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Teacher Understanding of Instructional Strategies in Elementary Mathematics

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This is to certify that the doctoral study by

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Abstract

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BS, University of South Carolina at Aiken, 2010

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Project Study Submitted in Partial Fulfillment

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Abstract

Synergizing Elementary School (pseudonym) experiences low state-required mathematics test scores in Grades 3 and 4 that are consistently below district and state proficiency rates. The purpose of this qualitative case study was to investigate the instructional practices used by Grade 3 and Grade 4 teachers, and if these practices aligned with research-based planning, standards-based instruction, attention to conditions of learning, and professional responsibilities of teachers to support students' achievement in mathematics. This study's conceptual framework was grounded in Robert Marzano's model of teaching effectiveness called the focus teacher evaluation model. Data for this case study was gathered from semistructured interviews from two third and two fourth grade mathematics teachers. Data was transcribed, organized, coded, and analyzed for themes and alignment with Marzano's model of teaching effectiveness. Based on the analysis, teachers at Synergizing Elementary School use many different instructional strategies that did not equate to an increase in student mathematics academic achievement. The themes that emerged from the interviews were different resources used, ineffective use of formative assessments, inability to teach to mastery, and more professional development opportunities needed on mathematics instruction. To address these findings, a 3-day professional development training was developed to provide the teachers with the purposes, processes, and strategies needed to effectively and consistently implement the research-based Engage New York mathematics curriculum. Results from this study may have implications for positive social change among teachers by addressing effective instructional mathematics practices to enhance student learning.

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Dedication

For my entire family. THIS IS OURS.

Acknowledgments

I would like to thank the Lord for guiding me throughout this process. He has kept me and I am forever grateful. A huge thank you goes to Dr. Ogden, my first chair, for all of her guidance and wisdom. To Dr. Kasunich, I also thank you for your feedback and guidance. Thank you to my URR, Dr. Hayes for your feedback and promptness. All of you have been instrumental throughout this process.

To my parents Johnnie and Sallie. Thanks so much for stepping in and being there for me when I needed both of you the most. I love each of you with every fiber in my body and I am so proud and elated that I get to share this with the both of you. To my sisters, Rosetta and Jessica. This journey has been a special one because I get to share it with the both of you. Thanks for speaking life into me when I was at my lowest. The bond we share is unmatched.

I could not have done this without the prayers of both of my church families and my dear pastor Vivian Lingard. I thank all of you for everything. To my best friend Tieulda, thank you is not enough. To my niece and nephews, the sky is the definitely not the limit.

To save the best for last, thank you to my loving husband, Stephone and beautiful daughters, Sade and Lamari. I love all of you for your love and support. The sacrifices I made to finish was not easy, but I would do it one hundred times again with you all by my side pushing me to be great. I appreciate the seed that was planted early so that this could come to fruition. This accomplishment is not mine alone. It is OURS.

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Section 1: The Problem

The Local Problem

One of the main goals of South Carolina Department of Education is to provide students with a high-quality education led by effective educators (South Carolina Department of Education, 2020). To provide appropriate mathematics instruction to any student, most educators are cognizant that they should use evidence-based instructional practices as mandated by the state legislation (Every Student Succeeds Act, 2015). The problem is that teachers are challenged to implement instructional practices to support students' achievement in mathematics.

Synergizing Elementary School (pseudonym) is experiencing low test scores as measured by the state-required mathematics assessment in Grades 3 and 4 that are consistently below district and state proficiency benchmark rates. Over the last 3 years, Synergizing's proficiency benchmark rates show that many students do not perform well in mathematics. In 2017, 31.8% of third graders and 36.5% of fourth graders did not meet mathematic expectations on the SC Ready mathematics assessment. In 2018, 31.6% of third graders and 51.2% of fourth graders did not meet mathematic expectations on the SC Ready mathematics test. The SC Ready mathematics proficiency for 2019 in Table 1 shows that 48% of all third graders and 28.9% of fourth graders at the elementary school did not meet the expectations compared to 21% of third graders and 24% of fourth graders throughout the state of South Carolina. Synergizing students are not performing adequately on the state assessments, whether measured at the local, district, or state level. Therefore, they are not prepared for the next grade level in mathematics.

Table 1

School, District, and State SC Ready Mathematics Percentage of Does not Meet Proficiency in 2019

Grade	Synergizing School	District	State
3	48.30%	9.8%	21.3%
4	28.90%	20.0%	24.3%

Several factors could explain the low proficiency rates of the Grade 3 and Grade 4 students in mathematics. However, according to Synergizing Elementary School's principal, mathematics coach, and Grades 3 and 4 mathematics teachers, the teachers face challenges providing instructional practices that could lead to increased student achievement. These challenges may contribute to the student's low proficiency rates. Doabler et al. (2014) emphasized the necessity of studying instructional practices since, in the absence of effective mathematics instruction, many students will experience early and persistent difficulties in mathematics and struggle to acquire mathematical proficiency. Blazar (2015) also urged additional research on teacher's instructional practices, given the effect teachers have through instruction on achievement.

Rationale

Evidence at the Local Level

A review of the local evidence from Synergizing Elementary School shows that Grades 3 and 4 elementary mathematics teachers have struggled to implement effective instructional practices that promote academic achievement (Mathematics coach, 2020). According to Synergizing's school improvement plan, the student's mathematics

achievement is low and needs to be addressed. State assessment data indicated that 48% of all third graders and 28.9 % of fourth graders at the elementary school did not meet the expectations on the state standardized test (SCDOE, 2019). Although several factors could explain Grades 3 and 4 students' low proficiency rates in mathematics, instructional practices used to support student achievement cannot be ignored.

Following parent receipt of individual student and school test results in 2019, the parent-teacher association expressed their concern about students' low achievement in mathematics at Synergizing to the school (via a letter to the principal, 2019) and publicly to the school board (during the board meeting of July 2019). In addition to expressed parental concern, the district superintendent elaborated on Synergizing's deficiencies in mathematics (Board Meeting Notes, 2019) and ensured the Board would continue to work on curriculum and instructional practices (superintendent personal communication, 2020). In an attempt to address the concern of the low mathematics scores, the math coach met with the Grade 3 and Grade 4 mathematics teachers to discuss the persistent math deficiencies and gleaned from the teacher's responses that they were struggling to meet the needs of the students in mathematics (Mathematics Coach,2020). According to the meeting's notes, some issues teachers cited were effective instructional time, deciphering between effective and ineffective practices that meet students' needs in their classes, and limited time to collaborate and plan across their grade level effectively.

In addition to the teachers' issues, there was evidence that teachers were struggling to implement instructional practices based on teacher observations conducted by the principal at Synergizing. The teacher observations showed minimal use of various

resources for teaching, little to no use of technology such as computers, and several periods within the classes where students appeared disengaged.

Based on the mathematics coach's discussion with the teachers and feedback from the principal evaluations in 2019, teachers struggled to implement instructional practices that increased student achievement in mathematics. Although student learning gains are measured through state standardized assessments, holding teachers accountable for effective teaching based solely on the testing data is questionable (Baker et al., 2013). With the teacher being the primary educational practitioner, the association between quality instructional teaching practices and student achievement cannot be dismissed (Anderson et al., 2019).

The purpose of this qualitative case study was to investigate and gain an understanding of how teachers are implementing instructional practices to support students' achievement in mathematics. Identifying what instructional practices educators use to teach mathematics is now essential. Some researchers even argue for a mixed-methods approach in which student achievement is combined with other measures, such as standards-based planning, standards-based instruction, conditions for learning, and professional responsibilities to evaluate teacher accountability concerning student academic achievement (Moran, 2017).

