be successful. (Stoehr, Banks, & Allen, 2011, p. 69)

Hughes and Dexter (2011) explained RTI as a multitiered intervention approach that assists students by being provided individualized instructional strategies within each tier. Academic core content instruction is however provided to students at each tier. Tier 1 consists of monitoring students monthly with the periodic universal screening of students. Through the universal screener educators are better able to determine if students may potentially experience difficulties and or be "at risk" of learning within the regular classroom. Tier 2 is more specialized and intervention is provided to students weekly. Educators monitor the weekly progress of students to determine if students are benefiting from the intervention strategies, or determine if they are being unresponsive

and whether they may need to move into the next tier. Tier 3 consists of intensive intervention and monitoring of student learning that could lead to special education referrals (Hughes & Dexter, 2011, pp. 4-9).

New math curricular standards are greatly " . . . increasing attention to understanding whether and how students are actually learning what is being taught in their classrooms and to providing additional supports when they don't" (Printy & Williams, 2015, pp. 179-180). Teachers must understand how to appropriately identify early struggling students. "Most educators look to RTI as a means of delivering early intervention to address academic problems, not school behavior problems" (Fuchs & Fuchs, 2006, p. 94). While educators in schools are aware that RTI exists, ". . . much still needs to be understood to ensure that RTI implementation will promote effective early intervention . . ." (Fuchs & Fuchs, 2006, p. 93). According to Darling-Hammond (2014), schools cannot raise student performance and close student academic achievement gaps until they begin to demonstrate improvement on closing existing teaching gaps.

Meeting the challenge.

The need for effective teacher preparation in mathematics best practices is essential to provide all students with equitable learning experiences.

> Shifting to a more balanced approach teaching, which places more emphasis on understanding subject matter, means that teachers must develop a detailed understanding of the subject they teach and the processes students use to learn these subjects. (Smith & Desimone, 2003, p. 119)

Our education system requires competent mathematics teachers that can effectively ". . . spread good practice, and to enhance equity for children . . ." (Darling-Hammond, 2006, p. 312). It is the teacher's responsibility throughout the day to provide students with the needed time to observe and wonder that can further encourage them to be independent decision makers (McVarish, 2008, p. 8). Teachers must empower all students to engage in the learning process by allowing them the " . . . opportunity for establishing cross connections between the subject matter of the lesson and the wider and more direct experiences of everyday life" (Dewey, 1916, p. 84).

Research indicates that administrators in schools must assist their teachers in addressing obtaining adequate teacher preparation that will afford students the opportunity to be equipped with the needed foundational mathematical skills and knowledge to be successful.

> In this changing world, those who understand and can do mathematics will have significantly enhanced opportunities and options for shaping their futures. Mathematical competence opens doors to productive futures…. All students should have the opportunity and the support necessary to learn significant mathematics with depth and understanding. There is no conflict between equity and excellence. . . (NCTM, 2017, p. 1)

Hargreaves and Fullan (2012) affirmed that districts and schools that have made a commitment to collaboration and sustained inquiry have accomplished student success. Improving teaching requires that leaders improve collaborative cultures within their schools and invest in the development of their teachers (pp. 44-45). Professionally

developing teachers to understand new curricular standards is not a choice and instead it is a responsibility that must transpire into students effectively understanding mathematics content, and "Public schools are where it is all supposed to start . . ." (Hochschild & Scovronick, 2003, p. 1). Hargreaves and Fullan (2012) declared "We must invest in developing teachers' capabilities and give them time to sharpen these capabilities to a high standard" (p. 45).

Summary

The literature review provided information about the historical context of federal education mandates that enacted standards and accountability beginning with *No Child Left Behind* in schools to further efforts of addressing the achievement gaps of students in academic content areas. The literature also described the underpinnings of a new mathematics curriculum adoption in the state of Texas as a backdrop to the challenges that both administrators and teachers must overcome to ensure that they are adequately preparing their students for the first formal administration of STAAR in May 2016.

The literature review began with an overview of federal mandates and accountability in education with NCLB legislation that has now been replaced with ESSA. I then moved into the rise of standards and accountability which resulted in STAAR and curriculum standards being aligned to a state test, mathematics content knowledge and reliance of textbooks of teachers was addressed as well as the challenges of professional development within schools. I concluded the literature review with teacher best practices that addressed closing the academic achievement gap in elementary mathematic classrooms.

The literature review as outlined addressed the challenges in curricular changes in education and justified the appropriateness and significance of this study. In the chapter that follows, the research design and methodology are explicated.

CHAPTER III

Methodology

Introduction

The purpose of this mixed methods study was to examine the challenges and underpinnings of curricular changes that Texas administrators and teachers are having to overcome with the adoption and implementation of the new mathematics TEKS in Title 1 schools in Texas as described in the previous chapters. This chapter outlines the mixed methods research employed to conduct this study. This chapter is organized by: (a) an overview, (b) research design, (c) the participants and landscape of the portraiture, (d) the role of the portraitist, (e) instrumentation, (f) data collection/preparing the portrait, and (g) data analysis.

Overview

Professional development of teachers is a critical component that directly impacts student academic achievement. Being an effective mathematics teacher includes being able to adapt instruction to support a diverse group of learners by developing ". . . knowledge, dispositions, and practices . . ." that will help shape students mathematical thinking (Turner, Drake, McDuffie, Aguirre, Bartell, & Foote, 2011). Professional development offered in schools to teachers is crucial and helps students gain a better

understanding of subject matter that transpires into academic student success. The study sought to examine professional development offerings within Title 1 schools.

Supportive learning communities in schools can also result in positive student outcomes. Professional learning communities in schools consist of trust, collaboration, and effectiveness that includes reviewing the academic achievement of students utilizing data from school assessments and responding to the needs of students through targeted instruction and intervention that can increase student academic success (Hallman et. al., 2015). Additionally, the study also sought to examine how learning communities are addressing the training needs of Title I schools.

As school districts transition into meeting the challenges of new curricular changes, resources such as textbooks are also essential to teachers in preparing their lessons. Education reform efforts have encompassed teacher's resources to include student activities that enable the learners to use reasoning, have opportunities to share and discuss methods to solve mathematical problems and understand the process involved (Remillard, 2000). The study also sought to describe the changes in teacher pedagogical practices.

This chapter provides an overview of the methodology that was utilized in conducting this study to describe and examine the challenges of administrators and teachers resulting from mathematics curricular changes in Title 1 schools in Texas.

By using a convergent parallel mixed methods design, data were collected separately and independently, quantitative and qualitative data were analyzed separately, and the two sets of data were merged at the end of the study. The purpose in using the

convergent parallel mixed methods research design is that this design allows the researcher to develop a more in-depth understanding of the phenomena by being able to compare multiple levels within a system (Creswell & Plano Clark, 2011).

To guide this study, the following research questions are asked:

1. How do teachers in Title 1 schools perceive professional development opportunities of the new mathematics TEKS?
2. How is professional development of the new mathematics TEKS being offered by administrators in Title 1 schools?
3. How are professional learning communities in Title 1 schools addressing training of the new mathematics TEKS?
4. To what extent, if any has the implementation of the new mathematics TEKS impacted the pedagogical practices of teachers in Title 1 schools?

Research Design

Quantitative research is often utilized in testing objective theories by examining relationships of measurable variables with the use of instruments that can then be numbered, coded, and analyzed using statistics and appropriate procedures (Creswell, 2009). Philosophical foundations of quantitative research are positioned around post-positivism to positivism (Baronov, 2012). Quantitative research consists of closed-ended questions that are grounded on predetermined categories, responses of participants are restricted to scales, and information using the method of numbers is collected (Creswell & Plano Clark, 2011).

Qualitative research examines questions with words and or descriptions. Qualitative research is used in exploring and gaining a more in depth understanding of the meaning as well as the individuals or groups that ascribe to a problem that exists in humanity, it can be examined with emerging questions that are collected in the settings of the participants, and the researcher has the responsibility to make interpretations of the collected data (Creswell, 2009). The philosophical foundations of qualitative research are positioned around constructivism. Qualitative research consists of open-ended questions that ask the "what" or the "how" to gain a greater understanding of the phenomenon and a participant can provide information to the question without being restricted (Creswell & Plano Clark, 2011).

Mixed methods research includes combining quantitative research and qualitative research because one type of research may not be sufficient to understand the problem. By offsetting the limitations of one type of method with the strengths of the other type of method can provide the researcher with a more complete and in depth understanding of the research problems (Creswell & Plano Clark, 2011). Furthermore, qualitative research helps us in understanding that ". . . Experience is the stories people live. People live stories, and in telling these stories, reaffirm them, modify them, and create new ones" (Clandenin & Connelly, 2000).

"Portraiture" will be used in the collection of the qualitative research design. Portraiture seeks to interpret the complexity of the social and cultural aspects of individuals through narratives that capture the internal tapestry.

> Portraitists seek to record and interpret the perspectives and experience of the people they are studying, documenting their voices, and their visions—their authority, knowledge, and wisdom. The drawing of the portrait is placed in social and cultural context and shaped through dialogue between the portraitist and the subject, each one negotiating the discourse and shaping the evolving image. The relationship between the two is rich with meaning and resonance and becomes the arena for navigating the empirical, aesthetic, and ethical dimensions of authentic and compelling narrative. (Lawerence-Lightfoot & Davis, 1997, p. xv)

Portraiture seeks to bridge artistic expression and human experiences to capture the *true self.*

The research design proposed for this study is the convergent parallel design noted by Creswell and Plano Clark (2011). A visual model of the convergent parallel research design is illustrated in Figure 1. The convergent parallel design is used when the researcher wants to triangulate the quantitative and qualitative methods through the form of comparing statistical results with qualitative findings and data is collected concurrent but separate, and upon merging the results the researcher will relate each of the research methods to produce a complete understanding of the research questions being asked (Creswell & Plano Clark, 2011).

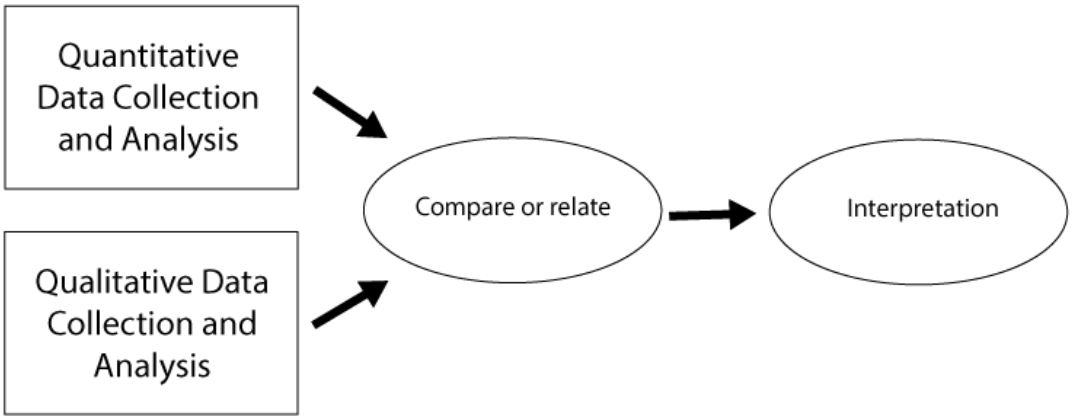

Figure 1. Mixed Methods Convergent Parallel Design (Source: J. W. Creswell and V. L. Plano Clark Creswell, 2011, *Designing and Conducting Mixed Methods Research,* p. 69).

The implementation of a convergent parallel design consists of four steps and procedures as noted by Creswell and Plano Clark (2011), the procedures proposed in this design to be employed were as follows: (1) independent collection of both quantitative and qualitative data strands are collected concurrently and distinctly; (2) the two data strands are analyzed independently of each other and treated with equal value in the research; (3) once the two data strands (quantitative and qualitative) are collected, the strands will be compared; and (4) mixing of the two strands will be employed during the final phase in which the results of each of the strands will be combined and interpreted in an effort to create a greater understanding of the overarching purpose of the research that will be synthesized in the discussion.

Participants and Landscape of the Portraiture

Participants in this study included principals and mathematics teachers in grades three and four at five of the six initially proposed Title I elementary schools selected from

a 2015 campus comparison group generated from TEA. The study proposed to initially use six Title I schools, but at the conclusion of the study only utilized five. Schools utilized in the study are all located in three different school districts across Texas and are representative of north, east, and southeast Texas regions (see Table 1). The sixth school was located in east Texas and was a part of Sunrise Independent School District and although the district provided permission to access the school, the principal was unresponsive to numerous requests made. There were twenty-five school districts on the campus comparison report for the forty schools in the group, fifteen school districts were asked for permission to conduct the study at their sites. Of the districts contacted, only four school districts agreed to provide their schools with permission to participate. As school districts declined to participate in the study, the researcher continued to move down the campus comparison group and request permission until six schools were obtained for the study.

In addition to IRB permission, the researcher also had to complete online superintendent district permission forms at three of the four districts. Additionally, one of the three school districts was also followed up with a district meeting to present the study. Student test score data for each of the schools was retrieved from Texas Academic Performance Reports (TAPR's) from TEA. The landscape of the portrait comprises of five Title 1 diverse campuses that had an average population of 743 students with ninety-one percent declared socioeconomically disadvantaged in 2015. Since 2015, all school numbers have however shifted and this school year, one of the five campuses utilized in

the study, Eisenhower Elementary, has also been restructured to service only grades 1-5. The school also has a current student population of approximately 400 students.

To protect the schools as well as the participants' anonymity, pseudonyms will be used in the study. The schools will be referred to as Apple Elementary, Bandera Elementary, Cortez Elementary, Delarosa Elementary, and Eisenhower Elementary. Additionally, school districts, principals, and teachers will each also be given a name as their pseudonym that will be used throughout the study. All five schools studied met standards and accountability for the 2016-2017 academic school year based on the Texas TAPR. Delarosa Elementary had the highest number of distinctions, having received a total of five (see Table 2). Delarosa Elementary also had the highest percentage of students passing mathematics STAAR in third grade with 87%. Additionally, Cortez Elementary and Delarosa Elementary also had the highest percentage of students passing in fourth grade, with each school having a passing percentage of 83% (see Table 3).

Table 1

Study School Districts and Sites

District Pseudonym	School Pseudonym	Grade Span	Number of Students
Valley Independent School District	Apple Elementary	EE-05	738
Hill Independent School District	Bandera Elementary	EE-05	775
Rock Independent School District	Cortez Elementary	PK-05	707
Rock Independent School District	Delarosa Elementary	EE-05	791
Sunrise Independent School District	Eisenhower Elementary	EE- 05	638

Table 2

2016-2017 TEA Standards and Accountability for Study Sites

School Pseudonym	% Econ Disadv	% ELL	Mobility Rate	State Accountability Rating	Number of Distinctions
Apple Elementary	91.2	41.9	18.0	Met Standard	1
Bandera Elementary	96.9	46.1	11.1	Met Standard	0
Cortez Elementary	88.0	41.3	10.4	Met Standard	1
Delarosa Elementary	85.8	44.9	8.2	Met Standard	5
Eisenhower Elementary	94.5	50.6	29.4	Met Standard	0

Table 3

2016-2017 3rd and 4th Grade STAAR Mathematics at Approaching or Above

School Pseudonym	Grade Level	Campus	District	State
Apple Elementary	3rd Grade	64%	65%	78%
Apple Elementary	4th Grade	72%	58%	76%
Bandera Elementary	3rd Grade	62%	60%	78%
Bandera Elementary	4th Grade	70%	57%	76%
Cortez Elementary	3rd Grade	76%	80%	78%
Cortez Elementary	4th Grade	83%	79%	76%
Delarosa Elementary	3rd Grade	87%	80%	78%
Delarosa Elementary	4th Grade	83%	79%	76%
Eisenhower Elementary	3rd Grade	72%	84%	78%
Eisenhower Elementary	4th Grade	63%	72%	76%

Sampling design.

Mixed methods research includes the collection of both quantitative strands and qualitative strands (Creswell & Plano Clark, 2011). In a convergent parallel design, important data collection decisions must be made regarding who will be utilized in the research as well as the format of the data collection for each of the strands (2011).

As noted by Collins and Onwuegbuzie (in press),

> . . . sampling designs comprise two major components: the sampling scheme and the sample size. The sampling scheme denotes the explicit strategies used to select units (e.g., people, groups, settings, and events), whereas the sample size indicates the number of units selected for the study. In mixed methods studies, the researcher must make sampling scheme and sample size considerations for both the qualitative and quantitative phases of the study. Thus, mixed methods sampling designs represent the framework within which the sampling occurs, including the number and types of sampling schemes, as well as the sample size. (as cited in Collins, Onwuegbuzie, & Jiao, 2007, p. 271)

Collins, Onwuegbuzie, and Jiao (2007) explained analytical and statistical generalizations can yield "interpretive consistency" when appropriate designs are used in mixed methods research as illustrated in Figure 2.

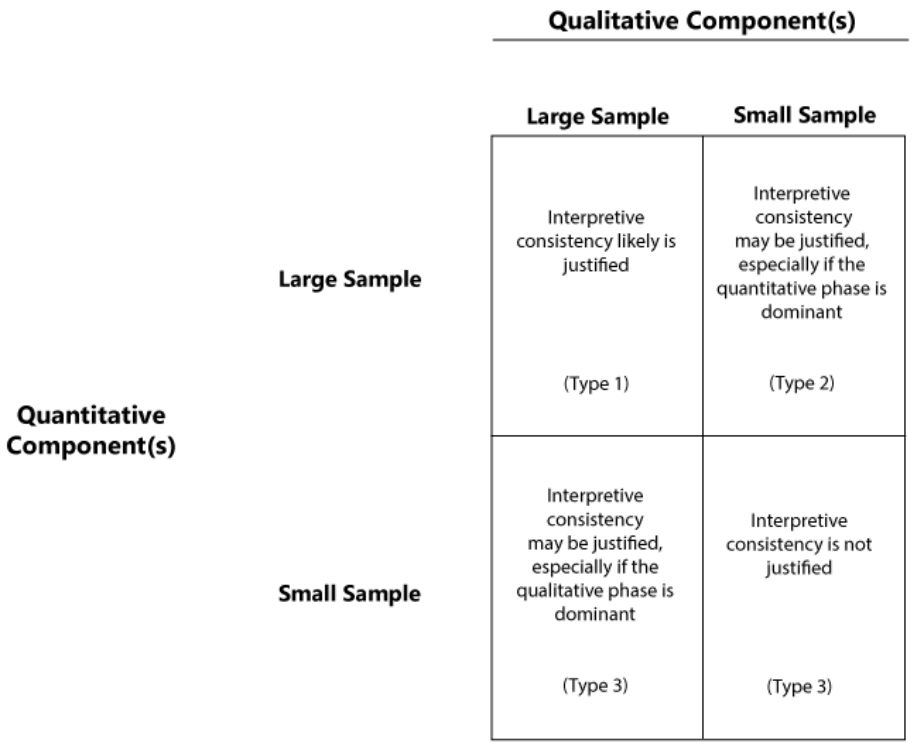

Figure 2. Two-dimensional matrix indicating sampling designs that can yield statistical generalizations that are interpretive consistent (Source: Collins, Onwuegbuzie, & Jiao, 2007, *Journal of Mixed Methods Research,* p. 276).

The phrase interpretive consistency is defined as ". . . the consistency between the inferences made by the researcher(s) and the sampling design (e.g., sampling scheme, sample size) used" (Collins, Onwuegbuzie, & Jiao, 2007, p. 273). Sampling designs include: the time orientation of both the qualitative and quantitative components being either sequential or concurrent; the relationship of the samples being identical, parallel, nested, or multilevel; and sampling schemes along with sample size strategies used in

each of the qualitative and quantitative phases in selecting the unit (Collins, Onwuegbuzie, & Jiao, 2007, p. 276).

Employing the framework of Collins, Onwuegbuzie, and Jioa (2007) the time orientation sampling design of this research study was concurrent while the relationship of the samples were also nested, as illustrated in Figure 3. "A nested relationship implies that the sample members selected for one component of the inquiry represent a subset of those participants chosen for the other phase of the study" (Collins, Onwuegbuzie, & Jiao, 2007, pp. 276-277).

The quantitative homogeneous sample consisted of a questionnaire completed by (n = 33) third and fourth grade teachers at five Title I elementary schools. Additionally, the qualitative homogeneous sample also consisted of the following: administrator interviews (n = 5), teacher interviews (n = 15), focus groups (n = 7), professional learning community observations (n = 7), and mathematics teacher observations (n = 15) all directly nested from the quantitative sample that included both administrators (principals) and teachers from all five of the schools.

In the qualitative phase, the following ranges of data collection were used for each of the five schools: two-three mathematics classroom observations, one-two professional learning community observations, one-two focus groups, two-four teacher interviews, and one administrative interview. The only criteria utilized for teachers in the sample were that they had to be third or fourth grade mathematics teachers. Interviewed teacher participants were random, but nested within the sample as teachers self-selected themselves to complete the interview process. The criteria utilized for administrators

were that they be either a principal or an assistant principal of the school. All five principals at each of the schools self-selected to complete the interview.

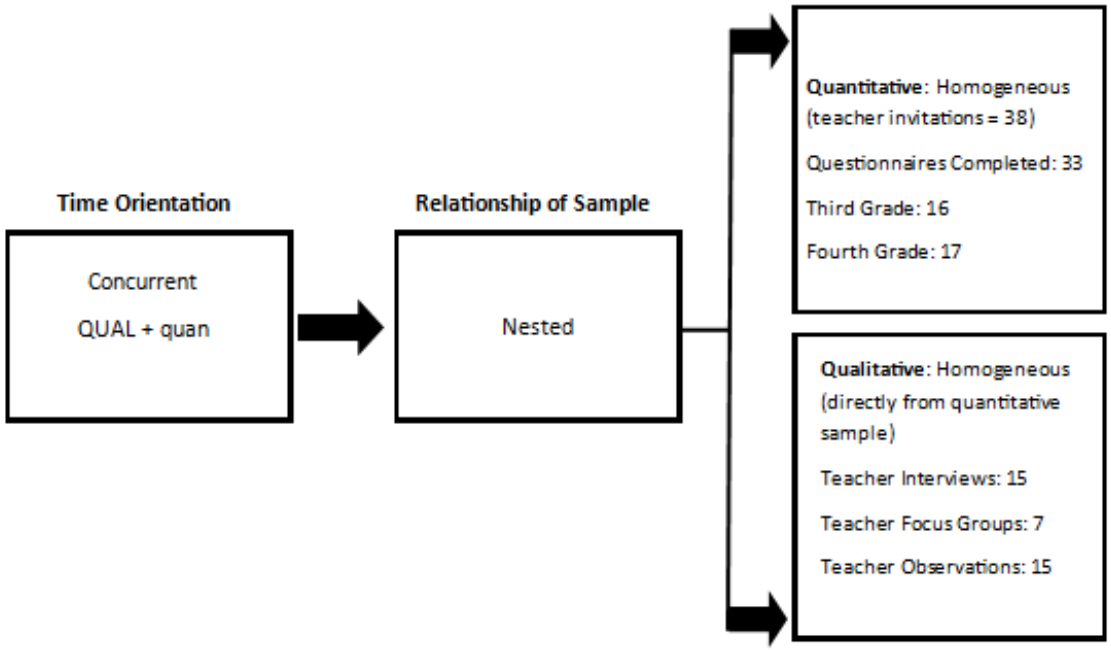

Figure 3. Mixed methods sampling model (Source: Collins, Onwuegbuzie, & Jiao, 2007, *Journal of Mixed Methods Research*, p. 276).

The Role of the Portraitist

A portraitist must have the ability to use a moral and ethical lens in the collection of data. Scholar–practitioners are leaders that must make many decisions in the research process, these decisions are guided by reasoning and moral principles because every decision they make regarding the collection, analysis, interpretation, and presentation of data has moral dimensions (Rallis & Rossman, 2012, p. 61). As a portraitist and a moral practitioner, there were moments encountered throughout the research process that required reflexivity and informed action.

> To learn from experience is to make a backward and forward connection between what we do to things and what we enjoy or suffer from things in consequence. Under such conditions, doing becomes a trying; an experiment with the world to find out what it is like; the undergoing becomes instruction- discovery of the connection of things. (Dewey, 1916, p. 140)

As a practitioner and researcher one must engage in a systematic inquiry process during the research design as one continuously makes decisions about data collection and demonstrates a willingness to critique both the community of practice and that of scholars (Rallis & Rossman, 2012, p. 62).

> It is a collaboration between researcher and participants, over time, in a place or series of places, and in social interaction with milieus. An enquirer enters the matrix in the midst and progresses in the same spirit, concluding the inquiry still in the midst of living and telling, reliving and retelling, the stories of the experiences that make up people's lives, both individual and social. (Clandinin & Connelly, 2000, p. 20)

As researchers, our philosophical assumptions are often guided by our beliefs. Blaikie (2000) asserted that as a researcher we will need to use a lens, take a stance towards the research process of our study, but also of our participants. Using the convergent parallel design Creswell and Plano Clark (2011) have suggested not to "mix" paradigms and instead work from an "umbrella" such as pragmatism that is "well suited for guiding the work of merging the two approaches into a larger understanding" (p. 78). The study sought to use the paradigm of pragmatism to address the multiple challenges

that administrators and teachers have experienced resulting from the new curricular standards.

> . . . Pragmatists decide what they want to research, guided by their personal value systems; that is, they study what they think is important to study. They then study the topic in a way that is congruent with their value system, including variables and units of analysis that they feel are the most appropriate for finding an answer to their research question. They also conduct their studies in anticipation of results that are congruent with their value system. (Tashakkori & Teddlie, 1998, pp. 26-27)

As researchers, we are ethical inquirers, which means we must ensure that we employ moral principles when conducting studies. We are decision makers and all the decisions that we engage in have moral dimensions (Rallis & Rossman, 2012). Focus groups conducted allowed the researcher to become both the observer and the researcher (Blaikie, 2000). By conducting focus groups, the researcher became more detached from her past experiences and instead allowed the participants to present their views and speak for themselves (Blaikie, 2000). Researchers must maintain the respect of their participants as well as the setting to prevent ethical issues from arising (Creswell, 2009, p. 89). National standards and a code of ethics must always be practiced during the research process.

Instrumentation

The study utilized a nested design that included the following sampling schemes: interviews, observations, focus groups, and questionnaires. All sampling schemes were

conducted and collected at all five of the Title I elementary schools. Additionally, as portraitists we seek to capture the true essence of the lived experiences of our participants.

Interviews.

A total of 5 administrator (principal) interviews were conducted, one administrator from each of the Title I elementary schools (see Appendix A) along with 15 third and fourth grade mathematics teachers (see Appendix B) to examine how professional development was being offered at Title I schools and how it is supporting mathematics teachers. Interviews were semi-structured with all administrative and teacher participants being asked the same questions in the same order with the researcher probing as needed (Morse & Niehaus, 2009, p. 130). The interviews also consisted of open-ended questions with the task of being able to ". . . build upon and explore . . . participant responses to those questions. The goal is to have the participant reconstruct his or her experiences . . ." (Seidman, 2006, p. 15).

The portraitist recorded the interview, asked questions of the participants to elicit a response, and took anecdotal notes throughout the interview while listening for "voice." Lawrence-Lightfoot and Davis (1997) explained that a portraitist that listens for voice seeks to understand movements and gestures of actors, they are attentive to moments of silence as it speaks about confusion or resistance, and they try to understand expression of range and sound (pp. 99-100).

Voice speaks about stance and perspective, revealing the place from which the portraitist observes and records the action, reflecting her angle of vision, allowing

her to perceive patterns and see the strange in the familiar. As the portraitist moves from thin to thick description, she uses the interpretive voice, which seeks meaning. (Lawrence-Lightfoot & Davis, 1997. p. 105)

Concluding the interview, the portraitist summarized the participant responses and ". . . ask for clarification if an answer is vague or to provide clarification if a question is not clear" (Tashakkori & Teddlie, 1998, p. 102). All interviews were transcribed and sent back to each individual participant for member checking and validity. Creswell and Miller (2000) explained that member checking consists of taking information back to the participants so that they can take part in the systematic process of confirming the narrative account. "With member checking, the validity procedure shifts from the researchers to participants in the study" (Creswell & Miller, 2000, p. 127).

Observations.

After initial interviews, third and fourth grade teachers from each of the five Title I schools were observed in seven professional learning communities planning collaboratively (see Appendix C). The portraitist also observed 15 teachers individually (see Appendix D) teaching mathematics content to their students. During the observations, the portraitist observed the behavior and interactions among teachers during scheduled professional learning communities.

> . . . an active participant in the interpersonal environment of the unit that is being observed. The main objective of the researcher is to measure/document the behaviors and interaction patterns as they occur in the "natural setting." (Tashakkori & Teddlie, 1998, p. 106)

Additionally, the portraitist also observed mathematics pedagogical practices implemented by individual teachers in third and fourth grade classrooms. Tashakkori and Teddlie (2003) declared natural settings are important because often participants do not always follow through with "what they say they do" (p. 312). Lawrence-Lightfoot and Davis (1997) explained portraitist in the field must try to capture all precise details of the ". . . physical setting; no detail is too small to warrant attention and record in the observational notes" (p. 45).

Focus groups.

Semi-structured, open-ended grade level focus group interviews were also conducted at all five Title I elementary schools. Marshall and Rossman (2010) stated that focus groups have many strengths that include being able to study participants in a relaxing atmosphere that is socially oriented (p. 149). Utilizing open-ended responses allowed participants the opportunity to explore questions freely relating to professional learning communities and training needs of the new mathematics curricular standards within Title I schools. Creswell (2014) alluded that the researcher will utilize an interview protocol (see Appendix E) that will be used in the recording of answers during the participant focus group interviews.

A total of one-two focus group interviews were conducted at each school, with a combined seven for all five schools. Focus groups consisted of individual and combined third and fourth grade level groups of teachers invited (see Appendix F) on each of the Title I elementary campuses. The portraitist also recorded and sought additional clarification concluding each of the focus groups with a final transcription of the

interview. Applying Krueger's (1994) model, interview questions serving distinct purposes were formulated for the focus groups that comprised of the following:

a) Opening Question: round robin question encourages all participants to actively answer and helps identify commonalities among the group.
b) Introductory Questions: Fosters communication by introducing the topic to participants and allows them to connect their responses to past experiences.
c) Transition Questions: These questions begin to drive the key questions of the study for all participants by having the scope broadened and additionally adding linking connections of their own personal views on the topic.
d) Key Questions: These are the questions that have the most substance, require great attention to detail, and help drive the study.
e) Ending Questions: These questions help participants self-reflect, self-assess, and help bring closure. Ending questions can consist of sharing final comments, a summary question, and a final question to sum up the focus group. (pp. 54-55)

Teacher questionnaire.

Third and fourth grade teachers at all five Title I elementary schools were invited to complete an online professional opportunities questionnaire (see Appendix G). Third and fourth grade teachers were emailed an invitation to complete the questionnaire. Only 33 of the 38 teacher participants emailed, completed the questionnaire (see Appendix H). Johnson and Christensen (2000) affirmed a questionnaire is a self-report data-collection that can provide ". . . information about the thoughts, feelings, attitudes, beliefs, values, perceptions, personality, and behavioral intentions of research participants" (p. 127). The

questionnaire by Shafer, Wagner, and Davis (1997) was adapted to align to the purpose of this study and permission was obtained (see Appendix I).

Data Collection

In the convergent parallel design, the two methods utilized were qualitative and quantitative research (QUAL + quan). In the design, the data was collected concurrently, however Creswell and Plano Clark (2011) indicated that researchers prioritize using variants where there is more priority on either quantitative and or qualitative in an effort to address the study's purpose (p. 180). The methodology applied in this study was based on the framework of pragmatism which is focused on "the research problem and allows multiple methods to address research problems" (Creswell & Plano Clark, 2007, p. 173). Creswell (2009) declared ". . . pragmatism opens the door to multiple methods, different worldviews, and different assumptions, as well as different forms of data collection and analysis" (p. 11).

The study collected two forms of quantitative data, teacher professional development opportunities offered in Title I schools through a professional learning opportunities questionnaire and individual school STAAR mathematics assessment data. The questionnaire that was utilized in the study was developed by Shafer et al. at the University of Wisconsin—Madison and supported by the National Science Foundation in 1997. The questionnaire was used in the study: "Longitudinal /Cross-sectional Study of the Impact of *Mathematics in Context* on Student Performance." Fifty-three teacher participants from a total of four urban school districts in grades 5, 6, and 7 participated in the study for a duration of three years. Data in the study consisted of the following:

teacher interviews, principal interviews, teacher school context questionnaire, and a teacher professional opportunities questionnaire. Data items on the questionnaire were analyzed by the creation of indices that were later analyzed and compared.

Walker (2016) also used the questionnaire in his multiple-case study design dissertation that included four teacher participants. Each of the participants took the questionnaire a total number of three times during the academic school year to gather baseline data. Data for all three of the questionnaires were analyzed for consistency and variance and was then triangulated with teacher interviews and teacher observations.

The mixed methods study obtained Institutional Review Board (IRB) approval of the methodology and all instruments used in the study. Formal consent were obtained from all respective school districts superintendents and/or personnel (see Appendix J), from individual school principals (see Appendix K), and from individual teachers (see Appendix L) that selected to participate in the study. Informed consent copies were provided to each participant before the study. Participants were assured complete confidentiality and informed that their participation was completely voluntary. Participants were also informed that as a participant they have the option to withdraw from the study at any point in time.

Qualitative data collection.

To answer the first, second, third, and fourth research questions, the study focused on examining professional development at Title 1 schools. Data was collected between the months of October 2017-February 2018. Qualitative data included administrative and teacher interviews (see Table 4). Teachers self-selected to complete the interview.

Mathematics classroom and professional learning communities observations (see Table 5), were also conducted. Teachers were observed teaching mathematics and participating in professional learning communities. Additionally, focus groups at all five Title I schools (see Table 6) were also conducted where teachers were invited and self-selected to attend and participate.

Administrators at each of the Title I schools that agreed to participate were interviewed for approximately 45-60 minutes at a time convenient for them in a quiet setting, additionally teacher interviews followed the same format. Third and fourth grade mathematics professional learning communities were observed. Teachers were observed in their professional capacity of teaching mathematics to their students for 50 minutes. Focus groups were conducted with third and fourth grade teachers for approximately 45-60 minutes. Focus groups took place at a convenient time both during teacher contracted planning times and after school in a quiet and comfortable setting. Settings for the thr focus groups were either in the school library or a teacher's classroom.

All interview sessions had formal introductions and/or protocols with administrators and teachers being informed that all interviews and focus groups would be: recorded and transcribed with a copy of the interview transcription being provided to the participants at which time they could request that changes and or deletions be made, they were also assured of their anonymity, and informed that they could withdraw their participation of the study at any time.

Table 4

Administrator and Teacher Interviews

Administrator Interviews	Total Number
Principal	5
Assistant Principal	0
Total Administrator Interviews	**5**

Teacher Interviews	Total Number
3rd Grade Teachers	7
4th Grade Teachers	8
Total Teacher Interviews	**15**

Table 5

Mathematics and PLC Observations

Mathematics Classroom Observations	Total Number
3rd Grade	8
4th Grade	7
Total Classroom Observations	**15**

Professional Learning Communities Observations	Total Number
Apple Elementary	1
Bandera Elementary	2
Cortez Elementary	1
Delarosa Elementary	2
Eisenhower Elementary	1

Total PLC Observations	**7**

Table 6

Focus Group Participation

Focus Group Participation	Total Number
Apple Elementary	1
Bandera Elementary	1
Cortez Elementary	2
Delarosa Elementary	2
Eisenhower Elementary	1
Total Participation	**7**

Focus Group By Grade Levels	Total Number
3rd Grade	15
4th Grade	11
Total Participants	**26**

Quantitative data collection.

To answer the first question proposed in the study, teachers were asked to complete a professional opportunities questionnaire through an emailed invitation (see Table 7). The link provided teachers with an introduction to the purpose of the study, the benefits, and instructions. Teachers were provided a two-week window to complete the questionnaire. Two days prior to the window closing, an automatic computer generated email was sent to all participants that had not completed the questionnaire.

Table 7

Online Teacher Questionnaire Participation

Questionnaire Submissions	Total Number
Completed (no missing Information)	33
Incomplete (missing information)	0
Total	**33**

Submissions by School	Total Number
Apple Elementary	5
Bandera Elementary	8
Cortez Elementary	7
Delarosa Elementary	13
Eisenhower Elementary	1
Total	**33**

Submissions by Grade Level	Total Number
3rd Grade	16
4th Grade	17
Total	**33**

Data Analysis

Data analysis for both quantitative and qualitative research required the researcher to employ similar steps in both strands: the data must be prepared for analysis, the data must be explored, the data must be analyzed, the data must be represented, the results must be interpreted, and both the data and the results must be validated (Creswell &

Plano Clark, 2011). "In the convergent design, after collecting both quantitative and qualitative data concurrently, the researcher analyzes the information separately and then merges the two databases" (Creswell & Plano Clark, 2011, p. 221).

An analysis must therefore be conducted when merging two research data strands to determine how the strands will be compared and utilized in answering the mixed methods research questions. Creswell (2014) stated that the merging of both quantitative and qualitative is the challenge due to the multiple ways that data can be merged. The data will be merged utilizing the four distinct ways that Creswell (2014) has mentioned can be used to merge:

1. A side-by-side comparison where the researcher will report the quantitative findings and then the qualitative findings.
2. A side-by-side approach where the researcher begins with the qualitative to findings and will make a detailed comparison to the findings and discuss the comparisons.
3. Data transformation where the researcher will take the emerging themes or codes of the qualitative data and quantify them by creating a scoring rubric that will allow for quantitative measures to be formulated.
4. Joint display of both the quantitative and qualitative data to visually see the merging of the two methods. Tables and graphs may be used by the researcher to represent the process.

Qualitative data analysis.

Following the collection of qualitative data, all interviews, focus groups, and observations were transcribed into text and prepared for a computer program. The researcher explored the data first by reading all interview transcripts to identify words or phrases and began the coding process. A second reading was conducted by the researcher to identify patterns and categories that linked and helped generate theme descriptions according to the researcher questions. The researcher then imported text data into the computer software program, NVivo 11 to analyze the data further and examine possible relationships using nodes within the program.

> Qualitative computer software programs can store text documents for analysis; enable the researcher to block and label text segments with codes so that they can be easily retrieved; organize codes into a visual, making it possible to diagram and see the relationship among them; and search for segments of texts that contain multiple codes. (Creswell & Plano Clark, 2011, p. 208)

The data were represented with discussions, visual models, figures, and tables using Excel. The emerging themes were interpreted and compared to the literature (Creswell & Plano, 2011, p. 205). As the qualitative data were further analyzed, the portraitist searched for illuminating patterns and themes ". . . to bring interpretive insight, analytic scrutiny, and aesthetic order to the collection of data. . ." (Lawrence-Lightfoot & Davis, 1997, p. 185). Once themes were identified from the multiple layers of interviews, observations, and focus groups, the researcher utilized triangulation to look for methods to converge the different data points (Lawrence-Lightfoot & Davis, 1997, p.

204). Subsequently, when patterns are scattered and do not emerge in triangulation, the researcher must also be able to discern them through interpretive reflection (Lawrence-Lightfoot & Davis, 1997, pp. 210-214).

Interviews, observations, and focus groups were analyzed using Creswell's (2009) six steps of analysis that included the following:

1. Organize, transcribe, and prepare all qualitative data for analysis.
2. Reflect, read, and identify the voice of all the data to formulate meaning.
3. Begin labeling and categorizing data using codes. Look for anticipated and unanticipated results by developing a qualitative codebook.
4. Use the coding process to generate setting and theme descriptions. Import and export data.
5. Develop a chronological order to convey the narrative making connections to themes.
6. Bring meaning to the qualitative data through interpretation. (pp. 185-189)

Quantitative data analysis.

Teacher participant questionnaires were constructed using Qualtrics, a research analysis system that was used to manage the questionnaire data. A quantitative analysis of the questionnaire was performed by the researcher to answer research question one and determine how professional development of the new mathematic TEKS is helping support teachers in Title I schools. Data analysis of the 12 items were explored and coded by the researcher to develop professional development indicators. All responses were then exported into Statistical Package for the Social Science version (SPSS)

software program. A frequency distribution breakdown on the number of occurrences and percentages of each of the questionnaire items was compiled. Statistical data from SPSS was used to interpret statements, figures, and tables of emerging themes in Excel. The results of the data were also interpreted and compared to the literature (Creswell & Plano, 2011, p. 205). Descriptive statistics in Excel were used for comparative effectiveness.

Validity and Reliability

Researchers must convey all appropriate steps used in their study to validate the accuracy and credibility of their findings (Creswell, 2009, 190). Mertens (1998) explained for research "to be useful, data collection instruments must be consistent" (p. 287). In qualitative data, validity strategies utilized will enhance the accuracy of the researcher's findings (Creswell, 2009, p. 191). Qualitative data was validated through the triangulation of interviews, observations, and focus groups. Qualitative data was also checked for accuracy using member checking. Lawrence- Lightfoot and Davis (1997) explained the aesthetic whole can only be achieved by the portraitist when a credible story is constructed in a logical and coherent sequence and is careful not to misrepresent the portrait that is being woven together in qualitative research (p. 246). Quantitative data will be checked and retested for comparisons. According to Creswell (2009), when using an existing survey, the researcher should establish validity and reliability through meaningful inferences to previous studies and furthermore the three forms of validity; content validity, concurrent validity, and construct validity (p. 149). Validity of the conclusions was therefore considered (Creswell & Plano, 2011, p. 205).

Trustworthiness

Trustworthiness was established and in congruence with Creswell and Plano (2011), the researcher employed ethical standards, used member checking, triangulation, and evidence. Additionally, also checked for accuracy and employed checking reliability. In the quantitative strand, the researcher used external ethical standards, checked the instrument use, and assessed the validity of the internal and external results (Creswell & Plano, 2011, p. 206).

1. Triangulation of data by establishing themes based on the multiple sources of data and or participant perspectives (Creswell, 2009, p. 191).
2. Member checking will also be employed to determine accuracy by requesting that another researcher check the validity of the polished product (Creswell, 2009, p. 191).
3. Creswell (2009) declared that the thicker the description, the more surreal the experience becomes (pp. 191-192). Lawrence-Lightfoot and Davis (1997) also explained ". . . portraitist will want to review portraits with an eye to the overall balance of descriptive details" (p. 271).
4. Lawrence-Lightfoot and Davis (1997) explained portraitists must be reflective of inclusion and exclusion of the relationship of the whole, with regards to their individual subjects and sites, and ultimately their overarching vision of the composition must encompass the "overall portrayal" (p. 281).
5. Clarify researcher bias through self-reflection of interpretive findings being shaped by their own personal background (Creswell, 2009, p. 192).

Summary

This chapter reviewed the problem and purpose for this study while providing the mixed methods methodological strategy for the research. A convergent parallel mixed methods design was utilized in this research study with the qualitative strand utilizing portraiture to collect the narratives of both teachers and administrators. The quantitative strand was utilized to quantify themes that emerged from teacher questionnaires to make side-by-side comparisons and afterwards jointly display all findings using descriptive statistics.

Johnson, Onwuegbuzie, and Turner (2007) declared mixed methods research " . . . should be used when the nexus of contingencies in a situation, in relation to one's research question(s), suggests that mixed methods research is likely to provide superior research findings and outcomes" (p. 129). The qualitative strand included interviews, observations, and focus groups that sought to determine the challenges that both administrators and teachers are facing with the newly adopted mathematic TEKS. The collection of participant questionnaires in the quantitative strand sought to enhance the study by revealing how professional development is supporting mathematics teachers in Title I schools. In the chapter that follows, findings of the research questions are interpreted and examined.

CHAPTER IV

Findings

Introduction

The purpose of this mixed methods study was to examine the challenges of new curricular changes that Texas administrators and teachers are having to overcome with the adoption and implementation of the new mathematics TEKS in Title 1 schools. Preparing teachers to teach mathematics through professional development opportunities is crucial to the success of both students and teachers. As new mathematics standards are released, teachers must be professionally developed to understand the pedagogy that encompasses teaching such rigorous standards, while still maintaining teacher quality.

The purpose of this study was achieved by using a mixed methods methodology that employed a convergent parallel design and included both qualitative and quantitative data. Additionally, portraiture was also used during the collection of qualitative data to interpret the complexity of the social and cultural aspects of schools and individuals through narratives that captured the internal tapestry and true essence of the lived experiences of the participants. This chapter presents the integration of mixed methodology, findings for both quantitative and qualitative data, a findings summary, teacher sketches, a description of the woven strands of leadership, and the educational

landscape for each of the five schools along with illuminating colorful themes applied to portraits at each of the five schools.

Mixed Methods Integration

Research question 1.

The first research question of the study was "How do teachers in Title I schools perceive professional development opportunities of the new mathematics TEKS?" To answer this question quantitatively, teachers were asked to complete an online professional opportunities questionnaire, with 33 teacher participants (see Table 8).

Table 8

3rd and 4th Grade Teacher Interviewed and Pseudonyms

Teacher Interviews and Pseudonyms	School	3rd Grade Teacher	4th Grade Teacher
Ms. Pearson	Apple Elementary	✓	
Ms. Jackson	Apple Elementary	✓	
Ms. Ryan	Apple Elementary		✓
Ms. Buck	Bandera Elementary	✓	
Ms. Mann	Bandera Elementary	✓	
Ms. Lamb	Bandera Elementary		✓
Ms. Wood	Bandera Elementary		✓
Ms. Newberg	Cortez Elementary	✓	
Ms. Brown	Cortez Elementary		✓
Ms. Thompson	Delarosa Elementary	✓	
Ms. Rodriguez	Delarosa Elementary	✓	
Ms. Contreras	Delarosa Elementary		✓
Ms. Johnson	Delarosa Elementary		✓
Ms. Delacruz	Eisenhower Elementary	✓	
Ms. Richards	Eisenhower Elementary		✓
	Total	**8**	**7**

To answer this question qualitatively, 15 teachers were also interviewed. A range of two to four teachers were interviewed at each of the five schools. Data were examined independently, followed by a side-by-side comparison of both sets of data.

Creswell and Plano Clark (2011) declared that mixed methods data analysis can be made using a side-by-side comparison for merged data analysis that display both the quantitative and qualitative findings together for both comparison effectiveness and for interpretation (pp. 223-232). Results from the teacher professional opportunities questionnaire were examined by individual school district first (see Appendix M). Results were then examined by individual mathematics grade level, both third and fourth grade independently (see Appendix N). Additionally, results of combined grade levels for grades three and four were also examined (see Appendix O).

The teacher professional opportunities questionnaire was sent to a total of 38 teachers in grades three and four that teach mathematics at each of the four school districts, but only 33 teachers selected to complete it with an 87% completion rate. The teacher questionnaire had twelve questions directly related to the teacher interview. The questions on the questionnaire included self-selected questions, 6-point ratings, Likert scale questions, and open-ended questions.

Data results from the quantitative data were directly compared to the qualitative data for both third and fourth grade mathematics; supporting statistical trends by qualitative themes (see Tables 9-10). Results from quantitative data derived from the teacher professional opportunities questionnaire were directly compared to qualitative data from teachers' interviews and supported through statistical themes (see Figure 4).

Table 9

3rd Grade Integration of Quantitative and Qualitative Data

Quantitative Levels of Teacher Professional Development	Qualitative Levels of Teacher Professional Development
Math Teaching Priorities	**Campus Priorities** ✓ collaboration ✓ vertical alignment teams ✓ teaching support ✓ district trainings and support
Standards and Accountability	**TEKS** ✓ STAAR Focus ✓ district and campus assessments
Professional Development Participation	**Teacher Development** ✓ district Training ✓ self-Teaching ✓ outside of the district **PD Training of Mathematics** ✓ district trainings ✓ self-teaching ✓ distinguishing the new vs the old TEKS **Math Curriculum Instructional Changes** ✓ rigor ✓ adjustment ✓ collaboration ✓ self-taught
Teacher Planning Time	**Resources** ✓ Pearson Envision/Motivational Math ✓ Technology ✓ Manipulatives
Mathematics Planning	**Teaching Time/Techniques** ✓ collaboration ✓ self-taught ✓ strategies/ideas
Collaborative Lesson Planning Time	**Additional Professional Development Comments**
Teaching Pedagogy	✓ PD trainings during the day ✓ Modeling ✓ technology training
Math Development Efforts	**Expectations**

Self-Reflection	✓ collaboration ✓ vertical Alignment ✓ teaching support ✓ district training

Table 10

4th Grade Integration of Quantitative and Qualitative Data

Quantitative Levels of Teacher Professional Development	Qualitative Levels of Teacher Professional Development
Math Teaching Priorities	**Campus Priorities** ✓ dissecting the TEKS ✓ district Level Training ✓ technology ✓ coaches to support math
Standards and Accountability	**TEKS** ✓ STAAR focus ✓ self-taught
Professional Development Participation	**Teacher Development** ✓ district training ✓ self-teaching ✓ trainings outside of the district **PD Training of Mathematics** ✓ district training ✓ dissecting the TEKS ✓ technology **Math Curriculum Instructional Changes** ✓ rigor ✓ self-taught ✓ problem solving strategies ✓ adjustment
Teacher Planning Time	**Resources** ✓ Pearson Envision/Motivational math ✓ technology ✓ manipulatives ✓ instructional support
Mathematics Planning	**Teaching Time/Techniques** ✓ collaboration ✓ self-taught ✓ need more trainings
Collaborative Lesson Planning Time	**Additional Professional Development**

	Comments
Teaching Pedagogy	✓ not enough PD ✓ more collaboration ✓ more resources
Math Development Efforts	**Expectations**
Self-Reflection	✓ resources and strategies ✓ collaboration ✓ vertical alignment ✓ TEKS consistency

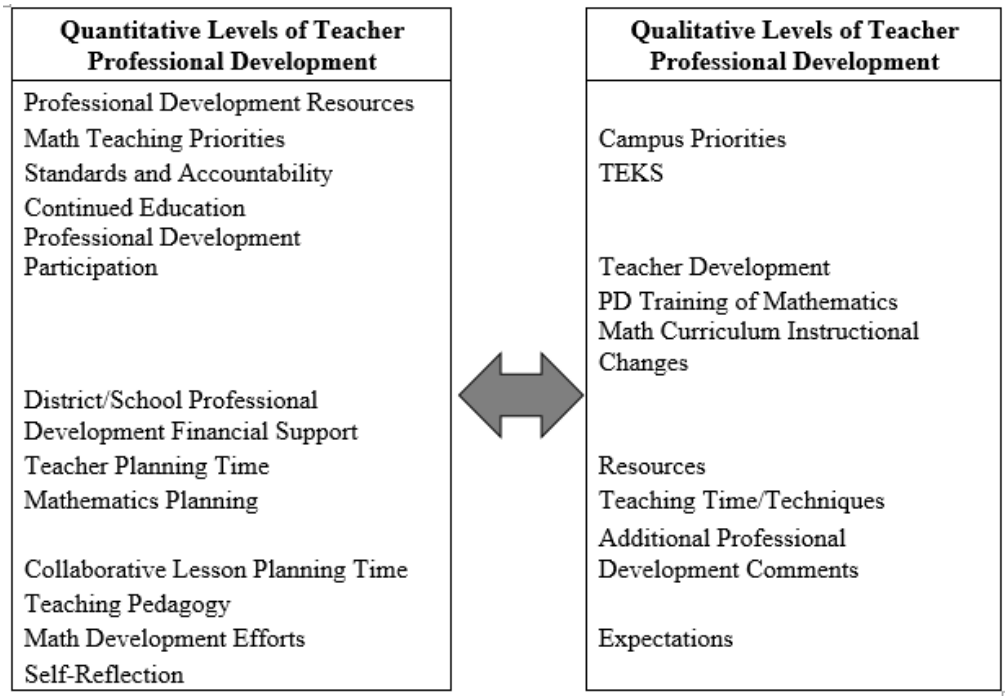

Figure 4: Mixed methods integration of quantitative and qualitative data.

Teacher sketches.