Evidence of the Problem in the Literature

Although many factors have been found to influence student achievement in mathematics, research shows through many studies that teacher practices play a significant role in student achievement (Ing et al., 2015; Reddy et al., 2020; Richman et

al., 2019). Therefore, it is possible that the challenges teachers face at Synergizing in providing effective instructional practices for students in mathematics may contribute to students' low achievement proficiency rates on the state standardized test. Based on the local evidence provided by teachers, the instructional coach, and the principal, the challenges include effective use of instructional time, deciphering between effective and ineffective practices that meet students' needs in their class, and limited time to collaborate with colleagues.

Current research studies provide insight into what instructional practices teachers may need to help students reach satisfactory mathematical achievement. Hughes et al. (2016) and Leko et al. (2019) take the guesswork out of finding evidence-based mathematics instructional practices for teachers. The authors provide resources for teachers to find evidence-based practices through sources that bridge the research gap. Some resources include The IRIS Center, Best Evidence Encyclopedia, and What Works Clearinghouse. While conducting evidence-based reviews of some current instructional practices in mathematics, Cook et al. (2020) found evidence that six out of eight high-quality studies showed positive student effects based on specific evidence-based mathematical practices teachers used in the classroom. Although the research by Cook et al. (2020) provides insight into what instructional practices teachers can use to help students reach acceptable mathematics achievement, the authors also noted that teachers must use them effectively. In three studies that showed minimal to low effects of evidence-based student achievement, the teachers did not use the practices with fidelity or were inconsistent with the use of practices.

There have been other issues with using evidence-based instructional practices. For instance, a study by Konrad et al. (2019) showed teachers with growing caseloads, demands of collecting data, and pressure from parents and administrators to produce results, negatively affected teacher efforts to look for and implement effective instructional practices. However, educators often gravitated towards quick-fix practices that promised results, but when results did not show the desired effect on student achievement, the instructional practice was often tossed aside. Additionally, Diery et al. (2020) found three aspects in their study that contributed to teachers' challenge using instructional practices to improve student achievement. These aspects included the teacher's attitude, barriers to implementation, and effective use. In the study, 58 teachers were surveyed. They found that while teachers had positive attitudes towards using evidence or researched-based instructional practices to help improve student achievement, the availability of time to develop and implement those practices was limited. This limitation often led to ineffective methods of practice.

As schools and districts work to meet rigorous goals set by the college and career-ready standards, specifically in mathematics, understanding teaching practices has become critical. Evidence-based instructional practices provide teachers with a strong starting point for selecting curriculum, teaching strategies and activities, and student practice opportunities (Mason et al., 2019). Student achievement in mathematics in the United States is lower than other countries (National Center for Educational Statistics, 2015), making it vital to improve mathematics achievement. In 2015, South Carolina Department of Education created college and career-ready standards and processes to

prepare students for success in their chosen career paths of either the workforce or postsecondary academic facilities. Since the educational focus of preparing students to become college and career-ready is based on the standards and processes, understanding teachers' instructional practices to prepare students for academic achievement is essential.

Definition of Terms

This case study contains terms related to instructional practices teachers use to support student achievement. The terms listed are used to help the reader understand the terminology used throughout the study. All terms are derived from the literature.

Academic standards: South Carolina Department of Education (2020) states academic standards are a set of expectations of what students are expected to know at the end of each grade level and academic subject (South Carolina Department of Education, 2020).

College and career-ready standards: According to the US Department of Education (2020), college and career-ready standards are rigorous academic standards developed from kindergarten through Grade 12 to support students' preparation and success upon graduation from high school.

Conditions for learning: Conditions for learning refer to factors that influence learning within teachers' classroom environment. There are several research-based conditions included in teacher evaluation that influence learning. These conditions include the use of formative tests to monitor student academic success, the provision of input and progress celebrations to students, the arrangement of students in groups to communicate with content, the creation of rules and procedures, the use of interaction

techniques, the establishment and preservation of successful relationships, and the communication of high expectations (Merritt, 2018).

Curriculum: Curriculum refers to lessons and academic content taught in a school or in a specific course or program that can include academic standards, learning objectives, units of lessons, textbook resources, videos, presentations, projects, and assessments (South Carolina Department of Education, 2020).

Every Student Succeeds Act: Every Student Succeeds Act, or ESSA, is a US law passed in December 2015 that replaced the No Child Left Behind law. ESSA governs the United States K–12 public education policy by holding schools accountable for student achievement (Adler-Greene, 2019).

Evidence-based instruction: Evidence-based instruction refers to instructional practices supported by research and associated with student achievement (Konrad et al., 2011).

Evidence-based planning: Walshaw and Anthony (2008) refer to evidence-based planning as instructional practices teachers use, including research-based resources and data to optimize and improve achievement or goals.

Marzano's focus teacher evaluation model: A behavioral evaluation system, based on standards-based and research-based instructional strategies, used to evaluate instructional practices teachers use in the classroom (Carbaugh et al., 2017).

Parent-teacher association: The parent-teacher association refers to a formal organization that is parent-led composed of stakeholders such as parents, teachers, community volunteers, and school staff whose purpose is to facilitate parental

involvement such as time, money, energy, and resources into their children's school (Murray et al., 2019).

Proficiency rates: According to the South Carolina Department of Education (2020), proficiency rates are levels, scales, or benchmark scores set to show how students achieve or fail to achieve proficiency benchmarks determined by state tests and assessments (South Carolina Department of Education, 2020).

Research-based teaching or instructional practices: Teaching practices, also known as instructional practices, are researched instructional practices associated with student achievement used to assist educators in designing, implementing, and teaching lessons in the classroom that guide desired student outcomes (Shirrell et al., 2019)

SC ready mathematics assessment: The South Carolina College-And- Career Ready (SCCCR) assessment is used to assess the mathematics college and career-ready standards taught in South Carolina (South Carolina Department of Education, 2020).

Standards-based instruction: Standards-based instruction refers to teaching methods based on standards that guide lesson planning, implementation, and assessments teachers use in the classroom (Edgerton & Desimone, 2018).

Standards-based planning: Marzano and Toth (2014) refer to standards-based planning as planning that uses resources built on standards and aligned assessments designed to close the achievement gap using data.

Student achievement: According to Education Evolving (2020), student achievement refers to academic goals students reach based on academic learning standards (Education Evolving, 2020).

Significance of the Study

Local sources such as personal communication with school administrators and student proficiency scores on state assessment tests indicate that teachers struggle to implement instructional practices associated with student academic achievement in mathematics. Local Grade 3 and Grade 4 teachers cited issues with effective use of instructional time, differentiating between effective and ineffective instructional practices that meet students' needs in their class, and limited time to effectively collaborate and plan across their grade level (Mathematics coach, 2020). Additionally, data from teacher observations indicated that teachers failed to provide students with effective instructional practices (Principal personal communication, 2020). The observations showed minimal use of various teaching resources, little to no use of technology such as computers, and periods of disengaged students. Also, concern was the low student proficiency scores on the state assessment test. Data indicated 48% of all third graders and 30 % of fourth graders at the elementary school did not meet the expectations on the state standardized test in mathematics (South Carolina Department of Education, 2019).

The results of this study may provide information that guides the district in addressing the local problem. The purpose of this study was to investigate how teachers are implementing instructional practices to support students' achievement in mathematics. Studying teachers' use of instructional strategies may lead to more effective teaching practices in mathematics. Study findings may also lead to the adoption or development of a school-wide mathematics curriculum, which could be an added support to enable teachers to implement effective instructional practices for Grade 3 and Grade 4

students in mathematics. As a result, an examination of instructional practices teachers use in the classroom was needed. Corcoran (2018) asserts that evidence-based programs and teacher professional development are essential to improve students' mathematics learning by enabling the comprehensive adoption of effective practices. The information gained from this study was used to create professional development on effective instructional math practices. The findings of this case study may also lead to positive social change for students in the form of higher achievement and feelings of success.