A total of fifteen third and fourth grade teachers were interviewed. Teachers varied in experince levels, perceptions, and teaching styles. Based on the district, some teachers recieved more professional development training than others. A commonality

that was shared among all teachers was that they all desired to be professionally developed to enhance their teaching practice.

Ms. Pearson. Ms. Pearson is a third grade teacher new to the profession and has only taught for three years, with all of her experience at Apple Elementary. As you walk into her classroom you will immediately notice the lighter shades of green and blue hues of color throughout. She has many student work samples covering her walls along with teacher-made anchor charts and manipulatives at her group tables. She explained to me how much of her teaching encompasses active student engagement, but that most of it was learned either during her preservice teaching or it was self-taught. She also explained to me how her campus really does not emphasize mathematics as a priority and that there is very little support for their teachers.

Ms. Jackson. Ms. Jackson is a third grade teacher that has been at Apple Elementary for two years, but had previous experience in another school district. As you enter her classroom you will immediately notice the colorful hues throughout and desks arranged into a horseshoe. During the interview, Ms. Jackson explained to me that at Apple there is not a great deal of support from administration and that "a lot of it is on your own." She also stated that she has a diverse group of students and she needs help with addressing each of their needs. She had stations and anchor charts set up around her room along with a classroom library. Furthermore, she went on to say that PLC's happen only once or twice a month and would really like to see more collaboration and for it to be more consistent.

Ms. Ryan. Ms. Ryan is a fourth grade teacher at Apple and has been teaching at the campus for three years, but has previous experience with another school district. Upon entering her classroom you will immeidately notice the brighter pink hues, her student desks arranged in groups, and all textbooks on cabinet shelves. Ms. Ryan expressed her frustration with the lack of professional development on the campus and how she is the only fourth grade teacher because the other fourth grade teacher is new to the profession and administration has designated her a support teacher that only has to go back and reinforce curriculum that Ms. Ryan has taught with stations. She explained how she teaches mathematics content in her classroom utilizing various textbooks and worksheets, while her colleague teacher reinforces the content through stations. She had a few anchor charts displayed and no student work samples that could be observed. The only student work samples observed were outside her classroom. She feels that because they are in a rural community, they probably do not have access to appropriate professional development. Furthermore, she explained how on her campus some of the teachers see sharing as a competition amongst themselves.

Ms. Buck. Ms. Buck is a third grade bilingual teacher and has six years teaching math all at Bandera Elementary. As you enter her classroom you will be astonished with the colorful green hues throughout her classroom, anchor charts on walls, student samples throughout, and a group style learning environment. She explained how at times her school tends to pioritize reading over math. She shared that she greatly values professional development having been an alternative certification teacher, but that the district does grealty support teachers within their school district. They have an

abundance of technology and often receive technology training to incorporate into math lessons. She also explained how the textbook adoption training is usually only held once within the school district and that happens during the summer.

Ms. Mann. Ms. Mann is a third grade veteran teacher that has been at Bandera for twenty-six years and all of her years teaching have been at the same school. She demonstrates a great deal of dedication and commitment to her students, her expectations are that profefssional development "meet the needs of our students." As you enter her classroom you will also notice the colorful hues with anchor charts on walls, student desks arranged in groups, community buckets on tables, and student samples throughout the perimeter of her classroom. She explained that they have weekly PLC's that help them because they are able to monitor the academic progress of their students. She also explained that attending these meetings provide all teachers with shared ideas and strategies to help address the gaps of their students.

Ms. Lamb. Ms. Lamb is a fourth grade bilingual teacher that has been at Bandera for three years, but has other previous district experience. Upon entering her classroom you will notice the bright color schemes throughout, anchor charts covering walls, student samples, desks arranged in groups, and manipulatives for stations. She indicated that she felt comfortable teaching mathematics having come from another school district, but says that at the campus level, the emphasis is really more directed at reading and writing. She explained that until now she has yet to receive formal training on Envision math, but did receive some at her previous school district. They have weekly PLC's and because they are self-contained, she would still like to see more collaboration for math.

Ms. Wood. Ms. Wood is a fourth grade teacher that is a new teacher and has only been teaching three years. As you enter her classroom you will notice the brighter colorful schemes throughout, desks arranged in groups, and anchor charts covering her walls. Being a new teacher, she explained that she needs help. She went on to explain that when she attends district trainings that they tend to focus on how to break down the TEKS and not the actual teaching of them, "they don't give us strategies on how to teach them." She explained that they are told to use Envision, but they can also supplement it with other resources. She stated that she used resources like "Teachers Pay Teachers" because in their PLC's they do not talk about where to access resources for mathematics units of instruction. As a new teacher she stated "I don't think math PD is helping."

Ms. Newberg. Ms. Newberg is a third grade bilingual teacher that has been teaching for four years all at Cortez Elementary. She explained to me that she is a product of the district, she attended school in the district, and she even worked as a paraprofessional at the school before becoming a teacher. As you enter her classroom, you will see illuminations of light as her walls are covered with anchor charts, student samples, maniuplatives, desks arranged in groups, and carpet that is over a decade old, however Ms. Newberg makes the best of it. Being a new teacher, she explained that she loves learning when PD is available. Being a new mom, she also stated that attending PD afterschool makes it difficult and would like to see more embedded during the actual contracted school day. She explained how her school district provided great intructional support, in addition to her campus doing the same by providing them with an

instructional coach. Additionally, she stated that the new standards are difficult to teach because she learned math using traditional methods and now they are very different.

Ms. Brown. Ms. Brown is a fourth grade bilingual teacher that has taught many grade levels at Cortez Elementary for the previous nine years. As you enter her classroom you will immediately notice white hues of color as many of her walls are bare, desks are arranged in groups, and she has a great deal of manipulatives on shelves. She explained to me that at the campus level PD is not present, but at the district level they have an abundance of trainings. She went on to explain how STAAR is a high priority and they tend to practice for it all the time and that the school does provide teachers with access to manipulatives needed for instruction. She explained how the new standards are much more rigorous and that some kids have the ability to understand them, but some simply do not. She hopes that at the campus level, more PD will be provided.

Ms. Thompson. Ms. Thompson is a third grade teacher and in her second year of teaching at Delarosa Elementary. As you enter her classroom you will notice colorful hues of student work samples, anchor charts covering older lockers in her classroom, desks arranged in groups, white older tiles covering her floors that represent the many generations of students that have walked the floors of the school, and manipulatives. She explained to me that although she is a new teacher, she has tremendous support from her team and her principal. She stated that math is a high priority, but the campus tends to do well because of all the shared collaboration that takes place. She feels that the campus and the district provide her with many PD opportunities that include sending her to make

and take classes. She expressed great gratitude about her colleagues that have assisted her in the transition to teaching.

Ms. Rodriguez. Ms. Rodriguez is a third grade teacher in her fifth year of teaching at Delarosa Elementary. Entering her classroom you will immediately notice the colored hues that include anchor charts covering her walls, student desks arranged in groups, student samples all along the walls, and manipulatives. She explained that they have tremendous support that include an instructional coach that provides them with the following: resources for lessons, textbook support as needed, differentiation strategies, and modeling of lessons when teachers need additional content support or simply do not understand. She also reiterated that math is a high priority and they are encouraged to embed it into other content areas. She explained that they attend district trainings, but also outside district trainings periodically.

Ms. Contreras. Ms. Contreras is in her third year of teaching and teaches fourth grade bilingual at Delarosa Elementary. When entering her classroom you will notice comfort and colorful hues as she has lamps to help minimize the amount of light distraction for her students, desks arranged as a horseshoe, manipulatives/buckets of community property placed on desks, anchor charts that cover her walls, and student work samples. She stated "I think we are very fortunate to work in a district that as a teacher we have a lot of leeway in the classroom, but once January comes, we focus a lot on strategies, on building the foundation of the TEKS for students that may not be getting them." She explained that they have PD and resources, but would like to see more outside of the district professional development trainings offered to all teachers.

Ms. Taylor. Ms. Taylor is in her 17th year of teaching and all of her experience has been at Delarosa. She has taught various grade levels and currently teaches fourth grade. When entering her classroom you will notice colorful hues as her walls are covered with anchor charts, student work samples, manipulatives throughout the room, desks arranged in groups, and buckets of community property. She explained that her campus is very math focused and data driven. She stated that they have monthly PD along with weekly PLC's. She also declared that they are still being trained on the new standards at the campus level. She expressed her content with district training and making everything available via the website for teachers.

Ms. Delacruz. Ms. Delacruz is also a veteran teacher that has been teaching for thirty years and twenty of the thirty years have been at Eisenhower Elementary. She currently teachces third grade and as you enter her classroom you will immediately notice colorful hues as walls are covered with anchor charts, commercial posters, desks are arranged in groups, manipulatives accessible to students, and textbooks remain on cabinets. She explained that PD helps them share ideas and that at the beginning of the year they had PLC's that were facilitated after school and really helped them get into the content, but now that they have lost their principal, PLC's are facilitated during the regular school day and there is not enough time. She also stated that on her campus she does not feel that they have been adequately trained on Envision and administration and district specialist emphasize that the textbook may not necessarily be the best tool to use and instead they should look at all available resources. As I spoke with her, I could not

help but notice that she mentioned how the district really wants them to stay in their lane and "not teach other things that we do not need to be teaching."

Ms. Richards. Ms. Richards has been teaching fourth grade for sixteen years also at Eisenhower Elementary. As you enter her classroom you will immediately notice the bright colored blue hues throughout as walls are covered with anchor charts, stations are set up with manipulatives, student samples are displayed, and buckets of community property are piled at the center of student desks that are also arranged in groups. She explained that on the campus the focus is STAAR and "you have to stay in your lane, you have to stick to the TEK, you have to make sure that everything is aligned to the TEKS." She explained that they have google documents that are shared and that the principal will always find PD that is geared towards STAAR standards. She did mention that she would like to see additional technology training on her campus.

Colorful themes.

Expectations. After asking third and fourth grade teachers what their expectations of mathematics professional development were, emerging themes included: collaboration, resources and strategies, vertical alignment teams, TEKS consistency, and district and training support (see Table 11).

Table 11

Mean Average of Expectations

Third Grade Expectations (n = 8)	**Frequency**
Collaboration	4
Vertical Alignment Teams	3
Teaching Support	4
District Training/Support	3
Total	14
M	**3.5**
SD	0.58
Fourth Grade Expectations (n=7)	
Resources/Strategies	6
Collaboration	4
Vertical Alignment Teams	2
TEKS Consistency	2
Total	14
M	**3.5**
SD	1.91

On the teacher questionnaire, questions eleven and twelve were used to compare teacher expectations. Third and fourth grade teachers stated that an average mean of 59% of teachers on their campus are involved in efforts to improve math. They characterized their level of support at 39% stating they had slight support and 55% stating they had strong support. Teachers expressed different professional development expectations. Third grade teachers valued collaboration and vertical alignment teams as their highest, juxtaposed to fourth grade teachers that valued resources/strategies and collaboration. Ms. Pearson explained, “I would like to see more strategies that will help students.” Ms.

Wood stated, “I would expect for us as a grade level to share because of our different experiences and backgrounds.”

Campus priorities. Teachers were then asked about how professional development priorities were established on their campus and they emphasized STAAR and the TEKS (see Table 12).

Table 12

Mean Averages of Campus Priorities

Third Grade Campus Priorities (n = 8)	**Frequency**
STAAR	6
Technology	3
No Priorities	3
Professional Learning Communities	2
Total	13
M	**3.5**
SD	1.73
Fourth Grade Campus Priorities (n=7)	
District Level Training	4
Dissecting the TEKS	3
Technology	3
Coaches Supporting Teachers	2
Total	13
M	**3**
SD	0.82

Teachers were asked on the teacher questionnaire question 2.a-d, to assess the number of times that they were allowed to visit another classroom, observe other teachers, receive feedback, and network with other teachers on a scale from 0-10+ times. A total number of 27% of teachers reported that they have never participated in any.

While 20% said they had the opoprtunity, but only once. A total of 16% reported to have participated two times. A total number of 86% of teachers had only particpated in any of the following four times or less.

When interviewed teachers emphasized that campuses had a range of priorities. Third grade teachers stated that STAAR and technology were a large emphasis. While fourth grade teachers stated that district level training and disecting the TEKS were of the highest importance. Ms. Garza stated that for STAAR, "Everything is data driven, they look at last years STAAR scores…and what we need to focus on." While both Ms. Pearson and Ms. Jackson stated that on their campus, math is a low priority. Ms. Brown stated that at the campus level they really do not have PD, but they do have them at the district level. Ms. Contreras also stated, "districtwide we have monthly math trainings."

TEKS. Teachers were also asked to what extent standards and accountabiity influence mathematics PD on their campuses and both grades three and four teachers agreed, STAAR was both the focus and the priority (see Table 13).

Table 13

Mean Averages of TEKS

Third Grade TEKS (n = 8)	**Frequency**
STAAR	6
District and Campus Assessments	3
Total	9
M	**4.5**
SD	2.12
Fourth Grade TEKS (n=7)	
STAAR	7
Self-Teaching	1

Total	8
M	**4**
SD	4.24

On the teacher questionaire, teachers were asked during the last year how often they participated in formal meetings of the new mathematics curriculum, teaching techniques, ideas for assessment, and evaluation of the math prorgam. Teachers were asked to answer by stating the number of times on a scale beginning with 0-10+ times. Teachers reported that 62% of them had only participated four times or less. Of those 17% reported that they had never had that opportunity and 8% having only participated once.

During the interview, teachers indicated that standards and accountability are driven by STAAR. Teachers also stated that they use their campus and district assessments to monitor their students, but also to drive their instruction. Ms. Johnson stated that her campus is "very data driven." Ms. Rodriguez declared, "We have to teach to the TEKS." Ms. Mann also explained, "It's pretty much what drives everything, that's what we are held accountable for." Additionally, Ms. Brown also explained how students are taught to practice, "We practice for STAAR so kids are really focused on double checking answers that are bubbled."

Professional development of mathematics. Teachers were later asked during the interview how the new standards have been addressed during professional development on their campuses and both grades three and four teachers stated standards are addressed through district training (see Table 14).

Table 14

Mean Average of Training of PD of Mathematics

Third Grade Professional Development of Mathematics (n = 8)	**Frequency**
District Training	5
Self-Teaching	3
Distinguishing new -vs- old	2
Modeling	1
Total	11
M	**3**
SD	1.71
Fourth Grade Professional Development of Mathematics (n=7)	
District Training	5
Offered Additional Instructional Support	3
Self-Teaching	1
No PD	1
Total	10
M	**3**
SD	1.91

Teacher questionnaire, question 5.b asked teachers if professional activities that they particpated in lead to changes in their teaching of mathematics. A total of 11% stated they strongly agreed, 64% stated they agreed, while 25% either disagreed or strongly disagreed. Teachers interviewed mostly stated that they received the training through the district. Ms. Delacruz stated, "mostly it was done through the district when they first rolled out, district professionals helped us and we were encouraged to particpate in outside training." Ms. Buck also professed, "I don't feel as though I have seen a lot of it recently." Ms. Contreras also explained that at her campus, "Resources have been updated, we have received test prep books, strategies on how to bridge the gap from the

old to the new." While Ms. Ryan stated, " I really feel that with professional development, they have not hit the new standards."

Resources and materials. Teachers were asked about how mathematics resources were being embedded into professional development. Teachers selected Pearson Envision and Motivational Math/Mentoring Minds as the top priority for both grade levels (see Table 15).

Table 15

Mean Average of Resources and Materials

Third Grade Resources and Materials (n = 8)	
Pearson Envision/Motivational Math	8
Manipulatives	4
Technology (lead4ard/iStation/TEKS Resource)	3
No Technology on Campus	3
Total	18
M	**5**
SD	2.38
Fourth Grade Resources and Materials (n=7)	
Pearson Envision/Motivational Math	5
Technology, but self-taught	3
Instructional Support	2
Manipulatives	1
Total	11
M	**3**
SD	1.71

Teachers were asked to evaluate formal and informal meetings or planning sessions with other math teachers, using a scale that included never, sometimes, frequently, and always. Question 10.a asked specifically about discussions that emphasized materials for instruction. A total of 27% of teachers indicated that they

sometimes have them, 42% indicated frequently, and 30% indicated that they always have discussions regarding instructional materials. Question 10.b asked about teaching materials and activity discussions with 30% indicating sometimes, 39% frequently, and 30% always.

Teachers were asked during the interview how mathematics resources are embedded into professional development and many stated Pearson Envision/Motivational Math and Technology. Ms. Rodriguez stated, "we receive textbook training." Ms. Buck explained, "When we implemented Envision two years ago, there was a lot of trainings at the beginning during the summer and school year, but I don't think we have gotten anything since." While Ms. Jackson declared, "I have never touched Envision, and in the storage room I found multiple CD's and I tried to teach myself how to use it." Ms. Ryan also professed, " We have Motivation Math…we have had them come and present, we have implemented the Dream Box . . . , but really the only PD we have ever had is just the webinars for Dream Box and the presenter." Ms. Pearson also explained, "They showed us how to use Lead4ward, TEKS Resource System, how to search the standards and quintiles, but that was it."

Teaching techniques. Teachers were asked how mathematics professional development was helping them inform their practice and both grade levels stated that through collaboration they are able to share and discuss ideas to enhance their teaching techniques (see Table 16).

Table 16

Mean Average of Teaching Techniques

Third Grade Teaching Techniques (n = 8)	
Collaboration	4
Self-Teaching	3
Strategies and Ideas	1
Total	8
M	**3**
SD	1.53
Fourth Grade Teaching Techniques (n=7)	
Collaboration	5
Need Additional Training	3
Self-Teaching	1
Total	9
M	**3**
SD	2

The teacher questionnaire asked teachers about the formal and informal meetings and planning sessions specifically to teaching techniques that included: assessment procedures, student groupings, lesson preparation, developing course goals and objectives, planning group events, sharing ideas, sharing stories, discussion literature recently read, and parent issues (see Figure 5). Teachers were asked to rate their experience levels with a 4-point scale beginning with never to always.

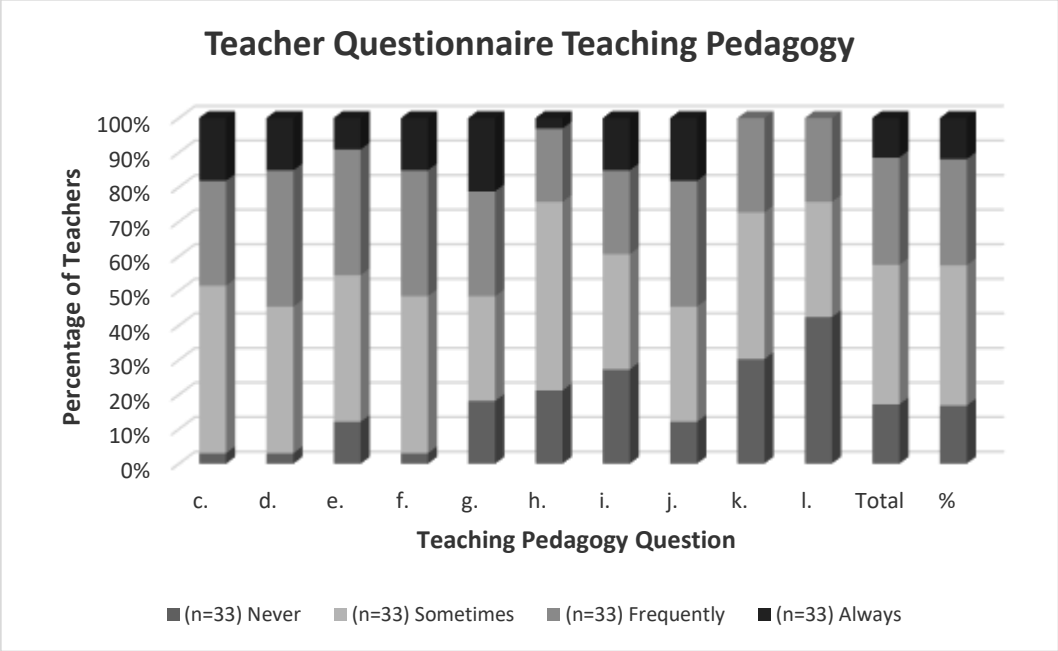

Figure 5. Teacher questionnaire teaching pedagogy by question and percentage of teachers that answered.

A total of 17% of teachers indicated that they have never had teaching pedagogy discussions, 41% indicated that they sometimes have them, with 31% stating they frequently have them, and 12% stating they always have them. During the interview teachers indicated that professional development helps them when they can share and collaborate. Ms. Mann explained, "It's helpful to to get experience from other teachers and see what worked." Ms. Ryan declared, "When I am able to collaborate with other teachers that have done other things, I am more successful." Ms. Johnson also stated, "A lot of times at PD, they will do things that I never thought about." Ms. Wood however stated, "I don't think math PD is helping, I wish as a teacher we had more opportunities."

Previous mathematics professional development. Teachers were also asked to reflect upon the previous two years of mathematics professional development, what

offering had been the most impactful. Teachers mentioned district level trainings as the highest for both grade levels (see Table 17).

Table 17

Mean Average of Previous Mathematics Professional Development

Third Grade Previous Math Professional Development (n = 8)	
District Level Training	4
Outside the District	3
Self-Teaching	1
Total	8
M	**3**
SD	1.53
Fourth Grade Previous Math Professional Development (n=7)	
District Level Training	3
Dissecting the TEKS	3
Technology	2
Total	8
M	**3**
SD	0.58

Teacher questionnaire 5.a asked teachers if they had participated in profesional development over the last 18 months and a total of 85% of the teachers responded with yes, they had participated. When asked during the interview what professional development was most impactful over the course of the last two years, teachers expressed different workshops and trainings that they had attended. Ms. Rodriguez mentioned attending a training outside the district, "The state of Texas and the district offered a math academy, it was really good because it broke down a lot of the TEKS and gave us many ideas." Ms. Newberg mentioned having the oportunity to attend a training by Kim Sutton

and being in complete amazement. Ms. Contreras mentioned attending "workshops in the district . . . ,one thing I do not like is that we do not have outside trainings." Ms. Lamb explained she attended a district training that showed her "a way to break down the TEKS using a concept map, you pull out the verbs."

Mathematics curriculum instructional changes. Teachers were asked how the implementation of the new Mathematics TEKS impacted their teaching practice (see Table 18).

Table 18

Mean Average of Mathematics Curriculum Instructional Changes

Third Grade Math Curriculum Instructional Changes (n = 8)	
Rigor	6
Adjustment	5
Collaboration	3
Self-Teaching	3
Total	17
M	**4**
SD	1.5
Fourth Grade Math Curriculum Instructional Changes (n=7)	
Rigor	5
Self-Teaching	4
Problem Solving Strategies Needed	1
Adjustment	1
Total	11
M	**3**
SD	2.06

Both grade level teachers explained that the rigor of the TEKS have increased, therefore they have had to change and or adjust their teaching (see Table 18).

Teacher questionnaire 5.cb asked teachers if professional development they had previously attended created changes that enhanced their students learning and led to changes in their mathematics teaching techniques. Teachers used a 4-point Likert scale that began with strongly disagree, to strongly agree. A total number of 21 teachers responded to this section and only 17% of the teachers disagreed or strongly disagreed, while 74% stated they agreed, and 9% stating they strongly agreed.

During the interview, teachers expressed how the rigor had led them to either adjust or have to self-teach to the new standards. Ms. Delacruz explained, "With the rigor that was added, it caused me to intentionally see what the TEK says." Ms. Contreras stated, "Many are a lot harder for students to grasp, but for the most part, I still teach based on my students' needs." Ms. Brown also declared, "I can see the difference from before and after, they are much harder." Ms. Ryan explained, "You really have to dig into those TEKS and find the holes, because then some things are not taught again for many years down the road. If they are not taught to mastery, it is lost."

Additional professional development teacher comments. Teachers were asked if there was anything else about professional development that they wanted to include and 50% of both third and fourth grade teachers emphasized, there is not enough professional development within their schools and or district. Ms. Rodriguez declared,

> I think professional development is necessary, especially if it is not a subject that you are strongest. It is a way to keep you updated on things that are changing, it is a way for you to collaborate with other teachers that may have ideas on how they are doing things, and it is a way to keep you abreast of the new things

coming out.

Ms. Jackson also explained, “I don’t know if it’s because we are a smaller town, a smaller district, that there is not as much available to us, but I feel we could really benefit from it as educators.” Ms. Contreras would like to have the opportunity to attend outside of the district training to broaden her scope. Ms. Wood professed, “I wish as a district and as a campus, more of it was provided to us.” Additionally, Ms. Ryan explained, “The standards are rigorous . . . more professional development.”

Summary of Mixed Methods Integration

The data findings from both quantitative (professional development teacher questionnaires) and qualitative (teacher professional development interview) were converged to answer the first research question. Questionnaire data were analyzed independently and by grade level that included third and fourth grade mathematics teachers. Questionnaire data was later compared to qualitative data through a side-by-side comparisons to help support both quantitative and qualitative themes (Creswell & Plano Clark, 2011).

The analysis of quantitative data provided an insight on teachers’ perception about the level of professional development being offered within their campuses and districts. A total of 94% of teachers indicated that they used the district framework or curriculum guide, while only 82% stated that they used the state framework. A total of 47% of teachers indicated that they either had never or only once visited or observed another teacher teaching mathematics. A total of 85% reported that they have participated in some form of professional development. Teachers also indicated that they

typically have an average of 44 minutes of planning time per instructional day. A total of 91% of teachers also reported they spend at least 15 minutes planning for lessons three times or less during the school week. Teachers also indicated both slight support and strong support to improve the mathematics program.

The analysis of qualitative data yielded emergent themes that provided insight about how teachers perceive professional development being offered on their campus (see Figure 6). Teacher sketches provided background information on teacher's level of experience, grade levels they teach, and the landscape of their classrooms. Qualitative data demonstrated that teachers greatly value collaboration among teams, but at the same time, they did not feel as though they were being provided enough professional development. Convergence and data provided further insight on how teachers perceive mathematics professional development.

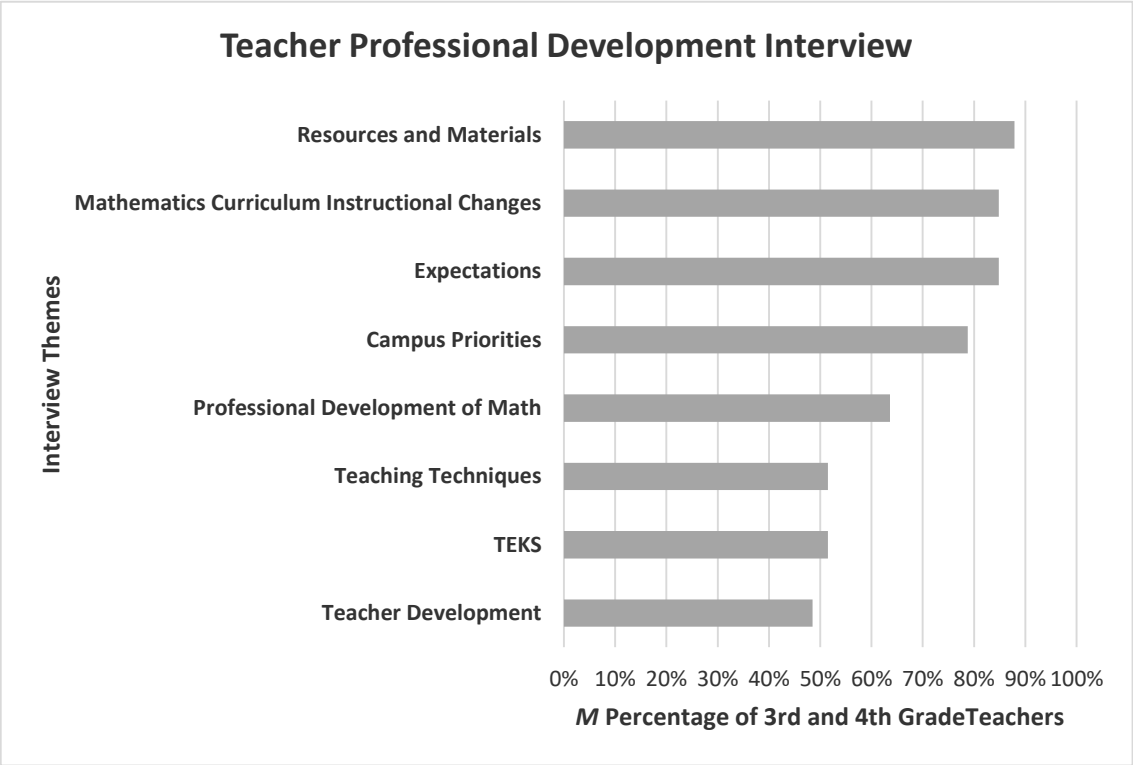

Figure 6: *Average Mean* Percentage of Emerging Themes (included the total number of subthemes within the category) from the Professional Development Opportunities Teachers Interview.

Qualitative Findings

Qualitative data included administrator interviews, teacher interviews, professional learning community observations, mathematics observations, and focus groups. All qualitative data was coded, examined, and presented in the following four sections. The first three sections address research questions two, three, and four. The final section addresses elements of the portrait by describing the educational landscape of the portrait and illuminating themes that helped shape the portrait to allow the researcher to construct an aesthetic whole.

> In developing the aesthetic whole, we come face to face with the tensions inherent in blending art and science, analysis and narrative, description and interpretation, structure and texture. We are reminded of the dual motivations guiding portraiture: to inform and inspire, to document and transform, to speak to the head and to the heart. (Lawrence-Lightfoot & Davis, 1997, p. 243)

Qualitative Research Question 2.

The second research question asked, "How is professional development of the new mathematics TEKS being offered by administrators in Title I schools?" When analyzing the data collected in this study, principal interviews yielded four prominent themes that included: (1) Supporting Teachers, (2) Providing Teachers with Training, Resources, and Materials, (3) TEKS Knowledge, (4) and Campus Involvement (see Table 19). Principals at all five Title I schools ranged in administrative experience beginning with this being their first year as a principal, to as many as sixteen years (see Table 20). As principals were interviewed, all five expressed a range of attitudes on how they were addressing the new mathematics TEKS and how they were professionally developing their teachers to meet the needs of their students. Principals demonstrated a strong emphasis on providing their teachers with adequate training, resources, and materials that support Texas TEKS.

Table 19

Administrative Interview Themes and Subthemes

Administrative Participants (Principals) (N=5)		
Theme	**N**	**Sub Theme Description**
Supporting Teachers	2	Teaching Strategies
	4	Coach/ Instructional Specialist
Training, Resources, and Materials	3	District Training
	5	Outside District Training
	3	Textbooks/Technology
	2	Manipulatives
TEKS Knowledge	2	Breaking Down the TEKS
	3	Analyzing STAAR Data
	3	Standards and Accountability
Campus Involvement	3	Power Walks
	2	Video Taping Teacher Lessons
	2	Empowering Teacher Leaders

Table 20

Title I Administrators

Administrator (Principal) Pseudonym	**School**	**Position**	**Years as an Administrator**	**Instructional Coach/Specialist for Math**
Mr. Avery	Apple Elementary	Principal	4	Specialist
Ms. Black	Bandera Elementary	Principal	1	Coach
Ms. Cavazos	Cortez Elementary	Principal	2	Coach
Ms. Diaz	Delarosa Elementary	Principal	7	Coach
Ms. Earl	Eisenhower Elementary	Principal	16	Specialist

Additionally, all principals interviewed said that they had a responsibility to support their teachers in some form. Ms. Cavazos stated, "Our job is to make sure that our teachers are equipped with as much knowledge as possible, but not only knowledge of the content, but the strategies to also teach it, so that we are able to reach every child." Providing teachers with training, resources, and materials was a top priority shared among principals. Ms. Black declared, "We use Envision Math, teachers use it as a staple to go to, and then teachers use whatever is needed to supplement that. Teachers were trained on Envision with the representatives when we first came in for adoption." Mr. Avery also explained the educational leaders' role is to ". . . make sure that teachers have the necessary materials and educational experiences." Principals expressed wanting their teachers to have the needed resources, but also to be able to utilize them in the classroom. Each of the five schools in the study adopted Pearson: Envision Math as their textbook of choice for both teachers and students.

Teachers having TEKS knowledge also emerged as a theme of high importance. Ms. Diaz stated, "The priority is on everything, it is not just on math, but because it is part of STAAR, we do have to put that pressure on teachers. We have to introduce that math . . . objectives . . . and stay within the TEKS." Administrators also expressed that leadership involvement on the campus was crucial to the success of both teachers and students. Ms. Cavazos explained that best teaching practices are embedded into professional development of her teachers by emphasizing:

> Fundamental five components, all solid good teaching. We do powerwalks, curriculum instructional coaches, myself go around, and check that teachers are in

the power zone: that there is critical writing in math, that kids are doing purposeful talks and that they are hitting all components. We do not let our teachers say that we teach math, you teach the child everything they need to learn, whether its math, science, or reading. We check all components and if teachers are not there, coaches meet with them to see how they can help them get to the power zone.

Qualitative Research Question 3.

The third research question asked, "How are professional learning communities in Title I schools addressing training of the new mathematics TEKS?" To answer this question, professional learning communities were observed and focus groups were conducted with both third and fourth grade teachers at each of the five campuses.

Professional learning communities were observed during teachers planning time and after school. Norms were not practiced in any of the schools PLC's, Bandera Elementary did however have an anchor chart that emphasized teacher participation in meetings. A total of seven PLC's were observed and Apple Elementary and Eisenhower Elementary was the only campus that facilitated their meetings after school. Both Apple Elementary and Eisenhower Elementary had an administrator present at PLC's. The PLC's at Bandera Elementary, Cortez Elementary, and Delarosa Elementary were each facilitated by either the instructional coach or the instructional support specialist (see Table 21). School PLC's shared and discussed instructional goals, action steps, next steps, and reflected (see Table 22). Delarosa Elementary teachers are self-contained; therefore, only one teacher met with the coach during the PLC and the information was

then shared among all teachers at a Thursday PLC meeting when teams come together as a grade level for all content areas. Apple Elementary had grades two to five present in their after school PLC because Mr. Avery stated he wanted them to discuss vertical alignment, but no vertical alignment planning was ever shared or discussed.

Table 21

Members Present at PLC Observations

School	Grade Levels	Number of Teachers Present	Administrator/ Coach Present
Apple Elementary	2nd-5th Grade Math Teachers	4 (3&4)	Administrator Instructional Specialist
Bandera Elementary	3rd Grade Math Teachers	6	Instructional Specialist
Bandera Elementary	4th Grade Math Teachers	7	Instructional Specialist
Cortez Elementary	3rd Grade Math Teachers	3	Coach
Delarosa Elementary	3rd Grade Math Teachers	1	Coach
Delarosa Elementary	4th Grade Math Teachers	1	Coach
Eisenhower Elementary	3rd Grade Math Teachers	2	Administrator Instructional Specialist

Table 22

PLC Observation Summary

School	Instructional Goals Shared and Discussed	Discussion/Summary	Action Steps Discussed	Next Steps for Next Meeting	Reflections Shared

Apple Elementary	1. Where are we? 2. Assessment Data 3. Teaching Strategies 4. Technology Integration	Yes	Yes	No	Yes
Bandera Elementary	1. Assessment Data 2. Tutoring Support 3. STAAR Reminders 4. Math Vocabulary	Yes	Yes	Yes	Yes
Bandera Elementary	1. Units of Instruction 2. Assessment Data 3. Anchor Stations 4. Reading/Writing Assessment	Yes	Yes	No	Yes
Cortez Elementary	1. Unit of Instruction 2. Resources/ Envision 3. Lesson Planning 4. Scope and Sequence	Yes	No	No	Yes
Delarosa Elementary	1. Assessment Data 2. Lessons for Next Week 3. Technology Integration 4. TEKS	Yes	No	No	Yes

Delarosa Elementary	1. Scope and Sequence of TEKS 2. TEKS 3. Distinguishing between Supporting and Readiness Standards 4. Resources to be used	Yes	Yes	No	Yes
Eisenhower Elementary	1. Assessment Data 2. Content/ Language Objective 3. TEKS	Yes	Yes	No	Yes

Additionally, focus groups of both third and fourth grade math teachers also addressed the training of the new mathematics TEKS. Teachers expressed that collaboration among teachers, sharing of resources and materials, and having the opportunity to analyze mathematics academic achievement helps them within their PLC's (see figure 7). One of the fourth grade teacher participants from Eisenhower Elementary mentioned, PLC's help her learn and grow through "collaboration, we teach each other, we model our lessons and give each other ideas." A third grade teacher at Cortez Elementary also said PLC's help because "we are able to get feedback from each other." A fourth grade teacher at Bandera Elementary also explained that during PLC's "We help each other out with specific standards that kids are struggling with and test taking strategies." Third grade teacher at Delarosa Elementary stated PLC's "give us ideas and resources on how to teach different styles of learners; whether students are tactile,

listening, or visual learners, we always receive a variety of options for our students." Teachers at Apple Elementary unfortunately expressed concern as one teacher stated, "PLC's are supposed to happen every two weeks, but they only happen once a month and only after school." An additional teacher at Apple Elementary stated, "They give us a ton of resources, but I have no idea how to use them. And when you go to the teacher edition, it tells you to go online for the component and you ask for a login, all you hear is that they are working on it."

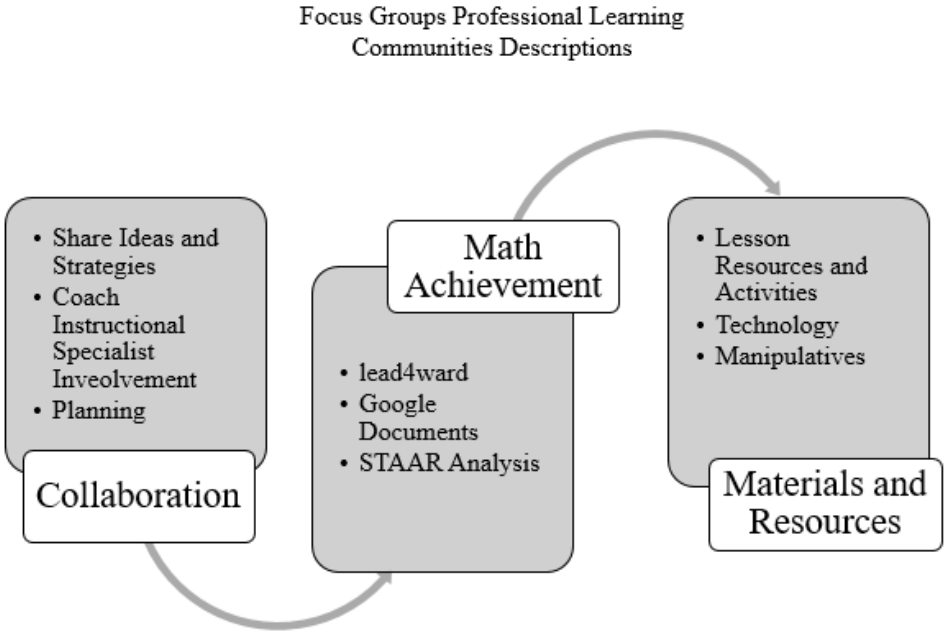

Figure 7. Focus Groups PLC description.

Monitoring math academic achievement and or underachievement was also a common theme among teachers at all five schools and this is done through data meetings within their PLC's. A fourth grade teacher at Delarosa stated "We have data meetings

and it is there when information is shared across the school, district, and by individual student. We also have a Google document that we share as a team." A fourth grade teacher at Bandera Elementary also explained, "We have access to data from our common assessments at the campus and district level, and based on the data we are able to form our small groups."

The sharing of materials and resources was also a common theme among teachers' at all five schools. Teachers at Cortez and Delarosa from the same school district mentioned technology resources made available to them by the district, especially "Curriculum Corner". A fourth grade teacher from Cortez explained, "We use curriculum corner and sometimes we don't bring what's available because we all have access to this and instead we focus on how to teach a concept and this is how we are able to help each other." A third grade teacher at Delarosa declared, "We are provided with a lot of manipulatives, if we want to do an activity that is hands on, all manipulatives are available to us, we are given resources that are aligned with the TEKS and it is shared among us." A fourth grade teacher at Apple Elementary unfortunately explained, "All the top of my cabinets are Envision textbooks that I have never even touched." A third grade teacher at Apple Elementary also stated, "Every blue moon I use my textbook, but when I am stuck and I don't understand something and don't know where else to go, I go onto Pinterest and YouTube." Additionally, another fourth grade teacher at Apple Elementary declared, "They give us a ton of resources, I have cupboards of Envision textbooks and I have no idea how to use them."

Four of the schools mentioned monitoring math academic achievement as a high priority. Teachers at Apple mentioned that they use Lead4ward to help them break tests apart and drive their instruction. Fourth grade teachers at Delarosa stated that after assessments they have data meetings to show them where their students are. Bandera Elementary teachers stated that they use Google Documents and Lead4ward. Teachers at Cortez Elementary also stated that they receive data after common assessments. Bandera Elementary and Cortez Elementary teachers for both third and fourth grades were very vocal and declared that RTI for all three tiers was done in their classrooms. Fourth grade teacher at Bandera Elementary explained, "Tier 1, 2, and 3 all are done in the class by us, we don't have enough people, only for reading are our students pulled out."

Research Question 4.

The final research question asked, "To what extent, if any has the implementation of the new mathematics TEKS impacted the pedagogical practices of teachers in Title I schools?" To answer this research question, third and fourth grade teachers were observed delivering mathematics lessons (see Table 23). Teachers within the nested sample were also interviewed and asked the question directly: "How has the implementation of the new mathematics TEKS impacted your teaching practice?"

Table 23

Mathematics Teachers Observations

Mathematics Observations by School	3rd Grade	4th Grade	Math Minutes
Apple Elementary	1	2	90
Bandera Elementary	1	2	100
Cortez Elementary	2	1	90
Delarosa Elementary	1	2	90
Eisenhower Elementary	2	1	90

All mathematics lessons were observed for 50 minutes in each classroom. Observations included looking at the following components: classroom descriptions, lesson objectives, materials used, how the lesson was structured, differentiation strategies, how the teacher assessed learning and closure of the lesson (see Tables 24-27).

Table 24

3rd Grade Mathematics Teacher Lesson Observations, Part A

School	Class Description	Lesson Objectives Posted	Materials
Apple Elementary	1. Desks in Groups 2. Whiteboard 3. Anchor Charts/Visuals	Yes	1. Teacher made word problem 2. Journals 3. Manipulatives (stations)
Bandera Elementary	1. Desks in Groups 2. Whiteboard 3. Anchor Charts/Visuals	Yes	1. Envision Workbook 2. Manipulatives (stations) 3. Computers (stations) 4. iPads

Cortez Elementary	1. Desks in Groups 2. Whiteboard 3. Anchor Charts/Visuals	Yes	1. Envision Workbook 2. Manipulatives (stations) 3. Whiteboards/Markers
Cortez Elementary	1. Desks in Groups 2. Whiteboard 3. Anchor Charts/Visuals	Yes	1. Manipulatives (stations) 2. Whiteboards/markers 3. Construction Paper for Models
Delarosa Elementary	1. Desks in Groups 2. Whiteboard 3. Anchor Charts/Visuals	Yes	1. Construction Paper 2. Math Play Read Aloud
Eisenhower Elementary	1. Desks in Groups 2. Smartboard	No	1. Journals 2. Pencil
Eisenhower Elementary	1. Desks in Groups 2. Smartboard	No	1. Worksheets 2. Pencils

Table 25

3rd Grade Mathematics Teacher Lesson Observation, Part B

School	Lesson Structure	Differentiation	Evaluation	Lesson Closure	Classroom Assistance
Apple Elementary	Modeled, shared, and independent	Yes	Yes	Yes	No
Bandera Elementary	Modeled, shared, guided, and independent	Yes	Yes	Yes	Yes
Cortez Elementary	Modeled, shared, and independent	Yes	Yes	Yes	No
Cortez Elementary	Modeled, shared, guided, and independent	Yes	Yes	Yes	No

Delarosa Elementary	Modeled, shared, and guided	Yes	Yes	Yes	No
Eisenhower Elementary	modeled and independent	No	Yes	No	No
Eisenhower Elementary	independent	No	Yes	No	No

Table 26

4th Grade Mathematics Teacher Lesson Observation, Part A

School	Class Description	Lesson Objectives Posted	Materials
Apple Elementary	1. Desks in Horseshoe 2. Anchor Charts/Visuals 3. Smartboard	No	1. Worksheet 2. Pencil 3. Manipulatives (stations)
Apple Elementary	1. Desks in Groups 2. Anchor Charts/Visuals 3. Math Word Wall	No	1. Mentoring Minds Workbook 2. Math GPS Workbook
Bandera Elementary	1. Desks in Groups 2. Whiteboard 3. Anchor Charts/Visuals	Yes	1. Envision Math 2. Multiplication Charts 3. Whiteboard 4. IPads 5. Manipulatives (stations)
Bandera Elementary	1. Desks in Groups 2. Whiteboard 3. Anchor Charts/Visuals	Yes	1. Student Journals 2. Highlighters 3. Envision Math 4. Whiteboards 5. Manipulatives (stations)
Cortez Elementary	1. Desks in Groups 2. Whiteboard 3. Anchor Charts/Visuals	No	1. Worksheet 2. Computers (stations) 3. Manipulatives (stations) 4. Whiteboard/markers

Delarosa Elementary	1. Desks in a Horseshoe 2. Whiteboard 3. Anchor Charts/Visuals	Yes	1. Worksheets 2. Envision Workbook 3. Journals
Delarosa Elementary	1. Desks in Groups 2. Whiteboard 3. Anchor Charts/Visuals	Yes	1. Worksheets 2. Envision Workbook 3. Manipulatives (stations)
Eisenhower Elementary	1. Desks in Groups 2. Whiteboard 3. Anchor Charts/Visuals	Yes	1. Worksheets 2. Journal 3. Manipulatives (stations) 4. Whiteboard/markers

Table 27

4th Grade Mathematics Teacher Lesson Observations, Part B

School	Lesson Structure	Differentiation	Evaluation	Lesson Closure	Classroom Assistance
Apple Elementary	Modeled and Independent	No	Yes	No	No
Apple Elementary	Modeled and Independent	No	Yes	No	No
Bandera Elementary	Modeled, shared, guided, and independent	Yes	Yes	Yes	Yes
Bandera Elementary	Modeled, shared, guided, and independent	Yes	Yes	Yes	Yes
Cortez Elementary	Modeled, shared, and independent	Yes	Yes	Yes	Yes

Delarosa Elementary	Modeled, shared, and independent	Yes	Yes	Yes	No
Delarosa Elementary	Modeled, shared, and independent	Yes	Yes	No	No
Eisenhower Elementary	Modeled, shared, and independent	Yes	Yes	Yes	No

Mathematics teacher observations varied in context and delivery based on both the school and the teacher. A third grade teacher at Apple Elementary demonstrated to be able to incorporate all four instructional components, while her fourth grade colleague only demonstrated to be able to include two of the four components during the instructional lesson. A third grade teacher had her students working cooperatively completing a "four corners" activity, afterwards they had hands on activities, and they had opportunities to use their reading and writing skills. As you walk down the hall, you notice her fourth grade level colleague teaching in a very different style. Her fourth grade colleague had her students complete workbook questions and as students finished they sat and waited for others to finish in silence staring at the wall. Once all students were finished with their workbook questions, the teacher reviewed how to solve the problems assigned individually, and provided students with the correct answer. The teacher was however observed providing students with an incorrect answer on a word problem as she reviewed. Classrooms at Apple Elementary also have a Smartboard, but only the third grade teacher was observed using the technology to its full capacity.

Teachers observed at Bandera Elementary were also all able to include all four components, embedded student learning objectives, and also integrated technology using iPads. The school has a one-to-one initiative and once students completed their work, they moved into stations and iPads that included mathematics applications and programs. Students all worked in cooperative groups while the teachers facilitated small group instruction. Elementary teachers observed at Cortez and Delarosa were very consistent with their teaching and made sure to follow the same scope and sequence that mirrors the school district. Teachers used interactive lessons, stations, manipulatives, and textbooks to deliver their instruction. A third grade teacher at Delarosa Elementary had her students read a 3-dimensional play in cooperative groups and then provided them with a real world connection by selecting a group to present the production to the class. As students prepared to present the play, the teacher used questioning techniques to ensure that students could distinguish the different attributes of a 2-dimensional and 3-dimensional shape. A third grade teacher at Cortez was also addressing the same standard by having her students create and design a city with 3-dimensional shapes and then share and discuss the attributes of shapes in their city within their group. The teacher then had students share as a class the attributes using complete sentences. Students at these schools practiced stating the objective both at the beginning of the lesson and at the conclusion of the lesson.

At Eisenhower Elementary, a fourth grade teacher demonstrated to complete three of the four components of instruction while including interactive stations, hands on activities, technology that was vertically aligned to the TEKS, and had her student

learning objectives posted. Students in her classroom worked in collaborative groups while they shared and discussed information. The teacher was also observed facilitating small group instruction. On the opposite side of the hall at Eisenhower Elementary, a third grade teacher had her students spend 45 minutes completing the "Daily Five" using paper and pencil (5 math problems), when students finished they sat and stared in silence. The teacher then went on to spend an additional 20 minutes to review how to solve the five problems with her students. The other third grade teacher that was observed at Eisenhower Elementary had his students complete a Countdown to STAAR worksheet, students worked quietly and independently. The teacher paced the classroom and as students struggled, he assisted them. When students finished their work, they sat and stared in silence as well.

In addition to focus groups, teachers were also asked during an interview "How has the implementation of the new mathematics TEKS impacted your teaching practice?" A total of seven third grade teachers and eight fourth grade teachers answered this question (see Table 28).

Table 28

3rd and 4th Grade Math Teacher Interviews by Schools

Teacher Interviews By School	3rd Grade Teacher Interview	4th Grade Teacher Interviews
Apple Elementary	2	1
Bandera Elementary	2	2
Cortez Elementary	1	1
Delarosa Elementary	2	2
Eisenhower Elementary	1	1
Total	**8**	**7**

Five of the third grade teachers interviewed stated that the new TEKS are much more rigorous, but as time has gone on, they have adjusted. Ms. Newberg explained, "Even though I was new to teaching, I felt it because I was taught a different way using traditional methods. As I was trying to teach the new methods, it was really hard for me, and it still is." Ms. Jackson also stated, "Looking at the TEKS, they are hard to understand, I use the resources that I have been given." Ms. Mann declared, "It is learning curve like anything else . . . at the beginning it was really hard, we had these gaps to fill in, as time went on, all the grade levels adjusted." Ms. Rodriguez also explained, "Going back to when they came out, I felt like a horrible teacher. I had to figure out a way to simplify it for my students, it has been difficult. Last year and the year before last, I feel much better and more comfortable, I know what is expected of me . . . I have had to dig deeper into the TEKS."

Five of the fourth grade teachers also stated that the new mathematics TEKS are much more rigorous, but have adjusted. Ms. Moore declared, "At first it was a struggle because it was like the fourth graders skipped a couple of years, but through the years kids have caught up. But, it is still not a breeze." Fourth grade teacher, Ms., Johnson at Delarosa Elementary explained," I have had to start from scratch…many of the TEKS are a lot harder for students to grasp, but for the most part I still teach based on my student's needs." Ms. Johnson stated, "It seems like they really want the kids to know not just the answer, but also the process." Ms. Ryan also stated, "It has changed everything, they are much more rigorous."

Educational landscape.

Study Site 1: Apple Elementary. Apple Elementary is located in East Texas and the school has a current population of 738 students with 91.2% economically disadvantaged, servicing grade EE-05. The school also has 76.3% of students at-risk. The school is located in a rural community that also has a public four-year university in the town. The school is a very large campus and as you enter the building, you will immediately notice the blue and white tiles along the floor. As you turn to the left from the entrance, you will walk past the library and hallways of classrooms. Hallways are filled with student work samples by individual classroom and grade level.