Research Question

This qualitative study's guiding research question originated from the problem statement and was anchored in the purpose statement. Given the educational problem, the purpose of this qualitative case study was to investigate how teachers are implementing instructional practices to support students' achievement in mathematics. This case study aimed to answer the following research question:

RQ: What instructional practices used by third and fourth grade teachers are aligned or not aligned with research-based planning, standards-based instruction, attention to conditions of learning, and professional responsibilities of teachers?

Review of the Literature

This literature review examines studies that provide an understanding of effective instructional practices teachers use to support students' achievement in mathematics. Local evidence and current literature provided evidence for the need to explore teachers' instructional practices in mathematics. The review is organized around how the teacher's instructional practices are specifically related to (a) standards-based planning, (b)

standards or research-based instruction, (c) conditions for learning, and (d) professional responsibilities.

I conducted exhaustive research and analyzed peer-reviewed articles, school data, and journals for the literature review. The search for resources included various domains such as Walden's metasearch using ERIC, Google Scholar, Google, SAGE, and Education Research Complete. Keywords in the search included *standards and evidence-based instruction, mathematics instruction, evidence-based instruction, evidence-based planning, conditions for learning, professional responsibilities, effective mathematics instruction, elementary mathematics instruction, teaching practices, teaching strategies,* and *teaching mathematics.* Reference sections of current research articles published in 2017 or later were reviewed for content related to the study's topic.

Conceptual Framework

The purpose, research question, and methodology for this case study aligns with the conceptual framework. This study's conceptual framework is grounded in Robert Marzano's model of teaching effectiveness called the focus teacher evaluation model (Marzano & Toth, 2014). The framework provides research-based instructional practices associated with the effective delivery of instruction to students in the classroom. The evaluation model is used to evaluate teachers on their instructional practices in the school and can also guide instruction.

The focus teacher evaluation model is compiled from several foundational concepts and research from Robert Marzano's earlier works. Some of his works that are the basis for his framework include *The Art and Science of Teaching* (Marzano, 2007),

What Works in Schools (Marzano, 2003), *Classroom Instruction that Works* (Marzano et al., 2001), *Classroom Management that Works* (Marzano et al., 2003), and *Classroom Assessment and Grading that Work* (Marzano, 2006). Combined, the works based on research are considered the most extensive evidence-based research into what works in schools to improve student achievement. Marzano and Toth (2014) affirm the focus teacher evaluation model was intended to help educators with explicit instructional requirements correlated to specific student achievement and give a particular instructional language all through schools and districts. (p. 16). One of the defining characteristics of the focused teacher evaluation model is that it allows for specific feedback to teachers to help them systematically improve weaknesses in their instructional practices for an extended time.

Since 2010, Marzano and Toth have continued to develop the focused teacher evaluation model to identify the parts of a teacher's responsibilities that have been documented with empirical studies and theoretical research as promoting improved student learning (Donahue & Vogel, 2018). Marzano's focused teacher evaluation model consists of 23 instructional practice elements, divided into the following four domains:

- Domain1: Standards-based planning: Pre-teaching preparation elements that align resources and data with instruction (Carbaugh et al., 2017).
- Domain 2: Standards-based instruction: Standards-based instruction is essential because this type of instruction is used within the classroom and supports the development of student learning (Carbaugh et al., 2017)

- Domain 3: Conditions for learning: Teacher provided favorable conditions for learning because they influence student academic achievement (Carbaugh et al., 2017).
- Domain 4: Professional responsibilities: Activities conducted by teachers outside of the classroom to promote student achievement through elements like teacher collaboration and maintaining expertise with pedagogy (Carbaugh et al., 2017).

The research-based elements and domains within the focused teacher evaluation model are designed to provide teachers with data on their instructional practices Marzano & Toth, 2014). The ultimate purpose of the focused evaluation model is to provide teachers with data from their classroom so that they can reflect on teaching practices and identify specific instructional strategies they can work on to improve their range of skills and overall performance to help improve student academic achievement (Donahue & Vogel, 2018).

The local problem is that teachers were challenged to implement instructional practices to support students' mathematics achievement. Teachers at Synergizing School used district-adopted mathematics textbooks, their own knowledge, and access to a South Carolina Department of Education resource website. However, it was unclear how they use these resources concerning their instructional practices (Personal communication, mathematics coach, 2020). The local data showed a need to understand what instructional practices teachers used to promote student academic achievement in mathematics. Marzano's conceptual framework guided this study by providing critical research-based

planning, evidence or research-based instructional practices, conditions for learning, and professional responsibilities teachers should be using to ensure expected student outcomes.

Marzano and Toth (2014) assert that using the focus teacher evaluation model helps teachers implement new academic standards and helps identify and plan for grade-level instruction necessary to promote a standards-based classroom. The study's research question was designed to explore the research-based plans, evidence-based instructional practices, conditions for learning, and professional responsibilities teachers implement in Grades 3 and 4. The concept framed this study's purpose that teachers should be using these practices effectively in the classroom, leading to increased student academic achievement. For this study, understanding how and if teachers implemented research-based plans, evidence-based instructional practices, conditions for learning, and professional responsibilities in their classrooms that support student achievement in mathematics was necessary. Marzano and Toth (2014) suggest that models of teacher evaluations must provide an approach to promote the growth of teachers as teachers make the necessary curriculum improvements to benefit students in comprehensive, standards-based classrooms. Semistructured interviews and interview questions, guided by the conceptual framework, will explore teacher use of research-based plans, evidence-based instructional practices, conditions for learning, and professional responsibilities.

Review of the Broader Problem

The remainder of this literature review provides an extensive review of the present literature related to the local problem. The review begins with a review of teacher

evaluations. It then progresses into practices teachers use in the classroom, highlighting the four domains consistent with teacher evaluations, highlighting standards-based planning, standards or evidence-based instruction, conditions for learning, and professional responsibilities. The final section examined in the literature review is instructional resources for teaching mathematics.

Teacher Evaluation

Students in the United States continue to rank low in mathematics achievement compared to many other advanced industrial nations (Pew Research Center, 2017). Standards-based instructional practices hold promise for increasing the rigor and quality of mathematics education for students (Arthur et al., 2017). However, mathematics teachers may struggle with implementing instructional practices that lead to student academic achievement in mathematics. When students are provided effective mathematics instruction, teachers can reduce the performance gap between students at risk for mathematics difficulty and their higher-performing peers (The Iris Center, 2017). Therefore, when students' mathematics achievement is low, teachers' instructional practices need to be studied to improve them.

With the introduction of the Every Student Succeeds Act, schools are no longer forced to look at only high-stakes testing scores as a means to measure student academic achievement. Components of a teacher evaluation system now consist of various components such as standards-based teacher observations across the year, timely feedback for educators, multiple sources of evidence of student learning, and more collaboration between teachers or teachers and administrators (Close et al., 2020). These

areas provide more accountability avenues to evaluate teachers' instructional practices and their effect on student academic achievement. Teacher appraisal systems are vital to the movement of accountability and effectiveness of teachers as they are accepted mechanisms used by a school to review and score the performance and effectiveness of teachers (Basileo & Toth, 2019). In addition, the outcomes from tests are used to provide teachers with guidance and direct professional development, which may help improve students' academic performance.

There are well-documented data on the use of teacher evaluations based on student test scores on high-stakes assessments. Tienken (2018) asserts standardized test results do not explain how well teachers teach and are, therefore, meager measures of student academic achievement. Researchers argue that because policymakers cannot hold educators accountable for a single process, a more effective strategy for improving academic achievement is to be more flexible in the process and require a specific standard of outcomes (Alexander et al., 2017).