Classrooms at Apple Elementary are very spacious and have smartboard technology along with a range of two-four computers per classroom. Classrooms have a wall of shelves where teachers store their textbooks. Each student in math classrooms has a student workbook of Envision, Motivational Math, and GPS. Students in fourth grade math classrooms do not have anything inside their desks and all their books are stored on shelves. Students in third grade math classrooms have all their belongings stored inside their desks, they also have buckets of materials that are shared with other students. Third grade classrooms were filled with anchor charts, while fourth grade classrooms had very few. The school currently has a five-way switch that includes the following: math instruction, math stations, reading, writing, science/social studies. Students are required to transition a total number of five times throughout the instructional day.

Study Site 2: Bandera Elementary. Bandera Elementary is located in north Texas with a population of 775 students, with 96.9% economically disadvantaged, servicing grades Early Elementary Education (Pre-Kindergarten)-five. The school also has 78.1% of students at-risk. The school is located in a rural community that also has a four-year private university in the town. The school is also a very large campus that is sectioned off into pods as you enter the building. Walking through the school you will notice the beautiful brown and white tiles along the floor, colorful furniture and desks in pods for small group instruction, and each classroom has new colorful desks and chairs. Hallways are also covered with student work samples on walls and in glass cases.

Classrooms at Bandera Elementary are filled with manipulatives, textbooks, and technology. All classrooms also have whiteboards and document cameras. Teachers have a range of computers from two-four and each student has their own individual iPad. Students keep their belongings in their desks, rooms are arranged in groups, and students have buckets of materials to share materials. Students have Envision math workbooks, manipulatives that can be shared, and many student teachers present throughout classrooms. Classrooms are also filled with visual aids and anchor charts that are teacher made, teachers have their content objectives posted, and classrooms are very spacious. Bandera elementary teachers in third and fourth grade are all self-contained and teach all subjects.

Study Site 3. Cortez Elementary. Cortez Elementary is located in southeast Texas and has a student population of 707 students with 88% economically disadvantaged and services grades Early Elementary Education (Pre-Kindergarten)-five.

The school has 58.1% students at-risk. The school is located in an urban city with many two and four-year colleges nearby. The school is an older neighborhood school that has faculty and staff that attended the campus as children and now currently work there. As you walk in the school it is colorful and welcoming, you will see mailbox signs for all teacher classrooms, the school has lockers down the hallway, and student work is displayed everywhere.

Classrooms all have a whiteboard and a document camera for teachers to use during instruction. Teachers also have access to iPads and computers. Each teacher has a range of two-four computers per classroom. Teachers have access to a shopping closet of manipulatives where they can check out supplies as needed, but must return them upon using them. In student desks, you will find student journals and Envision math workbooks. Both third and fourth grade teachers have numerous visuals that include anchor charts that are teacher made for their students. Teachers at Cortez Elementary are departmentalized and only teach math and science. Within their classrooms you will also see desks arranged as groups, all teachers have their content objectives posted, and classrooms that have extensive wear and tear, but teachers continue to make the best out of them.

Study Site 4. Delarosa Elementary. Delarosa Elementary is also in the same school district as Cortez Elementary. The school has a population of 791 students with 85.8% economically disadvantaged and services grade Early Elementary Education (Pre-Kindergarten)-five. The school has 62.6% at-risk. The school is also an older neighborhood school in an urban city with access to both two and four-year universities.

The school is a large campus and when you look directly at it, it resembles a horseshoe. Each classroom has a whiteboard and document camera for their classrooms. Hallways are filled with student samples throughout the building. As you walk down the hallway you will see older tiles, but even as aged as the school is, it continues to maintain its cleanliness. Each classroom also has an abundance of manipulatives and technology. Teachers stated that they have five iPads for each teacher and each one also has a range of 2-4 student computers.

Classrooms at Delarosa are filled with visuals and anchor charts that are teacher made. Teachers there are self-contained and have many similarities to Cortez Elementary. Throughout the building, you will see it mirror much of what you see at Cortez and faculty and staff have a long history there as many attended the campus as children. Additionally, both schools stated that they are homegrown. At each of these schools, you will see materials that include: Envision math, Motivational Math, and supplemental resources. All classrooms that were observed were also arranged as groups or a horseshoe, all teachers had their content objectives posted, and although classrooms were not very spacious, teachers make them comfortable for their students.

Study Site 5. Eisenhower Elementary. Eisenhower Elementary is located in east Texas and has a student population of 638 students, but this year has declined to approximately 400 students because the school has been restructured. The school has 94.5% students that are economically disadvantaged and 70.8% that are at-risk. The school currently only services grades one-five. As you enter the school, you will see a lounge area for parents and as you walk further down you will run into the library, the

school cafeteria, and hallways of classrooms. The campus is a very large campus, has many empty spaces, and classrooms are very spacious. Each teacher's classroom has smartboard technology.

Some hallways have student work, while others do not. When I visited the school in early October, student work samples in addition to standards and objectives were displayed. Currently, they have new leadership and some teachers were moved to teach other grades and content areas as late as January. The school has an interim principal that oversees Eisenhower Elementary and her home campus in the district. When I visited the school in January, I was informed that the principal was no longer there and that all district specialists were there as support two-three days a week. Teachers on this campus are departmentalized and teach math and science, although one stated that they never teach science. Some teachers have visuals and anchor charts, while others do not. Each classroom has a range of two-four computers. When I conducted the focus group, I encountered that both the third and fourth grade teacher had been there for well over ten years, but they mentioned not ever interacting with one another.

Woven strands of leadership.

Mr. Avery. Mr. Avery has been a principal at Apple Elementary for the last four years. He demonstrates to greatly care about the wellbeing of his students. In the morning he takes the time to do car rider duty by unloading students off cars as they arrive and after school he does the same. He tries to provide his teachers with the needed resources and materials to effectively teach. He uses a five-way switch with his teachers, making transitions throughout the instructional day. Additionally, he offers to cover

teachers' classrooms to observe others, but only for twenty minutes at a time and not for a full mathematics lesson. He explained that his students do not do well with substitute teachers, therefore all trainings are held after school. He greatly prides himself in advocating that his teachers can receive modeling support from an outside consultant, but that consultant also visits all schools within the district, making training and development not so easily accessible.

Ms. Earl. Ms. Earl is in her sixteenth year being principal and is currently the interim principal at Eisenhower Elementary. She demonstrates to have a great deal of skills and knowledge to effectively accomplish the job, but did state that she is not an expert in math and relies on her teacher leaders in the mathematics department heavily. During the interview when asked questions she wanted to explain what she was doing on her home campus, for example she stated that she was not aware of resources embedded into this campus earlier. She did explain that at the time of the interview district specialists were at the campus several days a week co-teaching with teachers, doing pullouts, and modeling because students were struggling. Ms. Earl sat in an empty office as she spoke with me, the school does not have an assistant principal, only one instructional specialist. The school is also departmentalized and transitions during the school day.

Ms. Cavazos. Ms. Cavazos explained that she is a product of the school district, she is homegrown and is in her second year of being principal at Cortez Elementary. She is very committed and dedicated to her students knowing that she too, was once in their shoes. She stated that having grown up in the community she could greatly relate to the

struggles that her students are experiencing. She prides herself in making sure that her teachers are making real world connections across content areas. She is supportive of her teachers' efforts to bridge curriculums and currently has several teachers that embed robotics instruction into their classrooms. She speaks very highly of all her teachers, all of her teachers are departmentalized, transition during the school day, and are supported by an instructional coach. Ms. Cavazos has a friendly assistant principal that is very involved by making his presence in various places throughout the building.

Ms. Black. Ms. Black is currently in her first year being principal at Bandera Elementary. She is very protective of her teachers' time, which is a great quality to have. When I first approached her about conducting my research on her campus, her concern was her students and teachers, which I greatly respect. She is also very dedicated to both teachers and students. When visiting her school you will almost never find her sitting in her office as she is constantly walking her teachers' classrooms and assisting her teachers wherever needed. She does afterschool bus duty alongside her teachers. She has two assistant principals and throughout the day, her assistant principals are often observed facilitating small group instruction for students throughout classrooms. Her campus is self-contained, her school has a one-to-one initiative with an iPad for every student, and she has two instructional specialist divided by grade levels. Her assistant principals are extremely friendly as well and demonstrate to have a close relationship with students. Students were observed addressing each administrator by their individual name.

Ms. Diaz. Ms. Diaz is in her seventh year as principal and she was a former teacher and assistant principal at Delarosa Elementary. She is extremely friendly and

never forgets to welcome her visitors with great hospitality. She strives to make sure that all students at her school are successful. She can be observed throughout the day in meetings to support teacher's needs, walking classrooms, and visiting with students. Her teachers expressed that they have an amazing principal that supports them and one that does not micromanage them. A great deal of her staff have been there for a very long time and her turnover is minimal. Her teachers' lounge has a recognition spot for her teachers and many times, she provides them with treats that will help them get through the day. She has high expectations and they are conveyed through her leadership and transparency in her teacher's classrooms. Her teachers are self-contained because she wants to minimize the amount of lost instructional time during transitions. Her school is also unique and utilizes a block schedule: Mondays and Wednesday teachers teach English, language arts, writing, and social studies, and on Tuesday and Thursday her teachers will teach math and science, leaving Fridays split with all subjects.

Illuminating themes.

Theme 1: Standards and Accountability. The first illuminating theme was related to interview questions three, four, and six. Teachers were asked about school mathematics priorities and how standards and accountability influence professional development.

STAAR. Eight third and fourth grade teachers interviewed, explained that STAAR is a major focus on their campus. Teachers mentioned having participated in STAAR math camps, individualized data meetings to identify where there kids were, and expectations being extremely high, but also obtainable for their students. Teachers at

Apple Elementary explained that tested grades tend to receive more resources on their campus. Teachers at Delarosa Elementary stated that their principal expectations are for each of them to focus on all content areas because essentially they teach the whole child.

Resources and materials. All fifteen teachers stated that Envision Math is their district adopted textbook, but five of the teachers at Apple and Eisenhower Elementary stated that they have not used the textbook due to never have been formally trained on how to use the teachers edition and supplemental resources it comes with. Ms. Thompson explained, "I use Pearson Envision, but it is not like the STAAR test, I use it as an introduction, and then I use Motivational Math because it breaks down all the TEKS." Third and fourth grade teachers at Bandera explained that Pearson Envision training is only provided to new teachers on their campus during the summer. Four teachers also stated that they used Mentoring Minds/Motivational Math within their classrooms.

Manipulatives. Five teachers stated that manipulatives are readily available to them on their campus. Third grade teachers at Delarosa and Cortez Elementary both stated that their district offers them training where they model and teach them how to use manipulatives in mathematics lessons and if they attend the training, they are provided manipulatives used during the training session to take back to their classrooms. Third and fourth grade teachers at Apple Elementary also stated that they have manipulatives, but never receive formal training on how to embed them into math lessons.

Technology. Six of the teachers interviewed also stated that technology was a major component of their campuses. Teachers at Bandera Elementary mentioned that

their campus has iStation and an individual iPad for each of their students. Teachers at Apple Elementary mentioned that they rely on Lead4ward to provide them student STAAR data and that their grade level has the Dream Box App for their students. Teachers at Cortez and Delarosa Elementary mentioned that they have enough iPads for stations in their classroom as well as computers.

Theme 2: Mathematics Professional Development. The second illuminating theme related to mathematics professional development. Teachers were asked about mathematics professional development helping them inform their practice and to reflect on the most impactful training that they have had in the previous two years.

Collaboration. Nine teachers stated that math professional development allows them to share and discuss ideas and strategies with other teachers. It allowed them to collaborate on better ways to teach their students. Ms. Brown explained, "It helps by listening to other teachers, they might have different ideas." Ms. Thompson also stated, "It helps because we are always asking questions, it makes me feel like I am not alone." Ms. Delacruz declared, "I think collaboration with others helps me understand the foundation."

District Training. Seven teachers interviewed stated that they receive much of their training from the district. Teachers at Rock Independent School District praised the district efforts for trainings offered. Third grade teacher at Delarosa explained that "last year I attended a make-and-take class, I was able to bring it back to my classroom, it stuck out at me because we actually made something instead of just sitting there. Bandera Elementary third grade teacher stated that the district offered her a gifted and

talented (GT) class that showed her how to differentiate for her students. Fourth grade teacher at Bandera Elementary also shared that the district continuously offers numerous workshops on dissecting the TEKS.

Outside District Training. Three teachers at three of the school districts mentioned that they were provided outside professional development opportunities, but these opportunities only allowed a few to attend and they were summer trainings. Valley Independent School District, Hill Independent School District, and Rock Independent School District provided their teachers with opportunities to attend regional trainings, professional trainings that included presenters like that of Kim Sutton, and state facilitated trainings by the Texas Education Agency.

Theme Three. Mathematics Expectations and Additional Comments. The final illuminating theme that emerged was teachers' mathematics professional development expectations and additional teacher comments.

Support. Seven teachers mentioned that they expected for districts to be supportive of training needs by providing them teaching strategies. Ms. Pearson stated that she would like to "see more strategies that will help students work together and explain their thinking." Ms. Rodriguez welcomed feedback and stated that her expectation is that "we have coaching to help with any questions . . . we are pretty open to our curriculum instructional coaches coming into model." Ms. Brown has the professional development expectation that they should be provided "lots of support, stuff that we can actually use."

Additional Professional Development. Eight of the teachers interviewed also stated that they would like to see additional professional development offerings during the school day to help them master their teaching practice. Ms. Pearson stated, "I would definitely like to see more professional development specific to my grade level." An additional third grade teacher at Apple Elementary also explained, "From a professional opinion, I think professional development is super important, but it is not offered enough." Ms. Newberg greatly wants professional development during the day, "I just wish we had professional development during the day, I would attend so many more. As a teacher I am also a learner." Ms. Wood at Bandera Elementary also would like to see more professional development. She stated,

> I think math is a big struggle for teachers. I wish as a district and as a campus, more of it was provided to us. We are kind of just thrown into this and told this is what you are going to teach, but not this is how you are going to teach it or what you can use to teach it, those things are so much more impactful. I love teaching math, but I need help.

Summary of Qualitative Analysis

After concluding all teacher interviews, focus group interviews, and principal interviews, the researcher reviewed, corrected, and added anecdotes as needed. All teacher participants and principals were contacted by email to thank them individually for their participation, they were also provided with transcripts of the interviews, and encouraged to provide the researcher with any corrections and or feedback. The recorded

audio recordings were transcribed by the researcher using computer software. All interview transcripts were read for transcription corrections and readability. NVivo11 was used to code interview transcripts by individual question, afterward interview transcripts were read a second time separately to develop additional interpretation by individual grade level that allowed the researcher to formulate codes. Codes were entered into NVivo 11 and themes and subthemes were identified by grade levels.

Summary

This chapter presented findings of both quantitative and qualitative results. Quantitative data was presented as descriptive data to describe and examine the teacher professional opportunities questionnaire. The results of the qualitative strand were coded and interpreted and revealed three themes: TEKS, Mathematics Professional Development, and Mathematics Expectations along with Additional Comments. All three of the themes were directly related to each of the research questions that emerged from teacher's interviews and focus groups. The integration of data findings occurred by comparing the quantitative data directly to qualitative data, therefore supporting statistical trends by qualitative themes.

CHAPTER V

Summary, Conclusions, Implications, and Recommendations

Introduction

The previous chapter presented the findings of quantitative and qualitative data, and the merging of the data. This chapter consists of a summary of the study and findings, conclusions, and elements of the portrait that include implications for practice and recommendations for future research that can enrich the landscape of educational settings. A conclusion of the study also offers a final overview on the scope of the research study and how an educational portrait can be framed.

Summary of the Study

The purpose of this mixed methods study was to examine the challenges of new curricular changes that Texas administrators and teachers are having to overcome with the adoption and implementation of the new mathematics TEKS in Title 1 schools. The purpose of the study was achieved by using a mixed methods methodology that employed a convergent parallel design which included both quantitative and qualitative data that was collected during the same phase of the research process, both strands of data were equally prioritized, analyzed independently, and later converged during the interpretation (Creswell, & Plano Clark, 2011, p. 71). Results were compared and synthesized during the discussion of each of the strands of data.

Additionally, portraiture was also used during the collection of qualitative data to encourage participants to share their personal views and perceptions on how professional development is offered within their schools to support the transition of new curricular standards. "The portraits are shaped through the dialogue between the portraitist and the subject, each one participating in the drawing of the image" (Lawrence-Lightfoot, & Davis, 1997, p. 3).

The quantitative data collection consisted of teacher professional opportunities questionnaires that were emailed to teachers and archival TEA TAPR reports to examine individual school STAAR mathematics scores for third and fourth grade. The professional learning opportunities questionnaire utilized within the study was adapted from Shafer, Wagner, & Davis, (1997). Qualitative data collection consisted of administrator and teacher interviews, focus groups, mathematics lesson observations, and professional learning community's observations.

The study utilized five Title I schools generated from a campus comparison group. Fifteen school districts were contacted to request permission to access the schools, but only four of the fifteen school districts permitted their schools to participate in the study. Apple Elementary, Bandera Elementary, Cortez Elementary, Delarosa Elementary, and Eisenhower Elementary had thirty-eight teachers that consented and agreed to participate in the study. Of the thirty-eight teachers that gave consent, only thirty-three teachers answered the questionnaire, fifteen third and fourth grade teachers were interviewed, fifteen mathematics classrooms were also observed for 50 minutes each. One administrator for each Title I campus was also interviewed.

The study utilized purposeful sampling from a TEA campus comparison group of Title I schools. Study participants consisted of third and fourth grade teachers who completed the teacher professional opportunities questionnaire. A nested sample of 33 teacher participants were utilized and 15 of the teachers self-selected to complete the individual teacher interviews. The nested sample of participants was divided into individual grade level groups; third grade had 16 teachers, while fourth grade had 17 teachers. Participants also self-selected to participate in focus groups facilitated at their schools. Additionally, participants were also observed during professional learning community's observations and or during mathematics instruction. The researcher observed random teachers within the sample of 38 that consented to participate as they taught mathematics lessons.

To carry out the purpose of this study, the following research questions were asked:

1. How do teachers in Title 1 schools perceive professional development opportunities of the new mathematics TEKS?
2. How is professional development of the new mathematics TEKS being offered by administrators in Title 1 schools?
3. How are professional learning communities in Title 1 schools addressing training of the new mathematics TEKS?
4. To what extent, if any has the implementation of the new mathematics TEKS impacted the pedagogical practices of teachers in Title 1 schools?

Question 1 was answered utilizing the integration of qualitative and quantitative data. Data results from the quantitative data were directly compared to the qualitative data, supporting statistical trends by qualitative data. Questions two, three, and four were each answered qualitatively. Question two was answered using administrator interviews that were coded and resulted in four themes that emerged: support for teachers, training/ resources/materials, TEKS knowledge, and campus involvement. Question three was answered using observations from professional learning community's observations and focus group interviews. Observations were interpreted using descriptive statistics and focus groups were coded. Focus groups had three themes that emerged: collaboration, math achievement, and lessons/resources. Question four was answered using question 9 of the teacher interview and through the mathematics teacher lesson observations. The teacher interview question resulted in the following themes among teachers: rigor, adjustment, and self-teaching.

Summary of Findings

The findings of the data are reviewed by each of the research questions.

Research question 1 (mixed methods).

The first research question was, "How do teachers in Title 1 schools perceive professional development opportunities of the new mathematics TEKS?" The teacher professional opportunities questionnaire indicated that an average of 27% of third and fourth grade teachers have never had a chance to participate in observing other teachers, receiving meaningful feedback, and/or networking with teachers outside their school. An additional average of 20% indicated that they have only ever had this opportunity once.

Teachers also indicated that during the last year, an average of 34% of teachers only had the opportunity to participate in formal mathematics meetings two times or less.

Question five on the teacher questionnaire indicated that although 85% of third and fourth grade teachers have participated in some form of professional development, only 75% of those teachers however, indicated that the PD training led to changes in teaching mathematics. When desegregated by school district, Valley ISD and Sunrise ISD had 100% in PD participation; however, Rock ISD had the greatest number of teachers benefiting from professional development (see Figure 8).

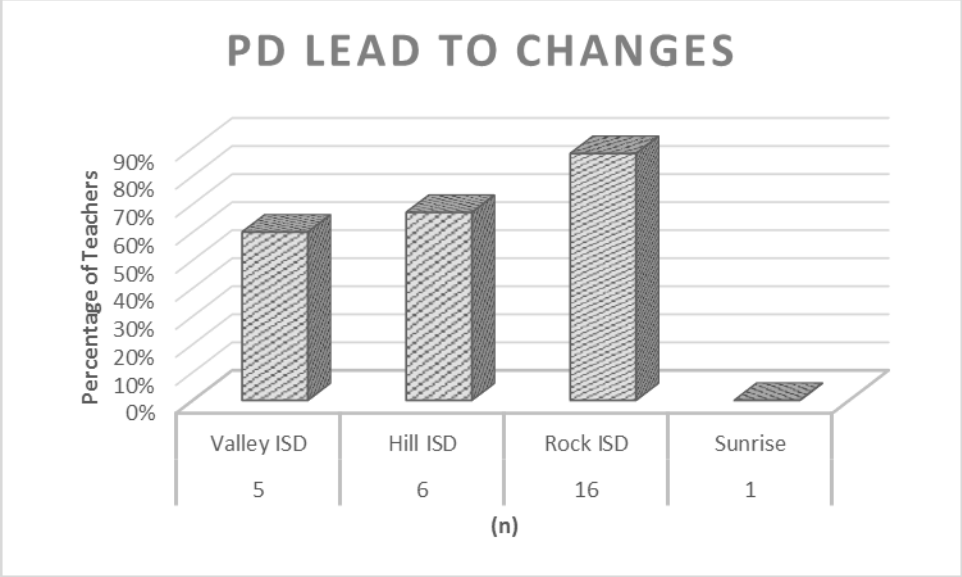

Figure 8: Professional development teacher participation by individual school district.

Teachers were asked about the types of support they received to attend PD and only six teachers selected release time, while four selected paid travel, 18 selected continuing education units, and 18 selected none at all. When teachers were asked when they plan for mathematics units of instruction, when does the collaboration take place,

21% of teachers stated during formal meetings, 64% stated during their contracted planning time, and 15% stated afterschool during their own time. When teachers were asked to list the number of times that they have participated in meetings that relate to lesson materials, teaching activities, assessments, grouping of students, developing mathematics learning objectives, sharing ideas, etc., a total average of 14% of teachers stated that they have never participated in these activities. An average 39% of teachers stated they sometimes participate in these activities, while 47% stated they frequently or always participate. Teachers were also asked about the total number of teachers that are involved in mathematics development efforts and teachers stated an average of 59%. A total of 94% of teachers also stated that they had slight and/or strong support to improve mathematics at their school.

Qualitative themes provided teachers an opportunity to use their voice and address how they perceived professional development on their campuses. Emerging themes indicated that they truly valued professional development and being able to grow as teachers, but teachers also indicated that they desired more professional development and that not enough PD of technology resources, textbook resources, or instructional strategies was being provided (see Appendix O). Teachers indicated that they valued PD because it provided them an opportunity to collaborate, share ideas, and find ways to reach their learners. The convergence data provided insight on how teachers perceive professional development offerings.

Research question 2 (qualitative).

The second research question was, “How is professional development of the

new mathematics TEKS being offered by administrators in Title 1 schools?" Findings indicated that principals viewed providing teachers PD of new mathematics curriculum with four prominent themes: (1) supporting teachers, (2) providing teachers with training, resources, and materials, (3) TEKS knowledge, (4) and campus involvement. Administrators expressed a range of attitudes during the interview about professional development offerings.

Mr. Avery. Mr. Avery is extremely supportive of his teachers and tries to be in all places at once. He relies heavily on his curriculum specialist, but only has one for all of his teachers. He believes in providing his teachers with training and development, but he will only do it if trainings are facilitated afterschool or during the summer. He wants his teachers to have TEKS knowledge, but relies on an outside consultant that is contracted by the district to provide this service to his teachers and is also very limited due to having to service the entire school district. He stated that he addressed the new standards by using resources such as Lead4ward, TEKS Resource, and Mentoring Minds. He believes that his teachers should be empowered to be independent learners of curriculum,

> It is my expectation that teachers will take learning into their own hands, in other words they should be doing a lot of getting into it on their own. They have all kinds of stuff to pull up, resources and materials are online, so my expectation is that at some point it is their responsibility also, they are professionals.

Ms. Black. Ms. Black is a very knowledgeable principal in mathematics. She believes that teacher's mathematics PD must be based on what her teachers needs are. She stated that her teachers are supported at the campus and district level. She addresses

training as needed, either afterschool or during a PLC. Her school is very focused on the TEKS and does this through looking at student data, lessons teachers are teaching, and addressing skills that need to be retaught. She observes her teacher's classrooms looking at the learning objectives and that students are able to reiterate them back, she also will use videoed lessons for peer observations in PD meetings. She explained, "We are supporting the teachers, showing them how it can be done, and we are setting that expectation."

Ms. Earl. Ms. Earl is an interim principal trying to run two schools at once. She demonstrates to be extremely supportive of her teachers at her home campus, at Eisenhower however, Ms. Earl is very dependent on district support. She relies heavily on mathematics specialist to help both schools. She believes her teachers should be supported with outside and district training. When asked about resources, she stated that teachers are taught resources such as mini stations to incorporate and that teachers are also provided grants. For TEKS knowledge, she indicated that teachers need to be trained to the rigor/depth/complexity of the standards, data has to help drive the decisions, and quality instruction must be the focus. She stated, "It's been hard adjusting, but teachers will step up to the plate." She believes in empowering teacher leaders to train others on mathematics.

Ms. Cavazos. Ms. Cavazos is a product of the school district that greatly believes in supporting her teachers. Both she and her staff provide teachers with training and support of resources/materials through campus coaches, district workshops, and afterschool PD. She provides teachers with training of TEKS knowledge through data

meetings, they address TEKS students are struggling with, and has periodic afterschool trainings. She explained, "As much as I hate to meet after school, 55 minutes is not enough time to dissect the TEK and verbs, so sometimes we have to meet." As she walks her teachers' classrooms, she is actively looking for the fundamental five components that her district has established to be the expectation in classrooms. Furthermore, she explained that these components encompass best teaching practices.

Ms. Diaz. Ms. Diaz is extremely supportive of her teachers by providing them the autonomy to teach, but making sure that they are adhering to the state standards. She provides her teachers with PD training of materials and resources facilitated by her coaches and ensures to send a grade level representative to all mathematics district meetings. She addresses academic deficiencies through STAAR data, math station rotations where teachers are empowered to teach to their strengths, and through district support. She is also very involved and looking for the fundamental five district components and touches base with teachers through a teacher's assessment and individual feedback. She shared, "This campus is really good and they share the wealth, it's good because we don't want them to stay static, and sharing among themselves is awesome."

Findings indicate that administrators at Title I schools are addressing mathematics professional development needs though effective leadership, the creation of collaborative cultures, providing teachers adequate time to share and discuss ideas, and investing in the learning of teachers. Findings also indicate that administrators at Title I schools are not fully investing in their professional capital.

Research question 3 (qualitative).

The third research question was, "How are professional learning communities in Title 1 schools addressing training of the new mathematics TEKS?" To answer this question, a total of seven PLC's were observed. A total of seven focus groups were also conducted. Information from both the observations and focus groups indicated that each of the four school districts had different perceptions on how to address the training of the new mathematics TEKS.

Valley ISD. Valley ISD had their PLC's after school until almost 6pm. They focused on sharing and discussing what they were doing in the present. Their administrator was present for the first ten minutes and then left. Teachers had no agenda and it was difficult to understand as many were speaking out of turn, they focused on what they were currently doing and how students were experiencing difficulty, but no teacher had physical data indicating the level of deficiency. They shared ideas on how to address gaps. Resources and or materials were not shared amongst each other. They shared and discussed different technology that they each individually incorporate into their classrooms. They had no action plan for any upcoming meetings.

Hill ISD. Hill ISD had grade level PLC's. They were very structured as teachers took turns speaking, all teachers participated, and teachers stayed focused on the objective of the meeting. The meeting was facilitated by the instructional specialist and she provided teachers with campus and district updates on future trainings or benchmarks the campus was having, meanwhile teachers documented these dates either on their computer or personal calendars. Meetings included desegregating data on a projector,

teachers shared and discussed lessons that they had taught to get their students to mastery, and teachers asked questions on differentiation strategies/stations. Teachers also shared and discussed the many ways that they are being inclusive of mathematics academic vocabulary. The PLC meeting ended at the end of their planning time.

Rock ISD. At Cortez Elementary teachers had grade level PLC's that took place during teachers planning time. Teachers had a coach present and it was very structured with the focus being on what they were doing the upcoming week. They shared and discussed the mathematics unit, lessons from the textbook that could be included, previous lessons that they have used to address that TEK, technology that could be embedded, and the coach also gave them additional resources and ideas. They discussed upcoming benchmarks and dates that they would be administering these benchmarks so that teachers could to plan accordingly. Additionally, they also used their district scope and sequence to plan their units of instruction.

Delarosa Elementary also had very similar PLC's to that of Cortez Elementary, only theirs was slightly different based on the needs of their school, that they are self-contained. They had one individual representative meet with the coach during their planning time to share and discuss the upcoming TEKS, activities that could be included, technology integration, TEKS that students could potentially struggle with and differentiation strategies that could help address the challenges through hands on manipulative learning. Coaches were very proactive and brought in a variety of resources and stated that they could create the stations for teachers if they selected to use them.

Teachers then came together as a group at an additional PLC to share and discuss the takeaways for each of the subject areas.

Sunrise ISD. Sunrise ISD held PLC meetings during teacher planning times. PLC's were facilitated by the principal and the curriculum specialist and they were very data driven. They shared and discussed current TEKS students were struggling with, they focused on student learning objectives, and how teachers could teach them. Teachers were also given ideas and strategies along with resources that they could embed into units of instruction. PLC's were followed up with Friday after school grade level walks of bulletin boards with the principal and curriculum specialist looking at learning objectives and evidence of teaching strategies.

Summary

Teacher focus groups indicated that PLC's provide teachers an opportunity to collaborate, share and discuss math achievement through data, and materials/resources that could be included into mathematics lessons. Findings indicate all elements of a professional learning community are not being employed at all Title I schools. Additionally, findings also indicate that professional development of mathematics is only being addressed at some Title I schools.

Research question 4 (qualitative).

The fourth research question was, "To what extent, if any has the implementation of the new mathematics TEKS impacted the pedagogical practices of teachers in Title 1 schools?" A total of fifteen teachers were interviewed and asked the question directly. A total of 11 teachers stated that the standards are more rigorous. Of

the teachers that were observed teaching mathematics lessons, four teachers did not differentiate instruction for their students. A total of five teachers out of the fifteen also did not close their mathematics lesson to reinforce content. Findings validate that the implementation of the new mathematics TEKS has impacted teachers pedagogical practices. Findings also indicate that teachers need additional professional development on mathematics because some teachers are still having difficulty with addressing the rigor, depth, and complexity of new curricular standards.

Conclusions

The study adds to the existing literature and knowledge base about the implementation of new curricular mathematics TEKS. The study found that four years later after the implementation of new mathematics curricular standards, both administrators and teachers continue to face challenges with the implementation within their schools. While teacher professional opportunities questionnaires indicated that 85% of teachers have received some form of PD, only 64% of those teachers indicated that the PD has directly helped them address mathematics topics. Qualitative interviews indicated that teachers were receiving training at both the district and campus level, however much of it was to unpack the TEKS and not fully directed at addressing mathematics teaching pedagogical practices. Principal interviews indicated that administrators aspire to provide teachers the tools and resources needed to address the mathematics TEKS, but some are unwilling to invest in PD during the instructional school day and/or only offer it periodically. Focus groups also indicated that while

teachers valued shared collaboration, some schools are not having regular PLC meetings and both students and teacher are being lost in the transition of new standards.

Additionally, teachers also confessed that addressing the new standards has been a difficult process even for those that are new to the profession as they were taught using traditional methods. They feel that they have had to go back and self-teach themselves to do math with new methodologies to understand the way they are expected to now teach. Some teachers mentioned feeling inadequately prepared, while others mentioned they felt like horrible teachers. Teachers emphasized that schools need to provide them with additional PD opportunities to address such rigorous standards.

Literature indicates that federal education mandates have raised standards and accountability expectations, but as a nation, we continue to struggle with getting students throughout America to become proficient in mathematics. In Texas, TEA introduced new mathematics curricular standards that teachers must teach, and students must be able to understand to meet academic proficiency and were tested beginning in 2014. The standards have demonstrated to be challenging to both administrators and teachers.

Literature indicates that teachers must have a deep understanding of their content knowledge (Ball, & Forzani, 2011; Ball, Thames, & Phelps, 2008). Teaching mathematics is complex and requires that teachers be knowledgeable of the content, but also aspire to teach it. Teachers must develop a great sense of self-efficacy when teaching mathematics (Tschannen-Moran, & Hoy, 2000). Findings indicated that only an average 39% of teachers are individually delving into different mathematics instructional resources. Additionally, teachers must also develop a sense of professional agency to

implement different instructional practices into their classrooms (Remillard, 2000). All teachers must be trained to utilize their adopted textbooks, but administrators must also ensure that textbooks are vertically aligned to their standards (Bruhn, and Hasselbring, 2013). Teachers must also be trained to utilize technology or other differentiation strategies in their classrooms, not just pencils and worksheets. Findings indicated that iPads and stations allowed teachers additional opportunities to reinforce content. Students learn better when lessons are inclusive of technology (Stoehr, Banks, Allen, 2011).

The literature also indicates teachers must also have access to mathematics professional development to improve teacher quality (Dash, Magidin de Kramer, O'Dwyer, Masters, & Russell, 2012). Teachers must have supportive PLC's that allow them an opportunity to collaborate and share ideas (Darling-Hammond, Bullmaster, & Cobb, 1995). Findings indicated that teachers in school districts value shared collaboration as it allows them to share ideas and strategies. New mathematics curricular standards require that teachers are current with their teaching pedagogy and can teach utilizing new methodologies. Teachers that are not professionally developed will often teach using traditional methods (Sather, 2009). Teachers must be professionally developed to teach their students in ways that students deserve (Darling-Hammond, 2012). All students deserve an opportunity to achieve academic success in all subject areas, including mathematics.

Implications

Professionally developing teachers in mathematics requires leadership that can promote a positive school culture in relation to learning new knowledge and strategies. Leadership in Title I schools must be willing to invest in their professional capital, they must acknowledge that education is a long-term investment (Hargreaves, & Fuallan, 2012). Teachers must be provided adequate time to collaborate (Darling-Hammond, 2014). The emphasis on teacher collaboration must be on academic achievement of all students. Leadership must also encourage teachers to embed active learning strategies into their classrooms. When students are provided opportunities to use manipulatives in classrooms, students can make more real-world connections (Moch, 2002). Teachers must also be professionally developed to monitor the academic achievement of their students. Additionally, teachers must understand how to provide their students with the needed intervention. Response to intervention in classrooms is inclusive of three tiers and should be appropriately monitored. Teachers on campuses indicated that they were facilitating all three tiers in their classrooms. Leadership must take ownership of students that are academically at-risk. Administrators and teachers must be professionally developed to meet the needs of all learners in classrooms.

Given the findings of this study, administration should examine professional development offerings at the campus level, district level, and outside the district to ensure that teachers are being provided the needed PD to teach to the rigor of the new mathematics curriculum. Some school districts demonstrated to be providing their schools and teachers with additional instructional and technical support, while others did

not. School districts should examine PD offerings and ensure that teachers are receiving quality instructional support. Effective leadership at the district level is needed in all school districts to provide principals and teachers effective PD on new program and curriculum implementation. Administration must also revisit their PLC's and ensure that they are structured, that enough time is being provided for teachers to collaborate, and that it is inclusive of an administrator or coach that will empower teachers to be learners during meetings.

Additionally, administrators should also be more observant of all teachers, not just struggling teachers. Findings indicated that some administrators may need additional leadership training to address closing mathematics academic achievement gaps on their campuses. Findings in the study also indicated that teachers that were teaching to mastery often felt unappreciated because principals did not do walk-throughs in their classrooms and that they too, would welcome frequent feedback and recognition. Teachers should be empowered to be teacher leaders, they should be provided opportunities to collaborate with other teachers and observe each other's instructional lessons. Administrators should use the data that other schools in their campus comparison groups are doing effectively to enhance practices within their own schools. Administrators should look at inquiry based learning opportunities, teacher led study groups, and establishing practitioner action research on their campuses to examine PD results. Finally, administrators need to be questioning and finding out what PD learning outcomes are of utmost importance to teachers. As Ms. Lamb stated, she would like "to have a say in what PD looks like."

Threads of leadership woven into these schools must encourage the professional training and development of mathematics teachers to enrich schools by addressing closing mathematics academic achievement gaps currently present. Leaders have a responsibility to professionally develop their teachers.

Recommendations for Future Research

The purpose of this study was to examine the challenges that teachers and administrators have had to overcome to meet federal legislation educational compliance in Texas schools. The researcher sought to examine how schools and districts were professionally developing their teachers on new mathematics curricular standards that were adopted in Texas. The study is a step in the right direction for all schools because as a nation our students are struggling to meet mathematics academic proficiency standards, closing the academic deficiency gap is crucial.

Texas Title I schools were the focus within the study, as they often tend to have the largest number of students academically challenged, but the study revealed that regardless of school classification, schools can be successful if effective leadership is in place to address the needs of both teachers and learners. The study is especially important and relevant for Texas schools because they belong to a campus comparison group that are similar in demographics and can be used for comparative effectiveness. Utilizing a campus comparison group in the study raises the question that if one school can perform at a specific level, then why can others in the same campus comparison group not have the same level of academic performance? Although the study revealed

significant findings for Texas Title I schools, there are recommendations for future research in all states across the country.

The first research question examined how teachers in Title 1 schools perceive professional development opportunities of the new mathematics TEKS. The questionnaire revealed that while Rock ISD teachers are benefiting from professional development on their campuses, other schools had a significant difference. In the study, Rock ISD also had the largest number of participants because two schools were utilized from within the school district. Additionally, Delarosa Elementary was all self-contained and provided the greatest number of teacher participants with a 93% completion rate. Further research is recommended to be inclusive of an equal sample from each of the school districts. Quantitative comparisons across states could be addressed in future research studies. Qualitative administrative district perceptions of professional development are also recommended. Furthermore, qualitative analysis of professional development offerings for schools across school districts and states is also recommended. An additional recommendation would also be to identify and utilize a different questionnaire instrument with fewer answer variables.

Although it was the intent of the researcher to initially utilize six campuses from six different school districts, that was not achieved due to lack of access to schools. Additionally, one larger school district was also proposed to be inclusive of all six schools for the study, but the school district would not allow for any of their schools to participate in the study. Initially two schools were also proposed to be used from Sunrise ISD, but after numerous attempts were made and no response from the principal, the

researcher selected to abandon the site as a field of study. Future studies could be conducted with a group of school districts that have approximately the same number of teacher participants or the focus is on one individual grade level.

Concluding Remarks

The findings of this study expanded on previous work in the area of effective leadership in schools to support teacher training and development. Additionally, the study also expanded upon professional learning communities in schools that encompassed a culture of shared leadership among teachers that is reflective of student academic success. This study revealed that the tapestry of our Title I structures can have landscapes that are covered in bright colors that truly have the ability to achieve academic success with effective leadership involvement. Schools are in need of educational leaders that promote a positive and shared culture and will provide their teachers with the needed time to be professionally developed. As third grade teachers at Delarosa Elementary stated, "…our administrators really listen to us,…administration created an environment where we don't take things personal, we value each other, having open communication really works."

Additionally, the study also revealed that even in high performing schools, teachers are lifelong learners, they have a strong desire to continue learning. Teachers need caring and understanding leaders that will be cognizant of the many other responsibilities that they have outside of the teaching profession. Effective leaders must recognize that teachers are already working additional hours to ensure the success of their students and professional development needs to take place both during the instructional

day and after school to allow everyone the opportunity to participate. As Ms. Newberg declared, "as a new mom and a new wife, it is hard to attend after school…before I would take all classes, but now I cannot." As educational leaders, we must value that teachers also have lives outside of the classroom.

Administrators must continue to develop even the best teachers on their campuses so that they too, can have a greater sense of self-efficacy in both their teaching and pedagogical skills. Teachers in this study mentioned feeling horrible and uncertain when new curricular standards were released because they could not convey the material effectively to their students. Mathematics teachers dedicated to the profession should never have to experience a lack of self-worth, instead they must be empowered to learn new best practices that result in student academic achievement through campus and district professional development.

Quantitative findings revealed that teachers are extremely dependent on district curriculum resources, textbook and technology training, and most importantly on collaboration. Qualitative findings however revealed that not all teachers are adequately trained on mathematics textbook adoptions in Title I schools. Textbooks are costly resources for all school districts and they should be used to full capacity rather than sitting on teachers shelves. Teachers should be using textbooks, but also technology to differentiate within their classrooms, to conduct formative and summative assessments, and to enhance their mathematics instruction with supplemental resources. Teachers also must have online technology keys for adopted textbooks, coupled with periodic trainings that will provide teachers ideas and strategies for mathematics units of instruction.

Moreover, teachers need collaborative learning spaces and opportunities to learn from their colleagues. Teachers must be given adequate time to have discourse and dialogue about best teaching practices, especially for those that are new to the profession or new to teaching mathematics content in general.

Qualitative findings revealed that teachers have high PD expectations especially when new curriculum is adopted because they lack the understanding associated with such rigorous standards. While teachers should be dedicated to learning new standards, administrators and districts also have a shared responsibility to provide professional development training for their teachers on new curricula. Qualitative findings also revealed that teachers want to be able to close academic achievement gaps of their students, but as one teacher stated, they need additional help. Regardless of geographical location of schools, all teachers must have access to professional development. Teachers like that of Ms. Jackson should not be left wondering, "I don't know if it is because we are a smaller town, a smaller district, there is not as much available to us." School districts have a responsibility to seek the needed support to train and develop their teachers.

Teacher interviews and focus groups revealed that the educational landscape is so much richer in schools when strands of leadership are interwoven into the tapestry to be reflective of both the success of students and teachers. "The question of when a work of art is finished, when things are *right*, is an issue of great interest…" (Lawrence-Lightfoot, & Davis, 1997, p. 268). Teachers' voices in this narrative can be heard from afar pleading for mathematics training, feedback, support, and professional development.

Throughout America, students continue to demonstrate mathematics academic achievement gaps that begin as early as elementary education, that narrative however needs to change. Literature indicates that as a country, we have made strides in attempting to close mathematics academic achievement gaps, but our work is far from over and we have only just begun to paint the educational landscape.

Framing a portrait of education can only occur if teachers within the walls of these educational structures have the necessary skills, knowledge, and training needed to overcome the challenges of new mathematics curricular changes. The study sought to address to what extent mathematics curricular changes have impacted Title I elementary schools in Texas, findings indicate that teachers and administrators may experience learning curves when changes are implemented. Therefore, adequate professional development of both administrators and teachers is necessary to address the needs of learners and ensure that they are not lost in the transition. As Ms. Diaz, principal from Delarosa Elementary declared, "Professional development is very important for all of us, not just teachers, we learn so much," PD is a shared responsibility. Teachers truly are lifelong learners that strive to frame educational portraits within educational structures, breaking barriers in mathematics academic achievement is a collective effort that requires continuous training and development.

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APPENDIX A

Administrators Interview Questions

For purposes of this study, the following definition of professional development will be used; professional development (PD) is collaborative learning among teachers resulting in strategies that assist them in adapting practices that will assist their learners (Darling-Hammond, Bullmaster, & Cobb, 1995).

For purposes of this study, the following definition of professional learning communities will be used; professional learning communities help create and establish relationships among teachers as colleagues within educational structures while focusing on professional development that will improve and support student learning (Little, 2006, p. 15).

I am interested in your thoughts on mathematics professional development offerings at the campus level. Please answer the following questions as openly and honestly as possible and please remember there are no right or wrong answers. The interview will take approximately 45-60 minutes, all responses will be audiotaped and transcribed. The meeting will be audio taped so that I may accurately transcribe responses. Your responses will be confidential, there is no risk to you answering the questions as responses will not be used to evaluate you as an administrator in any way, and your name will not be mentioned in research reports of this study. I will provide a copy of the transcription to you before I include the information in my report. You may request changes or deletions at any time. However, the recording will remain only in my possession. When this project is complete, the tape will be destroyed. Please remember that you can withdraw your participation at any time during the research study.

1. What is your experience being an educational leader within the school district? Within the school?
2. What is an educational leader's role in the professional development of mathematic teachers?
3. How are priorities of mathematics professional development established on the campus?

4. To what extent do standards and accountability influence mathematic professional development priorities?
5. How have the new curricular mathematics standards been addressed through professional development?
6. How are mathematics resources embedded into professional development?
7. How are best teaching practices embedded into teachers' professional development of mathematics on your campus?
8. How is the professional development of your mathematics teachers supporting them and helping them inform their practice to ensure that all students are successful?
9. What types of ongoing mathematics campus professional development is currently being offered to your teachers?
10. Is there anything else about professional development that you would like to include into this interview?

APPENDIX B

Teachers Interview Questions

For purposes of this study, the following definition of professional development will be used; professional development (PD) is collaborative learning among teachers resulting in strategies that assist them in adapting practices that will assist their learners (Darling-Hammond, Bullmaster, & Cobb, 1995).

For purposes of this study, the following definition of professional learning communities will be used; professional learning communities help create and establish relationships among teachers as colleagues within educational structures while focusing on professional development that will improve and support student learning (Little, 2006, p. 15).

I am interested in your thoughts on mathematics professional development offerings at the campus level. Please answer the following questions as openly and honestly as possible and please remember there are no right or wrong answers. The interview will take approximately 45-60 minutes, all responses will be audiotaped and transcribed. The meeting will be audio taped so that I may accurately transcribe responses. I will provide a copy of the transcription to you before I include the information in my report. Your responses will be confidential, there is no risk to you answering the questions as responses will not be used to evaluate you as a teacher in any way, and your name will not be mentioned in research reports of this study. You may request changes or deletions at any time. However, the recording will remain only in my possession. When this project is complete, the tape will be destroyed. Please remember that you can withdraw your participation at any time during the research study.

1. What is your professional experience teaching within the school district? Within the school?
2. As an educator, what are your expectations of mathematics professional development at the campus level?
3. How are priorities of mathematics professional development established on the campus?
4. To what extent do standards and accountability influence mathematic professional development priorities on your campus?

5. How have the new curricular mathematics standards been addressed through professional development?
6. How are mathematics resources embedded into professional development?
7. How is mathematics professional development helping you inform your teaching practice to ensure that all your students are successful?
8. Reflecting to the previous two years of mathematics professional development, what offering has been the most impactful to you as an educator?
9. How has the implementation of the new mathematics TEKS impacted your teaching practice?
10. Is there anything else about professional development that you would like to include into this interview?

APPENDIX C

Professional Learning Community Observation

Date: _____ Subject Area: _____	Grade Level: _____
Norms: 1. _____ 2. _____ 3. _____ 4. _____	Start Time: _____ End Time: _____
Members Present:	
Instructional Goals: 1. _____ 2. _____ 3. _____ 4. _____	
Discussion/Summary:	
What follow-up is needed based on the information shared?	
Action Steps:	
Next Steps:	
Reflections:	

APPENDIX D

Mathematics Teacher Observation

Date:	School/Grade:	
Teacher:	Start Time:	End Time:
Classroom Description (*How was the class setup?*):		
Lesson Objectives (*What were the student content learning goals, were goals explained, and was background knowledge established?*): 1. _____ 2. _____ 3. _____		
Materials (*What resources, manipulatives, or technology were provided or used in the lesson?*):		
Lesson (*How was the lesson structured: modeled, shared, guided, and independent?*):		
Differentiation (*What types of student groupings were observed during the lesson?*):		
Evaluation (*How did the teacher assess student learning goals?*):		
Closure (*How did the teacher close the lesson?*):		

APPENDIX E

Interview Protocol

Focus Group Interview Protocol
Interview Protocol Project: *The Challenges of newly adopted mathematics curricular standards in Title I schools.*
Date:
Start Time: _____ End Time: _____
School:
Place interview is being held:
Interviewer: Carmen Cruz
Interviewees/ Grade Level: 1. _____ 2. _____ 3. _____ 4. _____ 5. _____ 6. _____ 7. _____
Position of Interviewee: See Diagram

Focus Group Interview Order

I. Welcome

II. The Purpose of the Interview & Study

A. The purpose of my study is to identify the challenges of the newly adopted mathematics curriculum in Title I schools. Today during this focus group interview I would like to learn more about how professional learning communities at your school are addressing your training as teachers of the new mathematics TEKS. Additionally, I would also like to learn to what extent, if any has the implementation of the new mathematics TEKS impacted your pedagogical practices as teachers.

B. For purposes of this study, the following definitions of terms will be used during the focus group interview:

1. **Professional Learning Communities:** help create and establish relationships among teachers as colleagues within educational structures while focusing on professional development that will improve and support student learning (Little, 2006, p. 15).

2. **TEKS:** Texas Essential Knowledge Skills adopted by the state board of education as state standards that students should be able to do for each grade level and teachers are to teach their students (TEA, 2016).

III. Interviewee Reminders

1. Please remember during this interview, there are no right or wrong answers. Keep in mind that as a researcher I am interested in your thoughts and opinions as educators on this campus. Your responses will be confidential, there is no risk to you answering the questions as responses will not be used to evaluate you as teachers in any way, and your names will not be mentioned in research reports of this study. You may withdraw your participation at any point in the research study.

2. Be respectful of others as they are speaking so that each teacher can state their opinions freely and openly without being talked over by their colleagues. The interview will take approximately 45 minutes and will be audiotaped and transcribed, when the project is completed all audiotapes will be destroyed. By allowing each person to speak without any interruptions will assist me in identifying the teacher speaking in the recording.

3. During the interview if you need any of the questions repeated and/or clarified, please do not hesitate to ask.

IV. Questions

1. Please state your name, the grade level that you teach, and how long you have been teaching at this school.

2. Share with me how mathematics professional learning communities are facilitated at your school?

3. How do professional learning communities help you plan mathematics units of instruction as a grade level?

4. How do professional learning communities help you address the needs of diverse learners?

5. What mathematics resources and/or support in professional learning communities are provided to you that help address your training needs of the new mathematics TEKS?

6. How do professional learning communities help you monitor mathematics achievement and/or underachievement of your students?

7. How do professional learning communities help you learn and grow as mathematics teachers?

8. Is there any additional information that you would like to add to this interview?

APPENDIX F

Focus Group Invitation

Who: Third and Fourth Grade Mathematics Teachers at _____ Elementary

When: _____
3:15-4:00 p.m.

Where: _____

What: An Informal Discussion Group (Focus Group), Snacks and beverages will be provided along with an opportunity to enter a $25.00 restaurant certificate drawing concluding the focus group.

As part of my doctoral studies at Stephen F. Austin State University, I am collecting data about how professional learning communities in Title I schools are addressing training of the new mathematics TEKS. I would really appreciate your taking some time from your busy and demanding schedule to share your thoughts and experiences in a small group setting.

Too often educational research is based on formalized and statistical data. With your help and input, I hope to be able to reflect real teacher experiences and feelings in my research report.

The meeting will be audio taped so that I may accurately transcribe responses. I will provide a copy of the transcription to you before I include the information in my report. You may request changes or deletions at any time. However, the recording will remain only in my possession. When this project is complete, the tape will be destroyed.

I am looking forward to talking with each of you on _____.

Carmen Cruz
Doctoral Candidate
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832-653-1039

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APPENDIX G

Teacher Professional Opportunities Questionnaire

Purpose of the Questionnaire:

The purpose of this questionnaire is to learn how professional development in Title I schools is supporting mathematics teachers.

Benefits of the Questionnaire:

Through the participation of the questionnaire, the researcher will have the opportunity to learn and understand how professional learning opportunities are supporting mathematics teachers in Title I schools. Additionally, the researcher will also learn about your participation in professional activities.

Instructions:

The questionnaire will take approximately 5-7 minutes to complete. Please make sure that you read each question carefully and try your best to answer all parts to the questionnaire. Your responses will be confidential, there is no risk to you in completing the questionnaire as the questionnaire will not be used to evaluate you as a teacher in any way, and your name will not be mentioned in research reports of this stud. Please remember that you can withdraw your participation at any time during the questionnaire. Demographic information collected allows the researcher to identify the number of respondents at each school and grade levels. Thank you for taking the time to complete this questionnaire.