Standards-Based Planning

Standards-based lesson planning is instructional practice teachers can use to support student achievement (Carbaugh et al., 2017). Two significant components of standards-based lesson planning are data to drive instruction and resources aligned with state standards (Carbaugh et al., (2017). The US Department of Education Office of Planning, Evaluation, and Policy Development (2011) asserts that studies show that for data to influence student academic achievement positively, teachers should analyze data such as formative and summative assessments or small group running records to guide

instructional decisions properly plan differentiated instruction. Accountability pressures from education reform policies such as ESSA hold educators responsible for how well students perform on state-mandated assessments encouraging them to use specific data to ensure student academic achievement in various areas of education (Farrell & Marsh, 2016; Roegman et al., 2019). In a study by Roegman et al. (2019), the authors found when teachers used data from common grade assessments to plan and guide teaching instruction and predictive information for future success on state assessments, most often, it led to them reteaching standards students had not mastered.

Moore et al. (2017) assert if educators have rigorous expectations for student learning that is independent and relevant in real-world experiences, then educators need to efficiently plan for students to reach and meet those goals. Findings from a study conducted by Merritt (2016) demonstrated that one of the most significant positive impacts teachers perceived to have on student achievement is their ability to have more time planning efficient lessons. In the study, teachers listed having a lack of time to prepare as a barrier to the successful implementation of evidence-based practices.

Standards or Evidence-Based Instruction

According to Elrod and Strayer (2018), standards-based mathematics instruction alludes to teaching actions that support the development of a learning community where problem-solving, reasoning and proof, communication, connecting mathematical ideas, and using multiple representations are fundamental to learning mathematics in the classroom. This type of instruction includes standards-based planning, standards-based instruction, conditions for learning, and professional responsibilities. The use of the

standards to guide instructional lesson planning will be a great place to implement a mandated curriculum using clarity of purpose and best practices in instruction (Lewis et al., 2019). As a result, the standards guide the instructional components and supports the most effective instructional practices for all students. Standards are defined by Carr and Harris (2001) as statements that identify fundamental knowledge and skills that should be taught.

Part of constructing standards-based instruction is using instructional resources to effectively understand mathematics concepts (Özkaya, & Karaca, 2017). According to Brown et al. (2017) and Sage et al. (2020), educators who engage in best practices employ various instructional delivery methods, such as technology, to allow students the best chance at concept mastery. Higgins et al. (2019) conducted a meta-analysis study of various studies that focused on using technology for mathematics instruction and its effect on students' academic achievement, attitude, and motivation. The results revealed that technology positively impacted student academic achievement in most of the studies, specifically in numbers, operations, and geometry (Higgins et al., 2019).

Conditions for Learning

Instructional practices are vital to improving student academic achievement; however, having favorable learning conditions is equally essential (Carbaugh et al., 2017). According to the Marzano-focused teacher evaluation model, teachers should employ seven fundamental conditions in the classroom. The conditions include:

- Using formative assessments to track student progress
- Providing feedback and celebrating progress

- Organizing students to interact with content
- Establishing and accepting conformity with laws and procedures
- Using engagement strategies
- Establishing and maintaining effective relationships in a student-centered classroom
- Communicating high expectations for each student to close the achievement gap

Carbaugh et al. (2017) emphasize that these conditions have a high probability of positively affecting students' academic achievement when implemented correctly. One of the main components of the conditions for learning is formative assessments to track student progress. Formative assessments help teachers understand the types of learners in the classroom and help produce specific data to help those learners increase academic achievement (Martin et al., 2017). Findings from a study conducted by Martin et al. (2017) demonstrated that when teachers use formative assessments such as students' reflective writing on lessons, they could use the assessments to construct meaningful conferences with the students. The conferences eventually lead to content-centered instruction based on the teacher's data from the written reflections of students' lessons. In this study, reflective writing as a formative assessment allowed students to evaluate their learning, which provided authentic data for the teacher to construct meaningful lessons.

In addition to using assessment data to drive instruction, providing a positive social climate in the classroom can support student academic achievement. Some studies have shown that a positive social-emotional environment, in which teachers listen and

show concern for their students' well-being, is associated with more student engagement and better learning outcomes (Stipek & Chiatovich, 2017). Stipek and Chiatovich (2017) conducted a study that examined the influence that quality reading and math instruction and classroom climate have on students' academic skills and engagement. The study included 314 third grade students in 245 classrooms. All students were from low-income families, just like the students in my research study. The data collected was based on classroom observations using a teacher evaluation model. Stipek and Chiatovich (2017) found high teacher ratings on classroom climate observation scales predicted high student engagement and student academic achievement levels. Although the analysis showed having a positive classroom climate is a great predictor of student engagement and academic achievement, the authors affirm the importance of the implementation of an orderly, task-oriented approach to teaching with routines and clear behavior expectations, allows for more student engagement in learning (Stipek & Chiatovich, 2017).

Although learning conditions positively affect student academic achievement, some studies show teachers must consider the nature and quality of specific conditions for learning in the class and their effects on low-achieving students. Horan and Carr (2018) conducted a literature review of two particular elements of conditions for learning: guidance and structure. The authors defined guidance as collaborative construction of knowledge and teacher and student involvement in substantial interaction supporting deep learning. Structured is defined as a purposeful and explicit organization of lesson plans, curriculum, and any materials or resources used for lessons. After examining 12 studies related to structure and guidance in the mathematics classroom, Horan and Carr

(2018) found that teachers who used high guidance and structure without any classroom variation had more students who struggled in mathematics. Horan and Carr (2018) pointed out that teachers did not consider students with learning disabilities and the level of prior knowledge of their students in some of the studies.

While it is evident that the present research provides support of effective instructional practices teachers can use in mathematics to improve student academic mathematics achievement, students in the US continue to receive low mathematics ratings. (Lynch et al., 2017). This inconsistency further supports the need to understand what instructional practices mathematics teachers can use to improve student proficiency in mathematics. Some of the instructional practices included are professional responsibilities teachers must adhere to, according to Marzano and Toth (2014), such as maintaining expertise in content areas and pedagogy and promoting leadership and collaboration among colleagues.

Professional Responsibilities

Elementary teachers often struggle with providing mathematics instruction that results in student proficiency (Mattera & Morris, 2017; Rittle-Johnson et al., 2017). Indicators that show student proficiency in mathematics include comprehension of mathematics content, ability to perform procedures, student ability to explain, reflect, justify thoughts in mathematics, and believe that mathematics is useful in the real world (Mattera & Morris, 2017). However, according to Rittle-Johnson et al. (2017), more procedural tasks are taught in the elementary classroom and not enough of teaching students to perform math processes fluently. One way to address teachers struggling to

provide mathematics instruction that results in student proficiency is to allow teachers to fulfill professional responsibilities such as maintaining pedagogy knowledge through professional development and promoting collaboration among colleagues (Dobbs et al., 2016).

Corcoran (2018) reported on a meta-analysis study that concluded that instructional process approaches, which included well-specified strategies that provided teacher professional development to guide students to use valuable methods for applying and learning mathematics, were the most solidly supported teaching approaches. Mathematics teachers need to learn more about the subject matter and pedagogy for the grade level they teach to help raise student academic achievement (Shernoff et al., 2017). This continuous learning gives teachers balance with knowing the mathematics content knowledge and applying that knowledge in the classroom. To validate the authors' ideas, studies have shown that teachers who incorporate their mathematical knowledge with their understanding of effective instructional practices can teach mathematics content with more depth, have an increased awareness of student's thinking and conceptual understanding, and can evaluate many methods and choose appropriate models of instruction (Hill et al., 2008).