Last Name: _____ **First Name:** _____

School District: _____ **Grade Level:** _____

School: _____ **City:** _____

State: _____ **Zip Code:** _____

Adapted from:

Shafer, M.C., Wagner, L. R., & Davis, J. (1997). A longitudinal/cross-sectional study of the impact of mathematics in context on student mathematical performance. Wisconsin Center for Education Research.

1. Which of the following have you read? (Select all that apply)

    a) Your school district mathematics framework or curriculum guide

    b) Your state mathematics framework or curriculum guide

    c) *Curriculum and Evaluation Standards for School Mathematics* published by the National Council of Teachers of Mathematics (1989)

    d) *Professional Standards for Teaching School Mathematics* published by the National Council of Teachers of Mathematics (1991)

    e) *Assessment Standards for School Mathematics* published by the National Council of Teachers of Mathematics (1995)

    f) Journals specifically related to mathematics teaching and learning such as *Teaching Children Mathematics* (formerly *Arithmetic Teacher), Mathematics Teaching in the Middle School,* and *Mathematics Teacher*

    g) Journals related to teaching and learning in the elementary and middle school that are not specifically targeted for mathematics

2. During the last school year, how often did you do the following? (Select one response for each statement)

	Number of Times					
a. Visit another teacher's classroom to observe and discuss his/her mathematics teaching	0	1	2	3-4	5-9	10+
b. Have another teacher observe your mathematic teaching	0	1	2	3-4	5-9	10+
c. Receive meaningful feedback on your mathematics teaching from peers or	0	1	2	3-4	5-9	10+

supervisors						
d. Participate in a group or network with other mathematics teachers outside of your school	0	1	2	3-4	5-9	10+

3. During the last school year, how often did you participate in formal meetings (e.g., department meetings) with other mathematics teachers in your school related to the following discussions? (Select one response for each statement)

	Number of Times					
a. The new mathematics curriculum	0	1	2	3-4	5-9	10+
b. Mathematics teaching techniques and student activities	0	1	2	3-4	5-9	10+
c. Ideas for assessing student learning of mathematics	0	1	2	3-4	5-9	10+
d. Evaluation of your mathematics program	0	1	2	3-4	5-9	10+

4. During the past 12 months, how many college or university courses did you take? (Select one)

0	1	2	3	4	More than 4

5.

Answer the following questions for each topic in the left column:			
a) Have you participated in professional development activities during the past 18 months that have addressed that topic? If yes, please answer part b.			
b) Did that professional development activity lead to changes in your teaching of mathematics? If you agree or strongly agree, please answer part c.			
c) Did the changes in your teaching enhance your students' learning?			
	a. My professional development activities addressed the topic	b. My professional development on this topic led to changes in my teaching of mathematics	c. The changes inspired this professional development activity were effective in facilitating/

						enhancing student learning.		
	Yes	No	SD	D	A	SA	NE	ME	VE
a. Core Ideas	Yes	No	SD	D	A	SA	NE	ME	VE
b. Techniques of Classroom Discourse	Yes	No	SD	D	A	SA	NE	ME	VE
c. Direct Instruction	Yes	No	SD	D	A	SA	NE	ME	VE
d. Student Reasoning	Yes	No	SD	D	A	SA	NE	ME	VE
e. Using on-going assessment to guide instruction	Yes	No	SD	D	A	SA	NE	ME	VE
f. Basic instructional practices on student knowledge	Yes	No	SD	D	A	SA	NE	ME	VE
g. Mathematics in context	Yes	No	SD	D	A	SA	NE	ME	VE

Note: SD: Strongly Disagree, D: Disagree, A: Agree, SA: Strongly Agree, NE: Not Effective, ME: Moderately Effective, VE: Very Effective

6. What type of support did you receive for attending professional development meetings, workshops, and conferences? (Select all that apply)

Release time from teaching	Paid travel expenses	Continuing education units
Honorarium	None	Other:

7. During the contracted school week, how much planning time do you typically have?
   a. _____ minutes/day
   b. _____ minutes/ week

8. How often do you spend at least 15 minutes (in formal or informal sessions) planning mathematics lessons, activities, assessments, etc. with other mathematic teachers? (Select one choice)

Number of Days:	0	<1	1-3	4-6	>6

9. When you plan mathematics lessons, activities, assessments, etc., with other mathematics teachers, when does this collaboration take place? (Select one choice)

Does not apply	During formal meetings	During contracted planning time	After school on your own time

10. In a typical formal and informal meeting or planning sessions with other mathematics teachers, indicate the number of times you participate in each of the following types of discussion. (Select one response for each statement)

a. Discussions about concepts to be emphasized in instruction, guiding instruction, obtaining materials, or including related materials	Never	Sometimes	Frequently	Always
b. Teaching materials and activities	Never	Sometimes	Frequently	Always
c. Specific teaching techniques	Never	Sometimes	Frequently	Always
d. Assessment procedures that reveal how students understand mathematics	Never	Sometimes	Frequently	Always
e. Problems with specific students and arrangement of appropriate help for them	Never	Sometimes	Frequently	Always
f. Individual preparation of	Never	Sometimes	Frequently	Always

lessons, tests, or grades				
g. Develop course goals or objectives for mathematics	Never	Sometimes	Frequently	Always
h. Scheduling, student grouping, or planning group events or projects	Never	Sometimes	Frequently	Always
i. Sharing ideas about mathematics that are interesting to you as an adult	Never	Sometimes	Frequently	Always
j. Sharing stories about teaching experiences in mathematics	Never	Sometimes	Frequently	Always
k. Discussing something you have read from professional literature about mathematics	Never	Sometimes	Frequently	Always
l. Parent Issues	Never	Sometimes	Frequently	Always
m. Other typical activity, please describe				

11. About what percent of the mathematics teachers at your school are involved in efforts to improve the mathematics program? _____%

12. In general, how would you characterize your efforts to improve the mathematics program at your school? (Select one)

Strong Opposition	Slight Opposition	Slight Support	Strong Support

Adapted from:

Shafer, M.C., Wagner, L. R., & Davis, J. (1997). A longitudinal/cross-sectional study of the impact of mathematics in context on student mathematical performance. Wisconsin Center for Education Research.

APPENDIX H

Teacher Questionnaire Invitation

XXXX XX, 2017

Dear Teacher:

I want to say thank you for agreeing to participate in my study: *The Challenges of the Newly Adopted Mathematics Curriculum in Title I Schools: A Mixed Methods Study.* Your feedback is extremely valuable to this study and I would like to ask your assistance in gathering additional information on teachers' thoughts and perceptions of professional learning opportunities offered on your campus.

I would greatly appreciate it if you could take a few minutes to complete this online questionnaire on or before xxxxx and xxxxx. The questionnaire will take approximately 5-7 minutes to complete. Please make sure that you read each question carefully and try your best to answer all parts to the questionnaire. Your responses will be confidential, there is no risk in completing the questionnaire as responses will not be used to evaluate you as a teacher in any way, and your name will not be mentioned in research reports of this study. Demographic information collected at the beginning of the questionnaire allows the researcher to identify the number of respondents at each school and grade levels.

If at any time during the questionnaire you experience any technical difficulties, please retry the link that has been emailed to you. If you continue to experience technical difficulties, please feel free to email me at cruzc1@jacks.sfasu.edu or my dissertation chair at sampsonp@sfasu.edu and we will resend the link if necessary. Thank you again for taking the time out of your busy teaching schedule to complete this questionnaire.

Please click the following link to begin the questionnaire:
Questionnaire Link Placeholder directly from Qualtrics

Sincerely,

Carmen Cruz
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APPENDIX I

Teacher Questionnaire: Permission to use Letter

To: Mary Shafer
Subject: Seeking Permission to Use Teacher Questionnaire from working Paper #11

Hi Dr. Shafer,

My name is Carmen and I am a doctoral student at Stephen F. Austin State University in Nacogdoches Texas headed into dissertation. I am conducting a dissertation on the following: *The Challenges of the Newly Adopted Mathematics Curriculum in Title I Schools: A Mixed Methods Study.* I wanted to request your permission to use and adapt the teacher questionnaire from your working paper #11: *A Longitudinal/ Cross-Sectional Study of the Impact of Mathematics in Context on Student Mathematical Performance,* for my dissertation. Please let me know if I need to provide you additional details, I greatly appreciate your help.

Regards,

Carmen Cruz, M.Ed.
HSI STEM Coach
St. Louis Hall 022
Office: (210) 431-6752
https://www.stmarytx.edu/academics/set/special-programs/hsi-stem/

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The Catholic and Marianist University
One Camino Santa Maria
San Antonio, Texas 78228
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Cruz, Carmen

From: Cruz, Carmen
Sent: Friday, May 26, 2017 1:01 PM
To: 'Mary Shafer'
Subject: RE: Seeking Permission to Use Teacher Questionnaire from working Paper #11

Good afternoon Dr. Shafer,

I want to thank you for agreeing to allow me to use and adapt the teacher questionnaire in my dissertation at Stephen F. Austin State University, it will be cited as you have requested.

Kind Regards,
Carmen Cruz

From: Mary Shafer [mailto:mshafer@niu.edu]
Sent: Wednesday, May 24, 2017 1:05 PM
To: Cruz, Carmen <ccruz14@stmarytx.edu>
Cc: Mary Shafer <mshafer@niu.edu>
Subject: Re: Seeking Permission to Use Teacher Questionnaire from working Paper #11

Hello, Carmen,

Thank you for your interest in the Teacher Questionnaire developed and used in the longitudinal and cross-sectional studies of Mathematics in Context. I was the research coordinator for the studies.

You have my permission to use and adapt the teacher questionnaire from working paper #11: *A Longitudinal/ Cross-Sectional Study of the Impact of Mathematics in Context on Student Mathematical Performance,* for your dissertation.

In your dissertation work, please make sure to cite this working paper as shown on the cover page of the document.

Mary Shafer

Mary Shafer
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Department of Mathematical Sciences
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From: Cruz, Carmen <ccruz14@stmarytx.edu>
Sent: Tuesday, May 23, 2017 12:43 PM

APPENDIX J

Superintendent Consent

XXX X, 2017

Superintendent XXXXX
XXXX Independent School District
XXXX, Texas, XXXXX

Dear XXXX,

My name is Carmen Cruz, and I am a doctoral candidate in the Department of Secondary Education and Educational Leadership at Stephen F. Austin State University. The purpose of this letter is to solicit your support and cooperation in my dissertation study, which is a mixed methods study on the challenges of the newly adopted mathematics curriculum in Title I schools. The purpose of this study is to identify: how professional development is supporting teachers in Title I schools, how professional development is being offered, how professional learning communities are addressing the mathematics training of teachers, how the implementation of the new mathematics TEKS have impacted teaching practices.

The results of this study will be significant for teachers and administrators by addressing the challenges faced by Title I schools through the implementation of new curriculum and help provide information to schools and districts making the transition to new mathematics curriculum more effective for all stakeholders, especially their students. This mixed methods study may also provide valuable information to educational leaders with regards to pedagogical practices that will help them better develop their teachers. Upon completion of the study, a copy of the final dissertation will be sent to the school district.

I am requesting your permission to interview administrators, third grade teachers, and fourth grade teachers for the study in your school district. I plan to begin data collection procedures beginning in early September of 2017 through October 2017. The approximate time frame established for data collection procedures is four weeks. This research project is a mixed methods study that includes collection of data via interviews, observations, focus groups, and teacher questionnaires. The interviews for both administrators and teachers will be conducted at their convenience and are expected to last 45-60 minutes. In addition, focus groups of both third and fourth grade teachers will be conducted in a group format and are expected to last between 45-60 minutes. Refreshments will be provided to the teachers during the focus group, along with an opportunity to enter a drawing for a $25.00 restaurant gift certificate as a token of appreciation for their involvement. Teacher questionnaires will take approximately 5-7 minutes to complete online.

All interview data collected will be held in strict confidence. Neither the school, nor the participant's real names will be used. Moreover, all data will be confidential, and teachers will be provided a pseudonym so their identities will not be known. Transcripts

of the interviews will be made available for participants to confirm the information provided.

If you choose to consent to the participation of your school district teachers and administrators in the mixed methods research, please sign below. If you have any questions or require clarifications, please contact me at 832-653-1039 or Dr. Pauline Sampson, chairman of the dissertation committee, at 936-468-5496. Any concerns with this research may be directed to the office of research and special programs at 936-468-6606. Thank you for your assistance.

Sincerely,

Carmen Cruz
Doctoral Candidate
Department of Secondary Education and Educational Leadership
College of Education
Stephen F. Austin State University
P. O. Box 13018
Nacogdoches, TX 75962
832-653-1039

Dr. Pauline Sampson
Chair, Dissertation Committee
Department of Secondary Education and Educational Leadership
College of Education
Stephen F. Austin State University
P. O. Box 13018
Nacogdoches, TX 75962
936-468-5496

Superintendent Consent for School District to Participate

"I consent for teachers and administrators at _____ Elementary school(s) to participate in the study by meeting with the researcher in interview sessions and focus groups. I also consent for the researcher to observe professional learning communities and third and fourth grade mathematics classrooms. I understand that all responses, schools, and the school district will remain confidential using a coding system, and the purpose of the study is to further the research on the challenges of newly adopted mathematics curriculum in Title I schools. I also understand that there is no risk in participating in the study and I can withdraw participation of my school district from this study at any time I so choose."

_____ _____
Superintendent/Assistant Superintendent Date

_____ _____
Person obtaining consent _____ Date _____
Note: The participant will receive a copy of this letter for his/her information, and the researcher will keep a signed copy in her files.

APPENDIX K

Principal Consent

XXXX XX, 2017

Principal XXXX
XXXXXXXXX
XXXXXX, TX, XXXXX

Dear _____:

This letter serves to request permission to collect data for my doctoral dissertation study at your Title I campus. Currently, I am a doctoral student at Stephen F. Austin State University in Nacogdoches, Texas. The title of my study is: *The Challenges of the Newly Adopted Mathematics Curriculum in Title I Schools: A Mixed Methods Study.* I plan to begin data collection procedures beginning in early September of 2017 through October 2017. The approximate time frame established for data collection procedures is four weeks. Permission to conduct the study has already been obtained from Superintendent _____ and it is attached to this letter.

The purpose of this mixed methods study is to determine: how professional development is supporting teachers in Title I schools, how professional development is being offered, how professional learning communities are addressing the mathematics training of teachers, and how the implementation of the new mathematics TEKS have impacted teaching practices. For purposes of this study I seek to interview administrators and teachers for approximately 45-60 minutes. I also seek to conduct focus groups for approximately 45 minutes with beverages and snack proved to third and fourth grade teachers along with a chance to enter a $25.00 restaurant certificate drawing for their participation. I also request to observe third and fourth grade professional learning communities, observe third and fourth grade teachers teaching a mathematics lesson, and ask teachers to complete an online questionnaire that will take approximately 5-7 minutes to complete. Neither the school, nor the participant's real names will be used in the study, pseudonyms will be assigned. Moreover, there is no risk involved as all data will be confidential.

The results of this study will be significant for teachers and administrators by addressing the challenges faced by Title I schools through the implementation of new curriculum and help provide information to schools and districts making the transition to new mathematics curriculum more effective for all stakeholders, especially their students. This mixed methods study may also provide valuable information to educational leaders with regards to pedagogical practices that will help them better develop their teachers. Upon completion of the study, a copy of the final dissertation will be sent to the school district. If you consent to allow teachers and administrators to participate in the study, please complete and return the attached Participant Consent Form.

If you have any questions, please contact me at: 832-653-1039 or Dr. Pauline Sampson, my dissertation chairman at: 936-468-5496. Any concerns with this research may be directed to the office of research and special programs at 936-468-6606. Your

consideration of this request is very much appreciated. I look forward to your positive response.

Kind Regards,

Carmen Cruz
Doctoral Candidate
Department of Secondary Education and Educational Leadership
College of Education
Stephen F. Austin State University
P. O. Box 13018
Nacogdoches, TX 75962
832-653-1039

Dr. Patrick M. Jenlink
Chair, Dissertation Committee
Department of Secondary Education and Educational Leadership
College of Education
Stephen F. Austin State University
P. O. Box 13018
Nacogdoches, TX 75962
936-468-1756

Principal Consent for School to Participate Form

"I understand the purpose of this study, and I agree for this study to be conducted at _____ Elementary school. I agree for the researcher to interview administrators and teachers, conduct focus groups of third and fourth grade level teachers, observe professional learning communities of third and fourth grade teachers, and observe third and fourth grade teachers teaching a mathematics lessons, and for third and fourth grade teachers to complete an online questionnaire. I understand that the name of my school, the name of my administrators, nor the names of teachers will be used in the final report, instead pseudonyms will be used. I also understand that there is no risk in participating in the study and I can withdraw my participation of my school from this study at any time I so choose."

_____ _____

Signature of the Researcher (Date) Signature of the Principal (Date)

Note: The participant will receive a copy of this letter for his/her information, and the researcher will keep a signed copy in her files.

APPENDIX L

Administrator/ Teacher Consent to Participate

in

THE CHALLENGES OF NEWLY ADOPTED MATHEMATICS CURRICULUM IN TITLE I SCHOOLS: A MIXED METHODS STUDY

The purpose of the study is to further the research on the challenges of newly adopted mathematics curriculum in Title I schools. The results of this study will be significant for teachers and administrators by addressing the challenges faced by Title I schools through the implementation of new curriculum and help provide information to schools and districts making the transition to new mathematics curriculum more effective for all stakeholders, especially their students. This mixed methods study may also provide valuable information to educational leaders with regards to pedagogical practices that will help them better develop their teachers. Upon completion of the study, a copy of the final dissertation will be sent to the school district. If you have any questions, please contact me, Carmen Cruz at: 832-653-1039 or Dr. Pauline Sampson, my dissertation chairman at: 936-468-5496. Any concerns with this research may be directed to the office of research and special programs at 936-468-6606.

"I _____consent to participate in the study by completing an online minute questionnaire that will take approximately 5-7 minutes and/or meeting with the researcher in interview sessions for approximately 45-60 minutes and/or focus groups for approximately 45 minutes. I understand that all responses, school information, and teacher names will remain confidential using a coding system and pseudonyms and there is no risk involved in choosing to participate. I also understand that all interviews and focus groups will be audiotaped and transcribed and destroyed when the project is completed. Additionally, I also understand that I can withdraw my participation from this study at any time I so choose. I understand data collection procedures will begin in early September of 2017 through October 2017, for an approximate duration of four weeks."

Date and Time Available for Interview: _____

Position/Number of Years in Position: _____

Email (questionnaire will be emailed): _____

_____ _____

Signature of the Researcher (Date) Signature of the Participant (Date)

Note: The participant will receive a copy of this letter for his/her information, and the researcher will keep a signed copy in his files.

Carmen Cruz
Doctoral Candidate
Department of Secondary Education and Educational Leadership
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APPENDIX M

Descriptive Frequency Item Analysis
Valley Independent School District

(n = 5)						
1. Which of the following have you read? (Select all that apply)						
Choice/ Count	%					
a) 5	100					
b) 4	80					
c)						
d) 1	20					
e) 2	40					
f) 2	40					
g)						
Total	14					
M	36%					
2. During the last school year, how often did you do the following? (Select one response for each statement)						
Number of Times	0	1	2	3-4	5-9	10+
A Visit another teacher's classroom to observe and discuss his/her mathematics teaching		1	1	2		1
B Have another teacher observe your mathematic teaching		1	2	1	1	
C Receive meaningful feedback on your mathematics teaching from peers or supervisors		3		1	1	
D Participate in a group or network with other mathematics teachers outside of your school	2	1	1		1	
Total Count	2	6	4	4	3	
%	11	32	21	21	16	0
3. During the last school year, how often did you participate in formal meetings (e.g., department meetings) with other mathematics teachers in your school related to the following discussions? (Select one response for each statement)						
Number of Times	0	1	2	3-4	5-9	10+

A The new mathematics curriculum		1	1		1	2
B Mathematics teaching techniques and student activities		1	2			2
C Ideas for assessing student learning of mathematics		1	1	1		2
D Evaluation of your mathematics program	2	2				1
Total Count	2	5	4	1	1	7
%	10	25	20	5	5	35

4. During the past 12 months, how many college or university courses did you take? (Select one)

	0	1	2	3	4	More than 4
Number of Times	3					2
Total Count	3	0	0	0	0	2
%	60	0	0	0	0	40

5. Answer the following questions for each topic in the left column:

a.) Have you participated in professional development activities during the past 18 months that have addressed that topic? If yes, please answer part b.

	Yes	NO	If no, participant does not complete question 5
Total Count	5		
%	100		

b.) Did that professional development activity lead to changes in your teaching of mathematics? If you agree or strongly agree, please answer part c.

Choice	SA	A	D	SD	Participants that disagree or strongly disagree stop and move to the next question
Total Count	1	2	1	1	
%	20	40	20	20	

c.) Did the changes in your teaching enhance your students' learning?

3 Teachers completed this section	**A** My professional development activities addressed the topic		**B** My professional development on this topic led to changes in my teaching of mathematics				**C** The changes inspired this professional development activity were effective in facilitating/ enhancing student learning.		
Choice	Yes	NO	SD	D	A	SA	NE	ME	VE
a.	1	2		1	2		1	1	1

b.	3				3				3	
c.	2	1			2	1			2	1
d.	3				3		1	1		1
e.	3				2	1			1	2
f.	3				2	1			1	2
g.	3				3				2	1
Total Count	18	3	0	1	17	3	2	11	8	
%	86	14	0	5	81	14	10	52	38	

6. What type of support did you receive for attending professional development meetings, workshops, and conferences? (Select all that apply)

	Release Time	Paid Travel	Continuing Ed. Units	Honorarium	None	Other
Total Count	2	2	2		2	

7. During the contracted school week, how much planning time do you typically have?

a. *M* = 45 Minutes/day

8. How often do you spend at least 15 minutes (in formal or informal sessions) planning mathematics lessons, activities, assessments, etc. with other mathematic teachers? (Select one choice)

	0	<1	1-3	4-6	>6
Number of Days:		2	2		1
Total Count	0	2	2	0	1
%	0	40	40	0	20

9. When you plan mathematics lessons, activities, assessments, etc., with other mathematics teachers, when does this collaboration take place? (Select one choice)

	Does Not Apply	Formal Meetings	Contracted Planning Time	After School on your own Time
Total Count		2		3
%	0	40	0	60

10. In a typical formal and informal meeting or planning sessions with other mathematics teachers, indicate the number of times you participate in each of the following types of discussion. (Select one response for each statement)

	Never	Sometimes	Frequently	Always
a.		2	2	1

b.		2	1	2
c.		2	1	2
d.		2	1	2
e.		2	2	1
f.		3		2
g.		3	2	
h.	1	3	1	
i.	1	2	1	1
j.		2	1	2
k.	1	3	1	
l.	2	3		
Total Count	5	29	13	13
%	8	48	22	22

11. About what percent of the mathematics teachers at your school are involved in efforts to improve the mathematics program? _____%

M = 52 % of Time

12. In general, how would you characterize your efforts to improve the mathematics program at your school? (Select one)

Choice	Strong Opposition	Slight Opposition	Slight Support	Strong Support
Total Count		2		3
%	0	40	0	60

Descriptive Frequency Item Analysis
Hill Independent School District

(*n* = 8)

1. Which of the following have you read? (Select all that apply)

Choice/ Count	Count
a) 8	100
b) 5	63
c) 1	13
d) 1	13
e) 0	0
f) 6	75
g) 3	38

Total	24					
%	43					
2. During the last school year, how often did you do the following? (Select one response for each statement)						
Number of Times	0	1	2	3-4	5-9	10+
A Visit another teacher's classroom to observe and discuss his/her mathematics teaching	3	4	1			
B Have another teacher observe your mathematic teaching	5	1		2		
C Receive meaningful feedback on your mathematics teaching from peers or supervisors	3	1		2	2	
D Participate in a group or network with other mathematics teachers outside of your school	3	2	1	2		
Total Count	14	8	6	6	2	0
%	39	22	16	16	6	0
3. During the last school year, how often did you participate in formal meetings (e.g., department meetings) with other mathematics teachers in your school related to the following discussions? (Select one response for each statement)						
Number of Times	0	1	2	3-4	5-9	10+
A The new mathematics curriculum	2	1		2	1	2
B Mathematics teaching techniques and student activities		1		1	3	3
C Ideas for assessing student learning of mathematics	1	1			3	3
D Evaluation of your mathematics program	4			2		2
Total Count	7	3	0	5	7	10
%	22	9	0	16	22	31
4. During the past 12 months, how many college or university courses did you take? (Select one)						
	0	1	2	3	4	More

						than 4
Number of Times	7				1	
Total Count	7	0	0	0	1	0
%	88	0	0	0	12	0

5. Answer the following questions for each topic in the left column:

a.) Have you participated in professional development activities during the past 18 months that have addressed that topic? If yes, please answer part b.

	Yes	NO	If no, participant does not complete question 5
Total Count	6	2	
%	75	25	

b.) Did that professional development activity lead to changes in your teaching of mathematics? If you agree or strongly agree, please answer part c.

Choice	SA	A	D	SD	Participants that disagree or strongly disagree stop and move to the next question
Total Count		4	1	1	
%	0	67	17	17	

c.) Did the changes in your teaching enhance your students' learning?