Instructional Resources

In addition to using various instructional practices, teacher instructional resources are essential to support student mathematics learning (Özkaya & Karaca, 2017). According to Aagaard (2017) and Huang (2019), in the 21st century, one powerful way to help students understand mathematical principles is through technology. Various

technology resources include laptops, mobile devices, and computer programs, are just some technological instructional resources used in the classroom to support student learning. Brown et al. (2017) conducted a study where preservice teachers made sense of using IPads and apps in the classroom of lower elementary students. The results revealed that although teachers were eager to embrace individualized learning opportunities in their classrooms through the use of IPads and their apps, training needs to take place in how they are to incorporate such technology.

Higgins et al. (2019) conducted a meta-analysis study of the effects of technology when used as an intervention tool in mathematics, has on student outcomes, motivation to learn, and attitude about learning. The findings from the study revealed students' achievement, motivation, and attitudes were strongly influenced when several technologies were employed for mathematics instruction. Cullen et al. (2020) claim that teachers' use of technology to teach mathematics daily improves both teaching and learning, as it (a) promotes learning cycles, (b) encourages interactions between student and material, (c) offers multiple representations to students, and (d) serves as a tool for student remediation. Another study conducted by Lashley (2017) aimed to determine if there is a significant difference between the academic performance of pupils in mathematics taught using computer-aided instruction and those who taught using the traditional method. Lashley concluded that students who were taught mathematics using computer-aided instruction were more proficient in mathematics on the posttest than students who were taught using traditional methods.

In contrast, some studies conducted found the use of technology resources was not effective in teaching mathematics. Uribe-Florez and Wilkins (2017) conducted studies and found that using technological resources took away from the fundamental learning process because students did not have access to concrete manipulatives and hands-on discovery activities. Ran et al. (2020) also found that technology resources such as computers and computer programs had little to no effect on student academic performance in mathematics when misused.

Implications

Since the influence teachers have on achievement occurs at least in part through instruction, researchers must recognize the different classroom practices that are significant to student learning outcomes (Blazar, 2015). This study examined teacher use of research-based planning, research or evidence-based instructional practices, conditions for learning, and professional responsibilities and how these practices support student mathematics achievement. Through the study approach, literature review and conceptual framework, research, and evidence-based practices were identified. Findings from this study may lead to more effective teaching practices in mathematics. Study findings may also lead to the adoption or development of a school-wide mathematics curriculum. Based on the possible findings of this study, projects that might be designed include (a) implementation of learning strategies, (b) professional development seminars, (c) professional learning materials, or (d) educator training on effective mathematics practices.

Summary

Over the past 3 years, students' proficiency scores in Grades 3-4 at Synergizing Elementary School indicated students were not performing well in mathematics. Based on the school data and information from key stakeholders, teachers were challenged to implement instructional practices to support students' mathematics achievement. The lack of an improvement in student mathematics ability rates implies a gap in local practice since the efforts of school administrators have not had a positive influence on student success. This study aimed to investigate how teachers implemented instructional practices to support students' achievement in mathematics. By exploring the instructional practices through semistructured interviews, I gained feedback to address the problem.

Section 1 identified the study's local problem, the rationale, the definition of terms, the study's significance, the research question, a review of the literature, and implications. In Section 2, I provide information on the research design and approach. I also include discussion of participants, data collection, and data analysis. This study was designed to investigate how teachers implement instructional practices to support students' achievement in mathematics.

Section 2: The Methodology

Research Design and Approach

A qualitative research design was used for this study. According to Creswell (2014), qualitative research investigates a phenomenon based on participants' personal opinions, feelings, and experiences. Lindlof and Taylor (2017) added an authentic interpretation of human thoughts, beliefs, behavior, and experiences is given by a simple qualitative research approach. As a part of my qualitative research approach, I focused on Grade 3 and Grade 4 mathematics teachers' instructional practices used to support student academic achievement. Creswell and Guetterman (2019) asserted that using a qualitative case study design is appropriate when there are unknown variables and researchers explore multiple perspectives.

I chose a qualitative research design for my study because it allowed me to examine teachers' instructional practices in the classroom. Merriam and Tisdell (2016) asserted in a natural environment, qualitative design is used to understand a concept and gain an understanding of participants' views through insight, exploration, and understanding. As data collection can take place from participants through the interview process, the qualitative research design is one of the most useful types of qualitative research. (Creswell, 2014; Merriam & Tisdell, 2016).

A case study approach was implemented to examine the research problem: teachers are challenged to implement instructional practices to support students' mathematics achievement. A case study was appropriate for this project study because it allowed the participants to share their instructional practices with the researcher. The

research approach selected allowed for a deeper understanding of instructional practices used in the classroom through various data collection methods such as interviews, archives, or (participant) observation (Ridder, 2017). The research and design approach allowed me to use semistructured interviews of two third and two fourth grade mathematics teachers. An exploratory case study was the most appropriate research methodology based on the nature of the research question and the current problem within the local school district. The research design and study approach helped me construct meaning from the data collected from interviews from Grade 3 and 4 mathematics teachers. I explored teacher use of research-based plans, evidence-based instructional practices, conditions for learning, and professional responsibilities, and instructional resources. Harrison et al. (2017) asserted that although qualitative studies can take on different approaches depending on the researcher's ontological or epistemological stance, all stem from efforts to explore, understand, and make meaning of experiences.

Justification for Using a Qualitative Case Study Design

According to Harrison et al. (2017), there is a wide range of qualitative study designs. These studies are comprised of exploratory, explanatory, interpretive, or descriptive aims. Examples of these models include narrative research, phenomenology, grounded theory, and ethnography. Some of these qualitative research designs were considered, such as grounded theory and ethnography; however, they did not fit the criteria needed to conduct this study. The grounded theory approach focuses on constructing a theory based on the data collected from a study (Chun Tie, et al., 2019).

Grounded theory was not appropriate because I was not trying to discover a new theory based on the research data.

Another research method I did not use was ethnography. An ethnography was not useful because the focus of the study was on what instructional practices teachers are using, not their beliefs, attitudes, and values that structure how they teach. A researcher conducting an ethnography study investigates a specific group of people and how their experiences and lifestyles have shaped them (Lodico et al., 2010). Since the focus of this study was on the teacher's experiences teaching mathematics in the classroom and not their beliefs or attitudes towards teaching mathematics, ethnography was not used.

Based on the research purpose of this study, a quantitative research approach was also not appropriate. Quantitative research methods use hypothesis testing to achieve the research goals in controlled and contrived studies (Park & Park, 2016). Since I did not collect data to prove or disprove a hypothesis, a quantitative research approach was not considered. A mixed-method research design was also considered for this project study but was not used. A mixed-method research design combines different data sources from qualitative and quantitative (Frias & Popovich, 2020). I did not collect statistical data in this study, along with the qualitative data. The data source for this study came from semistructured interviews.

Participants

Upon receiving approval from Walden University's Institutional Review Board (IRB), the local school district superintendent, and the school principal, I invited potential participants and collected their consent for the terms outlined in the informed consent

document. The IRB approval number was 02-04-21-0417624. Informed consent forms with the invitation e-mail were sent to each potential participant. The informed consent informed potential participants of the following rights as participants: (a) participants can decide to stop participating at any point of the process without repercussions, (b) participants can decide to not answer questions without providing a reason, and (c) participant identities will be kept confidential. Any potential teachers interested in participating in the study were asked to send an e-mail reply to indicate that they agreed to participate with the words, "I consent." This virtual way of giving consent provided the acknowledgment that each participant was aware of their rights and met the criteria for participating in the project study.

Based on the purpose of this study, purposeful sampling was used to select the participants for this study. According to Gill (2020), participants are chosen because they meet the inclusion criteria for the phenomenon being studied. I first wrote letters to the superintendent and school principal of the local elementary school to gain written approval to conduct the study (see Appendix B). Once approval was received from the study site, prospective participants were sent an email inviting them to participate in the study. The total number of possible participants was 10. All potential participants were sent an invitation/informed consent form via email. The form was designed to explain the purpose and details of the study in addition to the criteria for participation (see Appendix D). Select teachers were asked to volunteer their participation. Educators had to meet the following requirements to participate in the study: (a) have a South Carolina Elementary Education certificate, (b) have 2 or more years of teaching experience, (c) teach

mathematics instruction to Grades 3 and 4, and (d) recognize current mathematics standards and curriculum. Out of the 10 possible participants asked, four teachers participated in the study: two third grade mathematics teachers and two fourth grade mathematic teachers. Since the purpose of this qualitative case study was to investigate and gain an understanding of how teachers are implementing instructional practices to support students' achievement in mathematics, a small sample size was appropriate. Studies with a broad scope may require more participants or observations; clear topics require fewer participants (Gill, 2020). The small sample size used for this study was appropriate.

Out of the 10 potential participants, four participated in the study. Lobe et al. (2020) asserted that researchers conducting qualitative research face challenges due to the COVID-19 pandemic and restrictions on face-to-face interactions. Such restrictions made it difficult to get the target number of participants for this study. Several follow-up emails were sent to the other six selected participants who did not respond to the first email in an attempt to gain more participation in the study. After 2 weeks without responding, I decided to continue the study with the four consenting participants. Of the consenting participants, two were from third grade and two from fourth grade. Some of the other nonresponding participants who decided not to participate later disclosed that they would be unable to participate in the study due to their work schedules and other obligations.

Interviews were conducted after all four consenting participants were identified. All interviews were held via the telephone and away from the school site to ensure the safety and confidentiality of the participant. Before conducting interviews with

participants, an interview protocol was established. The interview protocol included a confidentiality statement to further provide participants with a written understanding of how the data will be used. The interview protocol was read to the interviewees before each one-on-one, semistructured interview. The semistructured interviews were held via telephone conference.

Researcher-Participant Relationship

The participants and I work in the same district; however, we did not work at the same school. The participants and I had developed a working relationship through our professional experiences serving within the same school system. As a grade-level educator myself, I have not had to evaluate or supervise any of the participants in my study. I reminded participants of the voluntary essence of the study in the invitation and informed consent forms before any involvement is accepted. I had no prior engagement or interactions with participants related to the study before receiving permission to begin research from Walden University's IRB.

Protection of Participants

Specific measures were taken to protect the potential participant's rights, confidentiality, informed consent, and protection from any harm from participation in the study. I informed potential participants that their names will be kept confidential and secured on a password-protected device and will not be used. Potential participants were informed that their names would be kept confidential by referencing them by a pseudonym to protect their identity. As an added measure, participants had the option to reschedule interviews to a time and place suitable for their schedules to ensure they were

comfortable during the interview process. Lastly, potential participants had the opportunity to schedule interviews over the phone or any non-person-to-person contact due to the rising cases of COVID-19 and any restrictions in the area that may prevent them from conducting a face-to-face interview. All four participants opted for telephone, non-face-to-face interviews.

Data Collection

Qualitative researchers face unique opportunities and challenges due to the disruption of COVID-19 and social distancing mandates restricting traditional face-to-face investigations of all kinds (Lobe et al., 2020). Therefore, the data collected for this study came from one-on-one interviews with mathematics teachers in Grades 3 and 4 via telephone conferencing. Merriam and Tisdell (2016) assert using interviews and the observation of artifacts and records, qualitative data can be obtained; however, only one approach is required. Individual semistructured telephone interviews were used to answer the research question to encourage participants to provide their account of teaching mathematics. The interview questions derived from the research question: What instructional practices used by third grade and fourth grade teachers are aligned or not aligned with research-based planning, standards-based instruction, attention to conditions of learning, professional responsibilities of teachers, and from Marzano's observation instrument modified for verbal interaction rather than direct classroom observation (see Appendix C). After transcribing each interview, I rewatched the teleconference or listened to the audio take to ensure accuracy. Part of the triangulation of data includes member checks. Each participant was given a copy of their interview transcript. After

each interview, participants were invited to participate in member checking to discuss the findings from the data analysis.

Interviews

During the semistructured interviews, I acted as the primary data collection instrument. Telephone conferencing was used to conduct each interview. Each interview was scheduled at a place and time based upon the interviewee's availability and appropriate technology and lasted approximately 60 minutes. Alternate times and dates were also available. The data were transcribed and analyzed after each interview, and participants were asked to review the analysis via the member checking process to review the results. While conducting the interviews, I kept a reflective journal where I interpreted what was said by the interviewee. There were no separate interview questions for the participants. All questions were the same. An additional audio recorder was available as backup during the interview process.

Researcher's Role

My job title is a third grade educator. I teach all academic subjects at this grade level. The elementary school that served as the site for this study is in the same district as the elementary school I work; however, both schools are in different locations. The elementary school for this study also has a different administration. I have no affiliation with the site school in any way other than working in the same district.

I have 9 years of teaching experience as a Grade 3 educator teaching all subjects and 2 years teaching language arts for fifth grade. My experience teaching third grade

mathematics may cause bias because I am familiar with the standards and content related to the research topic.

Data Analysis

Data analysis refers to the organization of data collected that is then coded by defining trends, categories, and themes that capture the information's commonalities and discrepancies (Creswell, 2014). According to O'Leary (2020), the steps in the analysis and interpretation of data are: (a) transcribe raw data from voice to text, (b) categorize data using a coding method aligned with Marzano's observation instrument (c) review all codes and make connections by identifying themes (d) validate and compare data for discrepant cases and (e) conclude and explain the findings.

Data was collected from the participants through individual interviews using safe social distancing via teleconferencing for this study. Once interviews were completed, data were transcribed into text form by hand. When a small database is used, Creswell (2014) stated that analyzing data by hand is preferred because it helps the researcher to track and locate text passages. After transcribing the text, I began the coding phase by searching for common words, phrases, and patterns. Once patterns were identified, the information was categorized into themes.

Once themes were established, the member checking process allowed the participant to validate the accuracy of the information. Member checking required me to send transcripts of data or interpretations of data to all or certain participants for comment. Such sharing is intended to boost the credibility of data collection and the participation of participants (Varpio et al., 2017). When member checks were complete, I

drew conclusions and explained the findings of the data. After presenting the data findings, the participants were then sent the results for another member check to check for viability.

Accuracy and Credibility of Research

It is my responsibility as a researcher to ensure that both the data collected and the findings of the data are credible, dependable, and transferable. Credibility, dependability, and transferability refer to the quality criteria of qualitative research. Korstjens and Moser (2018) describe each quality criteria as (a) credibility is the confidence that can be placed in the truth of the research findings, (b) dependability is the ability for findings to sustain over time, and (c) transferability is the degree to which the findings of qualitative research with other respondents may be translated to other contexts or settings.

To ensure the credibility of the research, I made sure each participant was involved in the member checking process. Participants were sent interpretations and invited for post-interviews for feedback discussion. Member checks are necessary to ensure all findings are unbiased, accurate, and thorough (Merriam & Tisdell, 2016). Interviews were conducted via telephone conference and recorded to generate a transcript to ensure dependability. To encourage the reader to decide whether the results are transferable to their environment, a thorough summary of the participants and the research process was provided. This means that participants can make the transferability decision since I do not know their particular settings.