4 Teachers Completed this section	**A** My professional development activities addressed the topic		**B** My professional development on this topic led to changes in my teaching of mathematics				**C** The changes inspired this professional development activity were effective in facilitating/ enhancing student learning.		
Choice	Yes	NO	SD	D	A	SA	NE	ME	VE
a.	2	2	1		3		1	3	
b.	2	2		2	2		1	3	
c.	1	3		1	3		1	3	
d.	3	1		2	2		1	2	1
e.	4				3	1		3	1
f.	3	1			3	1		4	
g.	4				4			4	
Total Count	19	9	1	5	20	2	4	22	7
%	59	32	4	18	71	7	12	67	21

6. What type of support did you receive for attending professional development meetings, workshops, and conferences? (Select all that apply)

	Release	Paid	Continuing	Honorarium	None	Other

	Time	Travel	Ed. Units			
Total Count	1				6	

7. During the contracted school week, how much planning time do you typically have?

a. M = 28 Minutes/day

8. How often do you spend at least 15 minutes (in formal or informal sessions) planning mathematics lessons, activities, assessments, etc. with other mathematic teachers? (Select one choice)

	0	<1	1-3	4-6	>6
Number of Days:		3	5		
Total Count	0	3	5	0	0
%	0	38	63	0	0

9. When you plan mathematics lessons, activities, assessments, etc., with other mathematics teachers, when does this collaboration take place? (Select one choice)

	Does Not Apply	Formal Meetings	Contracted Planning Time	After School on your own Time
Total Count		2	5	1
%	0	25	63	13

10. In a typical formal and informal meeting or planning sessions with other mathematics teachers, indicate the number of times you participate in each of the following types of discussion. (Select one response for each statement)

	Never	Sometimes	Frequently	Always
a.		1	5	2
b.		2	4	2
c.	1	4	2	1
d.		4	3	1
e.	3	4		1
f.	1	5	2	
g.	1	3	2	2
h.	2	5	1	
i.	3	2	2	1
j.	1	3	4	
k.	3	4	1	
l.	7	1		

Total Count	22	38	26	10
%	23	40	27	10

11. About what percent of the mathematics teachers at your school are involved in efforts to improve the mathematics program? _____%

M = 46 % of Time

12. In general, how would you characterize your efforts to improve the mathematics program at your school? (Select one)

Choice	Strong Opposition	Slight Opposition	Slight Support	Strong Support
Total Count			4	4
%	0	0	50	50

Descriptive Frequency Item Analysis
Rock Independent School District

(n = 19)

1. Which of the following have you read? (Select all that apply)

Choice/ Count	%
a) 19	100
b) 15	79
c)	
d) 1	1
e) 1	1
f) 4	21
g) 3	16
Total	43
M	44%

2. During the last school year, how often did you do the following? (Select one response for each statement)

Number of Times	0	1	2	3-4	5-9	10+
A Visit another teacher's classroom to observe and discuss his/her mathematics teaching	8	2	3	3		3
B Have another teacher observe your mathematic teaching	3	5	6	5		

C Receive meaningful feedback on your mathematics teaching from peers or supervisors	1	6	2	5	3	2
D Participate in a group or network with other mathematics teachers outside of your school	7		3	6	1	2
Total Count	19	13	14	19	4	7
%	25	17	18	25	5	9
3. During the last school year, how often did you participate in formal meetings (e.g., department meetings) with other mathematics teachers in your school related to the following discussions? (Select one response for each statement)						
Number of Times	0	1	2	3-4	5-9	10+
A The new mathematics curriculum	3		4	6	1	5
B Mathematics teaching techniques and student activities		1	4	8	1	5
C Ideas for assessing student learning of mathematics	1	2	4	6	1	5
D Evaluation of your mathematics program	9		3	5		2
Total Count	13	3	15	25	3	17
%	17	4	20	33	4	22
4. During the past 12 months, how many college or university courses did you take? (Select one)						
	0	1	2	3	4	More than 4
Number of Times	16	1			2	
Total Count	16	1	0	0	2	0
%	84	5	0	0	11	0
5. Answer the following questions for each topic in the left column:						
a.) Have you participated in professional development activities during the past 18 months that have addressed that topic? If yes, please answer part b.						

	Yes	NO	
Total Count	16	3	If no, participant does not complete question 5
%	84	16	

b.) Did that professional development activity lead to changes in your teaching of mathematics? If you agree or strongly agree, please answer part c.

Choice	SA	A	D	SD	Participants that disagree or strongly disagree stop and move to the next question
Total Count	2	12	2		
%	13	75	13		

c.) Did the changes in your teaching enhance your students' learning?

14 Teachers completed this section	**A** My professional development activities addressed the topic		**B** My professional development on this topic led to changes in my teaching of mathematics				**C** The changes inspired this professional development activity were effective in facilitating/ enhancing student learning.		
Choice	Yes	NO	SD	D	A	SA	NE	ME	VE
a.	14			1	12	1	3	9	2
b.	10	4		4	8	2	1	9	4
c.	13	1		1	12	1	3	8	3
d.	11	3		4	8	2		11	3
e.	12	2		1	12	1	2	8	4
f.	12	2		2	10	2	2	10	2
g.	12	2		3	10	1		13	1
Total Count	84	14	0	16	72	10	11	68	19
%	86	14	0	16	74	10	11	69	19

6. What type of support did you receive for attending professional development meetings, workshops, and conferences? (Select all that apply)

	Release Time	Paid Travel	Continuing Ed. Units	Honorarium	None	Other
Total Count	2	1	7		10	

7. During the contracted school week, how much planning time do you typically have?

b. M = 42 Minutes/day

8. How often do you spend at least 15 minutes (in formal or informal sessions) planning mathematics lessons, activities, assessments, etc. with other mathematic teachers? (Select one choice)

	0	<1	1-3	4-6	>6
Number of Days:			17	1	1
Total Count	0	0	17	1	1

%	0	0	89	5	5

9. When you plan mathematics lessons, activities, assessments, etc., with other mathematics teachers, when does this collaboration take place? (Select one choice)

	Does Not Apply	Formal Meetings	Contracted Planning Time	After School on your own Time
Total Count		3	15	1
%	0	16	79	5

10. In a typical formal and informal meeting or planning sessions with other mathematics teachers, indicate the number of times you participate in each of the following types of discussion. (Select one response for each statement)

	Never	Sometimes	Frequently	Always
a.		6	6	7
b.		6	7	6
c.		10	6	3
d.	1	8	8	2
e.	1	7	10	1
f.		7	9	3
g.	4	4	6	5
h.	4	9	5	1
i.	5	6	5	3
j.	3	6	6	4
k.	6	6	7	
l.	5	6	8	
Total Count	29	81	83	35
%	13	36	36	16

11. About what percent of the mathematics teachers at your school are involved in efforts to improve the mathematics program? _____%

M = 66 % of Time

12. In general, how would you characterize your efforts to improve the mathematics program at your school? (Select one)

Choice	Strong Opposition	Slight Opposition	Slight Support	Strong Support
Total Count			9	10

%	0	0	47	52

Descriptive Frequency Item Analysis
Sunrise Independent School District

(n = 1)	
1. Which of the following have you read? (Select all that apply)	
Choice/ Count	%
a) 1	33
b) 1	33
c)	
d)	
e)	
f)	
g) 1	33
Total	3
%	33

2. During the last school year, how often did you do the following? (Select one response for each statement)

Number of Times	0	1	2	3-4	5-9	10+
A Visit another teacher's classroom to observe and discuss his/her mathematics teaching			1			
B Have another teacher observe your mathematic teaching					1	
C Receive meaningful feedback on your mathematics teaching from peers or supervisors					1	
D Participate in a group or network with other mathematics teachers outside of your school				1		
Total Count	0	0	1	1	2	0
%	0	0	25	25	50	0

3. During the last school year, how often did you participate in formal meetings (e.g., department meetings) with other mathematics teachers in your school related to the following discussions? (Select one response for each statement)						
Number of Times	0	1	2	3-4	5-9	10+
A The new mathematics curriculum		1				
B Mathematics teaching techniques and student activities					1	
C Ideas for assessing student learning of mathematics					1	
D Evaluation of your mathematics program					1	
Total Count	0	1	0	0	3	
%	0	25	0	0	75	0
4. During the past 12 months, how many college or university courses did you take? (Select one)						
	0	1	2	3	4	More than 4
Number of Times	1					
Total Count	1					
%	100					
5. Answer the following questions for each topic in the left column:						
a.) Have you participated in professional development activities during the past 18 months that have addressed that topic? If yes, please answer part b.						
	Yes		NO		If no, participant does not complete question 5	
Total Count			1			
%			100			
b.) Did that professional development activity lead to changes in your teaching of mathematics? If you agree or strongly agree, please answer part c.						
Choice	SA	A	D	SD	Participants that disagree or strongly disagree stop and move to the next question	
Total Count						
%						
c.) Did the changes in your teaching enhance your students' learning?						
	A My professional development activities		**B** My professional development on this topic led to changes in my		**C** The changes inspired this professional development activity	

	addressed the topic		teaching of mathematics	were effective in facilitating/ enhancing student learning.
Choice	Yes	NO	SD D A SA	NE ME VE
a.				
b.				
c.				
d.				
e.				
f.				
g.				
Total Count				
%				

6. What type of support did you receive for attending professional development meetings, workshops, and conferences? (Select all that apply)

	Release Time	Paid Travel	Continuing Ed. Units	Honorarium	None	Other
Total Count	1	1				
%	50	50				

7. During the contracted school week, how much planning time do you typically have?

c. M = 45 Minutes/day

8. How often do you spend at least 15 minutes (in formal or informal sessions) planning mathematics lessons, activities, assessments, etc. with other mathematic teachers? (Select one choice)

	0	<1	1-3	4-6	>6
Number of Days:			1		
Total Count			1		
%	0	0	100	0	0

9. When you plan mathematics lessons, activities, assessments, etc., with other mathematics teachers, when does this collaboration take place? (Select one choice)

	Does Not Apply	Formal Meetings	Contracted Planning	After School on your own

			Time	Time
Total Count			1	
%	0	0	100	0
10. In a typical formal and informal meeting or planning sessions with other mathematics teachers, indicate the number of times you participate in each of the following types of discussion. (Select one response for each statement)				
	Never	Sometimes	Frequently	Always
a.			1	
b.			1	
c.			1	
d.			1	
e.		1		
f.			1	
g.	1			
h.		1		
i.		1		
j.			1	
k.		1		
l.		1		
Total Count	1	5	6	0
%	8	42	50	0
11. About what percent of the mathematics teachers at your school are involved in efforts to improve the mathematics program? _____% *M* = 75 % of Time				
12. In general, how would you characterize your efforts to improve the mathematics program at your school? (Select one)				
Choice	Strong Opposition	Slight Opposition	Slight Support	Strong Support
Total Count				1
%	0	0	0	100

APPENDIX N

Descriptive Frequency Item Analysis
3rd Grade Mathematics Teachers

(n = 16)						
1. Which of the following have you read? (Select all that apply)						
Choice/ Count	%					
a) 16	100					
b) 14	88					
c)						
d) 1	6					
e) 1	6					
f) 6	38					
g) 4	25					
Total	42					
M	38					
2. During the last school year, how often did you do the following? (Select one response for each statement)						
Number of Times	0	1	2	3-4	5-9	10+
A Visit another teacher's classroom to observe and discuss his/her mathematics teaching	4	2	5	3		2
B Have another teacher observe your mathematic teaching	4	4	2	4	2	
C Receive meaningful feedback on your mathematics teaching from peers or supervisors		6		3	6	1
D Participate in a group or network with other mathematics teachers outside of your school	4	2	3	4	1	2
Total Count	12	14	10	14	9	5
%	19	22	16	22	14	8
3. During the last school year, how often did you participate in formal meetings (e.g., department meetings) with other mathematics teachers in your school related to the following discussions? (Select one response for each statement)						
Number of Times	0	1	2	3-4	5-9	10+

A The new mathematics curriculum	3	1	2	5		5
B Mathematics teaching techniques and student activities		1	1	5	2	7
C Ideas for assessing student learning of mathematics		1	3	3	3	6
D Evaluation of your mathematics program	5	1	2	5	1	2
Total Count	8	4	8	18	6	20
%	13	6	13	28	9	31

4. During the past 12 months, how many college or university courses did you take? (Select one)

	0	1	2	3	4	More than 4
Number of Times	14		1			1
Total Count	14	0	1	0	0	1
%	88	0	6	0	0	6

5. Answer the following questions for each topic in the left column:

a.) Have you participated in professional development activities during the past 18 months that have addressed that topic? If yes, please answer part b.

	Yes	NO	If no, participant does not complete question 5
Total Count	12	4	
%	75	25	

b.) Did that professional development activity lead to changes in your teaching of mathematics? If you agree or strongly agree, please answer part c.

Choice	SA	A	D	SD	Participants that disagree or strongly disagree stop and move to the next question
Total Count		10	1	1	
%	0	83	8	8	

c.) Did the changes in your teaching enhance your students' learning?

10 Teachers completed this survey	**A** My professional development activities addressed the topic	**B** My professional development on this topic led to changes in my teaching of mathematics	**C** The changes inspired this professional development activity were effective in facilitating/ enhancing student

							learning.			
Choice	Yes	NO	SD	D	A	SA	NE	ME	VE	
a.	8	2		1	9		2	8		
b.	8	2	1	1	8		1	8	1	
c.	9	1	1	1	8		1	6	3	
d.	10		1	8	1		1	7	2	
e.	8	2	1	8	1			7	3	
f.	10				7	3		6	4	
g.	10			1	9			9	1	
Total Count	63	7	4	20	43	3	5	51	14	
%	90	10	6	28	61	4	7	73	20	

6. What type of support did you receive for attending professional development meetings, workshops, and conferences? (Select all that apply)

	Release Time	Paid Travel	Continuing Ed. Units	Honorarium	None	Other
Total Count	4	3	8		5	

7. During the contracted school week, how much planning time do you typically have?

d. M = 44 Minutes/day

8. How often do you spend at least 15 minutes (in formal or informal sessions) planning mathematics lessons, activities, assessments, etc. with other mathematic teachers? (Select one choice)

	0	<1	1-3	4-6	>6
Number of Days:		2	12		2
Total Count	0	2	12	0	2
%	0	13	75	0	13

9. When you plan mathematics lessons, activities, assessments, etc., with other mathematics teachers, when does this collaboration take place? (Select one choice)

	Does Not Apply	Formal Meetings	Contracted Planning Time	After School on your own Time
Total Count		4	10	2
%	0	25	63	13

10. In a typical formal and informal meeting or planning sessions with other mathematics teachers, indicate the number of times you participate in each of the following types of discussion. (Select one response for each statement)				
	Never	Sometimes	Frequently	Always
a.		3	9	4
b.		3	6	7
c.		8	6	2
d.		7	6	3
e.	1	7	6	2
f.		8	4	4
g.	3	5	5	3
h.	2	10	3	1
i.	3	6	3	4
j.	1	6	5	4
k.	5	7	4	
l.	7	4	5	
Total Count	22	74	62	34
%	12	39	32	18

11. About what percent of the mathematics teachers at your school are involved in efforts to improve the mathematics program? _____%

M = 68 % of Time

12. In general, how would you characterize your efforts to improve the mathematics program at your school? (Select one)

Choice	Strong Opposition	Slight Opposition	Slight Support	Strong Support
Total Count			6	10
%	0	0	38	63

Descriptive Frequency Item Analysis
4th Grade Mathematics Teachers

(*n* = 17)	
1. Which of the following have you read? (Select all that apply)	
Choice/ Count	%
a) 15	88
b) 13	76

c) 1	5
d) 1	5
e) 1	5
f) 5	29
g) 6	35
Total	42
M	40%

2. During the last school year, how often did you do the following? (Select one response for each statement)

Number of Times	0	1	2	3-4	5-9	10+
A Visit another teacher's classroom to observe and discuss his/her mathematics teaching	7	5	1	2		2
B Have another teacher observe your mathematic teaching	4	3	6	4		
C Receive meaningful feedback on your mathematics teaching from peers or supervisors	4	4	2	5	1	1
D Participate in a group or network with other mathematics teachers outside of your school	8	1	2	5	1	
Total Count	23	13	11	16	2	3
%	34	19	16	24	3	4

3. During the last school year, how often did you participate in formal meetings (e.g., department meetings) with other mathematics teachers in your school related to the following discussions? (Select one response for each statement)

Number of Times	0	1	2	3-4	5-9	10+
A The new mathematics curriculum	3	1	3	3	3	4
B Mathematics teaching techniques and student activities		2	5	4	3	3
C Ideas for assessing student learning of mathematics	2	3	2	4	2	4
D Evaluation of your mathematics program	10	1	1	2		3

Total Count	15	7	11	13	8	14
%	22	10	16	19	12	21

4. During the past 12 months, how many college or university courses did you take? (Select one)

	0	1	2	3	4	More than 4
Number of Times	13				3	1
Total Count	13	0	0	0	3	1
%	76	0	0	0	18	6

5. Answer the following questions for each topic in the left column:

a.) Have you participated in professional development activities during the past 18 months that have addressed that topic? If yes, please answer part b.

	Yes	NO	If no, participant does not complete question 5
Total Count	16	1	
%	94	6	

b.) Did that professional development activity lead to changes in your teaching of mathematics? If you agree or strongly agree, please answer part c.

Choice	SA	A	D	SD	Participants that disagree or strongly disagree stop and move to the next question
Total Count	3	8	4	1	
%	19	50	25	6	

c.) Did the changes in your teaching enhance your students' learning?

11 Teachers completed the next section	**A** My professional development activities addressed the topic		**B** My professional development on this topic led to changes in my teaching of mathematics				**C** The changes inspired this professional development activity were effective in facilitating/ enhancing student learning.		
Choice	Yes	NO	SD	D	A	SA	NE	ME	VE
a.	9	2		2	8	1		9	2
b.	7	4		5	5	1	3	7	1
c.	7	4		1	9	1	1	8	2
d.	7	4		5	5	1	3	7	1

e.	11				9	2		8	3	
f.	8	3		2	8	1	2	7	2	
g.	9	2		2	8	1	2	7	2	
Total Count	58	19	0	17	52	8	11	53	13	
%	75	25	0	22	68	10	14	69	17	

6. What type of support did you receive for attending professional development meetings, workshops, and conferences? (Select all that apply)

	Release Time	Paid Travel	Continuing Ed. Units	Honorarium	None	Other
Total Count	2	1	2		13	

7. During the contracted school week, how much planning time do you typically have?

a. M = 43 Minutes/day

8. How often do you spend at least 15 minutes (in formal or informal sessions) planning mathematics lessons, activities, assessments, etc. with other mathematic teachers? (Select one choice)

	0	<1	1-3	4-6	>6
Number of Days:		3	13	1	
Total Count	0	3	13	1	0
%	0	18	76	6	0

9. When you plan mathematics lessons, activities, assessments, etc., with other mathematics teachers, when does this collaboration take place? (Select one choice)

	Does Not Apply	Formal Meetings	Contracted Planning Time	After School on your own Time
Total Count		3	11	3
%	0	18	65	18

10. In a typical formal and informal meeting or planning sessions with other mathematics teachers, indicate the number of times you participate in each of the following types of discussion. (Select one response for each statement)

	Never	Sometimes	Frequently	Always
a.		6	5	6
b.		7	7	3
c.	1	8	4	4
d.	1	7	7	2

e.	3	7	6	1
f.	1	7	8	1
g.	3	5	5	4
h.	5	8	4	
i.	6	5	5	1
j.	3	5	7	2
k.	5	7	5	
l.	7	7	3	
Total Count	35	79	66	24
%	17	39	32	12

11. About what percent of the mathematics teachers at your school are involved in efforts to improve the mathematics program? _____%

M = 52 % of Time

12. In general, how would you characterize your efforts to improve the mathematics program at your school? (Select one)

Choice	Strong Opposition	Slight Opposition	Slight Support	Strong Support
Total Count		2	7	8
%	0	12	41	47

APPENDIX O

Descriptive Frequency Item Analysis
3rd and 4th Mathematics Teachers

(n =33)						
1. Which of the following have you read? (Select all that apply)						
Choice/ Count	%					
a) 31	94					
b) 27	82					
c) 1	3					
d) 2	6					
e) 2	6					
f) 11	33					
g) 10	30					
Total	84					
M	39%					
2. During the last school year, how often did you do the following? (Select one response for each statement)						
Number of Times	0	1	2	3-4	5-9	10+
A Visit another teacher's classroom to observe and discuss his/her mathematics teaching	11	7	6	5		4
B Have another teacher observe your mathematic teaching	8	7	8	8	2	
C Receive meaningful feedback on your mathematics teaching from peers or supervisors	4	10	2	8	7	2
D Participate in a group or network with other mathematics teachers outside of your school	12	3	5	9	2	2
Total Count	35	27	21	30	11	8
%	27	20	16	23	8	6
3. During the last school year, how often did you participate in formal meetings (e.g., department meetings) with other mathematics teachers in your school related to the following discussions? (Select one response for each statement)						

Number of Times	0	1	2	3-4	5-9	10+
A The new mathematics curriculum	6	2	5	8	3	9
B Mathematics teaching techniques and student activities		3	6	9	5	10
C Ideas for assessing student learning of mathematics	2	4	5	7	5	10
D Evaluation of your mathematics program	15	2	3	7	1	5
Total Count	23	11	19	31	14	34
%	17	8	14	23	11	26

4. During the past 12 months, how many college or university courses did you take? (Select one)

	0	1	2	3	4	More than 4
Number of Times	27		1		3	2
Total Count	27	0	1	0	3	2
%	82	0	3	0	9	6

5. Answer the following questions for each topic in the left column:

a.) Have you participated in professional development activities during the past 18 months that have addressed that topic? If yes, please answer part b.

	Yes	NO	If no, participant does not complete question 5
Total Count	28	5	
%	85	15	

b.) Did that professional development activity lead to changes in your teaching of mathematics? If you agree or strongly agree, please answer part c.

Choice	SA	A	D	SD	Participants that disagree or strongly disagree stop and move to the next question
Total Count	3	18	5	2	
%	11	64	18	7	

c.) Did the changes in your teaching enhance your students' learning?

21 Teachers completed this section that stated SA or A	**A** My professional development activities addressed the topic	**B** My professional development on this topic led to changes in my teaching of mathematics	**C** The changes inspired this professional development activity were effective in facilitating/ enhancing student

							learning.		
Choice	Yes	NO	SD	D	A	SA	NE	ME	VE
a.	17	4		3	17	1	2	17	2
b.	15	6	1	6	13	1	4	15	2
c.	16	5	1	2	17	1	2	14	5
d.	17	4		6	13	2	5	11	5
e.	19	2		1	17	3		15	6
f.	18	3		2	15	4	2	13	6
g.	19	2		3	17	1	2	16	3
Total Count	118	26	2	23	109	13	17	101	29
%	82	18	1	16	74	9	12	69	20

6. What type of support did you receive for attending professional development meetings, workshops, and conferences? (Select all that apply)

	Release Time	Paid Travel	Continuing Ed. Units	Honorarium	None	Other
Total Count	6	4	10		18	

7. During the contracted school week, how much planning time do you typically have?

e. M = 44 Minutes/day

8. How often do you spend at least 15 minutes (in formal or informal sessions) planning mathematics lessons, activities, assessments, etc. with other mathematic teachers? (Select one choice)

	0	<1	1-3	4-6	>6
Number of Days:		5	25	1	2
Total Count	0	5	25	1	2
%	0	15	76	3	6

9. When you plan mathematics lessons, activities, assessments, etc., with other mathematics teachers, when does this collaboration take place? (Select one choice)

	Does Not Apply	Formal Meetings	Contracted Planning Time	After School on your own Time
Total Count		7	21	5
%	0	21	64	15

10. In a typical formal and informal meeting or planning sessions with other mathematics teachers, indicate the number of times you participate in each of

the following types of discussion. (Select one response for each statement)				
	Never	Sometimes	Frequently	Always
a.		9	14	10
b.		10	13	10
c.	1	16	10	6
d.	1	14	13	5
e.	4	14	12	3
f.	1	15	12	5
g.	6	10	10	7
h.	7	18	7	1
i.	9	11	8	5
j.	4	11	12	6
k.	10	14	9	
l.	14	11	8	
Total Count	57	153	128	58
%	14	39	32	15

11. About what percent of the mathematics teachers at your school are involved in efforts to improve the mathematics program? _____%

M = 59 % of Time

12. In general, how would you characterize your efforts to improve the mathematics program at your school? (Select one)

Choice	Strong Opposition	Slight Opposition	Slight Support	Strong Support
Total Count		2	13	18
%	0	6	39	55

APPENDIX P

Qualitative Frequency Distribution for Sub-Themes		
Sub-Themes	**Percentage**	**Frequency**
Modeling	3.03%	1
PD During the Day	3.03%	1
Problem Solving Strategies Needed	3.03%	1
Strategies and Ideas	3.03%	1
Coaches Supporting Teachers	6.06%	2
Distinguishing new -vs- old	6.06%	2
Instructional Support	6.06%	2
Professional Learning Communities	6.06%	2
TEKS Consistency	6.06%	2
Need Additional Training	9.09%	3
No Priorities	9.09%	3
No Technology on Campus	9.09%	3
Outside the District	9.09%	3
Manipulatives	15.15%	5
Vertical Alignment Teams	15.15%	5
Adjustment	18.18%	6
Dissecting the TEKS	18.18%	6
Teaching Support	12.12%	4
Not Enough PD	18.18%	6
Resources/Strategies	27.27%	9
Rigor	33.33%	11
Pearson Envision/Motivational Math	39.39%	13
Technology (lead4ard/iStation/TEKS Resource)	33.33%	11
STAAR	57.58%	19
Self-Teaching	42.42%	14
Collaboration	60.61%	20
District Training/Support	81.82%	27
N		**33**
Total		182

VITA

Carmen Cruz was born and raised in Sunnyside, Washington. She graduated from Sunnyside High School in Sunnyside, Washington in 1995. She went on to attend Washington State University and earned a Bachelor's degree in Liberal Arts in 2006. She moved to Texas in 2007 and obtained her teaching certificate in 2008. She worked as an elementary public-school teacher for seven years in Title I schools. While teaching, she was selected campus teacher of the year, campus representative at Rice University Office of STEM, and Texas state representative for the Mickelson ExxonMobil Teachers Academy. After leaving the classroom she worked as an informal STEM educator. In 2013, she went back to college to receive her Master's degree in Educational Leadership from Stephen F. Austin State University (SFA), which was conferred in 2015. In 2015, she was accepted into Cohort XIX at SFA, where she earned a Doctorate of Education in Educational Leadership in 2018. Currently, she serves as both an independent STEM consultant and a STEM Curriculum Specialist at St. Mary's University.

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Style manual designation:	*Publication Manual of the American Psychological Association, Sixth Edition*
Typist:	Carmen Cruz