Discrepant Cases

Booth et al. (2013) defined discrepant case analysis as a research component that decides whether the data obtained contradicts trends or themes developed from data analysis. During data analysis, I looked for evidence of discrepant cases by reviewing and comparing themes to less prevalent statements and perceptions of the participants to ensure data saturation. I also reviewed transcripts for data that did not align with emerging themes, patterns, and phrases. Booth et al. (2013) declared that researchers could establish a deeper, more in-depth understanding of a phenomenon by searching out disconfirming instances, thereby lending credibility to the resulting study account. According to the data, I found all four teachers to be outliers. All of the study participants agreed that they are not using the same strategies in their classrooms. Although the participants had access to the Engage New York curriculum, they admitted to only using some of the resources or not using it. Teachers opted to use different resources to teach mathematics because it was easier to use with the Google Classroom platform to teach from. In adjusting to using other platforms for teaching, researchers Kansal et al. (2021). pinpoint:

> The ability of the instructor and student to apply accurate and applicable pedagogy with appropriate tools for online education is dependent on their expertise and the platforms they utilize, which include combined communication and collaboration platforms (p.12).

Lockdowns and social distancing measures during the COVID-19 pandemic have caused disruptions in the educational system. Pokhrel and Chhetri (2021) proclaimed a

paradigm shift in the way educators deliver quality education—through various online platforms. Online learning, distance, and continuing education have become a panacea for this unprecedented global pandemic, despite the challenges posed to educators and learners. Based on the information from the participants, all students and teachers were given laptops for e-learning. More online learning tools have been utilized since the closing or partial closing of schools. E-learning tools have played a crucial role during this pandemic, helping schools and universities facilitate student learning during the closure of universities and schools (Subedi et al., 2020).

Teachers at the local elementary school have experienced difficulties with teaching during a pandemic. Participants disclosed that they spent a lot of time learning about the e-learning teaching platform Google Classroom to teach lessons and communicate with parents and students. Google Classroom is just one collaboration platform that allows teachers to create educational courses, training, and skill development programs (Petrie, 2020). As stated in some participant interviews, two of the leading online mathematics learning games used in the classroom are Reflex and Zearn. Both programs are used to target mathematics concepts such as multiplication, addition, subtraction, and division.

Teaching to mastery has been an ongoing concern mentioned by some of the participants as well. Teachers are struggling to teach standards with fidelity. Due to reduced contact hours for learners and a lack of consultation with teachers when learning/understanding difficulties, students' academic performance is likely to suffer in classes held for both year-end and internal examinations (Petrie, 2020). Based on the

data collected and analysis of the data, I concluded that teachers at the local elementary school use different instructional strategies that are not equating to increased student mathematics academic achievement. Quality mathematics instruction is essential to student academic achievement, and educators must work to remove any obstacles.

Data Analysis

Teachers at the study school have used district-adopted mathematics textbooks, relied on their knowledge, and accessed a South Carolina Department of Education resource website. However, it is unclear how they use these resources during their instructional practices. Based on the problem, the purpose of the study was to investigate and understand how teachers implement instructional practices that support student achievement in mathematics. Once approval was given from Walden's Institutional Review Board (Approval No. 02-04-21-0417624), data were collected from four semistructured interviews. Potential participants were emailed an informed consent form (see Appendix D) outlining the basis of the research, participant protection, and all aspects of the study as voluntary. Out of the ten potential participants, four participated in the study. Several follow-up emails were sent to non-responding potential participants in an attempt to gain more participation in the study. After two weeks without responding, I decided to continue the study with the four consenting participants. Of the consenting participants, two were from third grade and two from fourth grade. Some of the other possible participants later disclosed that they would be unable to participate in the study due to their work schedules and other obligations.

COVID-19 played a significant role in the number of participants I could get for the study and how I conducted the study. In higher education, students, faculty, and staff are adjusting to new strategies for conducting research. For the foreseeable future, research facilitation will be a problem, and investigators should be prepared to respond in the case of a stop or closure. (Elmer & Durocher, 2020). While attempting to gain participants for the study, some teachers were quarantined for several weeks and could not participate in the study. Eventually, I was able to get four participants to participate in the study. Due to the unforeseen effect COVID-19 had on finding participants, a smaller sample was used to conduct the study.

Patterns

Four participants answered questions during semistructured individual interviews. The data showed that teachers at the local elementary school had varying responses to instructional practices used in the classroom regarding research-based planning, standards-based instruction, conditions for learning, and professional responsibilities.

The interview questions derived from the following research question:

RQ: What instructional practices used by third grade and fourth grade teachers are aligned or not aligned with research-based planning, standards-based instruction, attention to conditions of learning, and professional responsibilities of teachers? The interview protocol contained seven open-ended questions. Participant responses were recorded using an audio recorder. The participant's interviews were transcribed by hand. Transcripts were then color-coded and highlighted to show themes.

Since the research and interview questions were based upon the framework of Marzano's effective teaching strategies that are standards-based planning, standards-based instruction, conditions of learning, and professional responsibilities, I checked for responses that aligned. The framework for this study, Marzano's Focused Teacher Evaluation Model, incorporates a standards-based planning domain as a starting point, focuses on the ten most critical instructional elements necessary for standards-based instruction, incorporates conditions for learning that must be in place in the classroom for effective standards-based learning, and finally, provide a focus on professional responsibilities that serve as the foundation that supports the other domains (Carbaugh, et al., 2017). The basis of this framework was used to find codes and themes.

After transcribing the data from the interviews by hand, coding was used to find themes and create categories based on the data. According to Creswell (2014), keeping track of and evaluating data is critical for theorists and researchers who employ qualitative studies to uncover themes and guarantee that the findings are based on the analysis. After transcribing data from the interviews, coding was used to pick up on keywords or information found for each category within the research question. Coding is the process of analyzing data to examine the smaller facets of data collected and the act of formulating a connection between them (Lodico et al., 2010). Each transcript was read several times and then given a code that aligned with the research question. Words from each part of the research question were identified using a highlighter color to organize the data.

Questions related to each instructional practice within the research question were categorized as shown in Table 2.

Table 2

Categories and interview questions related to the research question

Categories within the research question	Interview questions corresponding to the categories within the research question.
Research-Based Planning	1. How do you use data to plan for mathematics lessons? 2. How do you plan for differentiated instruction when students do not grasp concepts?
Standards-Based Instruction	3. What type of instructional procedures do you use when teaching mathematics? a. What strategies have you found to be most beneficial to students? b. What strategies have you found to be the least beneficial to students? 4. How do you design instruction to fit with mathematics standards? a. What happens when students are not grasping mathematics concepts?
Conditions of Learning	5. What do you typically do to establish and maintain classroom rules and procedures to foster positive classroom conditions for learning? a. What happens when students do not follow the rules and procedures you have in place? 6. How do you actively engage students during a mathematics lesson? a. Do you use instructional resources such as manipulatives or technology? Why or why not?
Professional Responsibilities	7. As an educator, what do you do, outside of the classroom, to maintain expertise in mathematics content and pedagogy? a. Do you have opportunities to collaborate with other colleagues? b. If so, what happens during the collaborations?

Themes related to instructional practices used by third grade and fourth grade teachers aligned or not aligned, with research-based planning, standards-based instruction, attention to conditions of learning, and teachers' professional responsibilities, emerged once the data were transcribed and analyzed. Four themes derived from the

analysis of the qualitative interview questions. The themes are (a) different resources used by teachers, (b) ineffective use of formative assessments, (c) inability to teach to mastery, and (d) more professional development opportunities needed.

Research-Based Planning

Theme 1: Different Resources Used by Teachers. All four participants discussed the different resources used in the classroom to construct lessons. Part of Marzano's Focused Teacher Evaluation Model includes teachers being able to articulate how planned curriculums and resources will facilitate student learning to the level of rigor required by the standards taught. Although participants stated the using different resources to teach mathematics, it is unclear how these planned resources are used to support the rigorous mathematics standards. Participant 1 said, "I use so many different things when I'm teaching. I normally use the Engage New York curriculum to pull lessons from, or it just depends on what I'm teaching." Participant 3 identified Reflex and Zearn as two reliable resources stating, "Every morning before I teach math, my students know they must master one lesson on the math program Zearn and get a green light in Reflex. This program helps them increase their fact fluency and master multiplication tables." Participants explained that all of the third grade and fourth grade teachers get together to plan their lessons every week and share instructional material based on what they are teaching for the upcoming week. Participant 2 stated, "I am so glad we get to plan with other grade levels because we get to see exactly what fourth grade is using to help their students, and if we can incorporate any of it before our third graders get there, it helps." Participants expressed that they were happy that they get to pick and choose

what curriculum and resources they get to use to teach standards and are not tied to just one thing. Participant 1 explained that "although we are teaching the standards, we are using different things to reach our students."

Collectively the participants expressed their satisfaction with pulling different resources; however, according to Marzano, more attention should be given to how teachers are using the planned resources to close the achievement gap. Marzano and Toth (2014) asserted that teachers should articulate how the planned technologies, curriculums, and resources facilitate student learning to the level of rigor required by the standard and how any issues will be addressed if students struggle with concepts.

In addition to identifying what they are using, the participants explained why they continued to use different resources. Every participant recognized the limitations of their ability to align resources to the standards based on the nature of remote learning. Participant 3 shared, "Covid has really put a damper on how I do things in the classroom now that I must teach students virtually and face-to-face." Participant 4 stated, "Using Engage New York was beginning to get too tough to implement while I had students at home trying to learn. I just had to find something else that worked for everyone." Marzano expresses that one of the research-based planning instructional elements teachers should incorporate is planning that is aligned to grade-level standards. Marzano and Toth (2014) explained that teachers need to provide support for students with different needs and monitor student work for evidence of learning. Although the teachers recognized the limitations they had with teaching a specific curriculum, it was unclear

how their resources benefited the students other than it was easier to use on the Google Classroom teaching platform.

Research-Based Instruction

Theme 2: Ineffective Use of Formative Assessments. While analyzing the data, I realized that although participants discussed what assessments were being used to drive their instruction, participants did not disclose how in-depth the data was reviewed and how it will drive instruction. Teachers need to review work that shows student thought processes, not just if the answers are right or wrong. (Gibbons & Cobb, 2016). In this study, all of the participants indicated they used different formative assessments in their classrooms. Teachers discussed using information from various forms of assessments such as problems of the day and exit tickets to assess students. To close the achievement gap, Carbaugh et al. (2017) contended that teachers must use data to identify and plan to meet each student's needs and provide evidence that shows students are making progress.

Participant 2 noted, “the information I receive from the assessment data allows me to reteach, create small groups, and construct future activities to be done or assignments to come.” Another participant indicated formative assessments drive the majority of the instruction in her classroom. According to Participant 1, “the data collected from all of my formative assessments tell me where to begin with a class or certain students, what concepts need re-teaching within my small groups, and when they are ready for a summative assessment.

Participant 4 stated, “I start each class with a Do Now. The Do Now helps me review a previous skill and recheck to understand or even introduce a new skill. I then

end each class with an exit slip as a final assessment." While Participant 2 shared, she used Thumbs Up/Thumbs Down to identify levels of understanding. Only one participant mentioned the use of past assessments to help make informed teaching decisions. Participant 3 stated, "I like to look at past assessments and old data to determine what my students need the most from me to help improve their grades. I also create assessments based on the data". By collectively combining the results from standardized assessments and other formative assessments, teachers will have a collection of more in-depth data to use during conferencing to make more informed decisions on instructional practices to use.

Conditions for Learning

Theme 3: Inability to Teach to Mastery. Participants admitted to incorporating some of Marzano's conditions for learning, such as establishing rules and procedures and incorporating group work within lessons to help students reach mastery of standards. It was unclear how teachers used engagement strategies within those groups to cognitively engage with the content to move them forward to master mathematics skills. Participants discussed the difficulties they faced with teaching the standards until students have mastered them. Participant 2 stated, "I don't believe many of the students have mastered some of the basic concepts of mathematics because I spend so much time going over stuff students are expected to know." Participant 1 noted, "Remediation before teaching a new skill has placed my students behind in some standards. We cannot move forward because we are catching math skills students have not retained or not learned." New state standards require more clarity in the progressions of knowledge addressed in class, more

application of knowledge by students, and deeper inferential thinking (Carbaugh et al., 2017). The participants explained how the district does not have a specific pacing guide for them to follow; therefore, this could explain how students are possibly not getting enough foundational strategies in the lower grades before coming to third grade. Participant 3 shared:

> I can only imagine what standards are possibly being skipped in second grade since the district has not provided us with any sort of guide. I guess the lower grades pick and choose what's essential for their students and do the best that they can to cover them.

Teaching students the standards until they are mastered includes teachers providing students with conditions in the classroom that have a high probability of positively affecting their achievement when those conditions are correctly implemented. Participants established rules and procedures at the beginning of the year to create a positive classroom climate that allowed students the greatest opportunity to learn. Participant 1 stated, "I rarely have issues in my class because I made it clear from the first day of school that we are a family." Participant 4 shared:

> Although we have to stay 6 feet apart due to COVID-19, I still find safe ways to make sure my students interact in small groups. Being out all summer has made them realize how important their friendships are, and I want to help them by encouraging them to talk and have conversations in their group.

Part of the conditions for learning in Marzano's framework includes students working in groups or teams. In this era of rigorous standards, where the goal is to prepare students

for college and careers, students must work together in groups or teams. Group work facilitates both cognitive processes and the development of conative skills (Carbaugh et al., 2017). Based upon Marzano's conditions for learning, the teachers struggle with correctly implementing the conditions with fidelity to meet the academic needs of students.

Professional Responsibilities

Theme 4: More Professional Development Opportunities are Needed. Data collected and analyzed based on the research question showed a common theme that more professional development geared toward teaching mathematics to students is needed. When asked the question, as an educator, what do you do, outside of the classroom, to maintain expertise in mathematics content and pedagogy, Participant 3 stated, "Professional development these days has been less standard content-driven and more on how to use the platform Google Classroom since we have had to do a lot of virtual stuff." Participant 4 agreed by stating, "I almost know more about teaching on Google Classroom than teaching." All of the participants decided that the training on how to use Google Classroom was vital and met the needs of the students and teachers, but now they would like to focus on content that can be used on the virtual platform to help their students reach levels of achievement in mathematics.

In contrast, all participants mentioned that they hope there would be time for more collaborative workshops between the two small districts that are merging. Participant 1 stated, "Being able to work with other grade levels in the other district could benefit all of us since we are such small schools." Additionally, Participant 2 added, "Now that we are

combining the districts, we may finally have a set curriculum and sound pacing guide to help us and help our students because ultimately the students are the ones who are suffering."

Based on the information gathered from the interview question about outside professional development to keep up with content and pedagogy, all participants stated that they had recognized barriers that have kept the district from utilizing collaborative efforts with colleagues over the past two years face-to-to professional development opportunities. The participants mentioned how between teachers and staff being quarantined due to COVID-19, it was challenging to provide workshops, even virtually, for teachers. Participant 4 also discussed how difficult it would be to sit in front of her computer for a professional development workshop stating, "I probably wouldn't focus at all if I had to sit through someone talking to me for two days straight through a computer for hours." Participant 1 valued any professional development or collaborative opportunities the district could attempt to provide but agreed that a virtual setting would not be beneficial.

Summary

This qualitative case study aimed to investigate how teachers are implementing instructional practices to support students' achievement in mathematics. Four participants were interviewed to determine what instructional practices used by third and fourth grade mathematics teachers are aligned or not aligned with research-based planning, standards-based instruction, attention to conditions of learning, and professional responsibilities of teachers. This study's conceptual framework was grounded in Robert Marzano's model of

teaching effectiveness called the Focus Teacher Evaluation Model (Marzano & Toth, 2014). The framework provided research-based instructional practices associated with the effective delivery of instruction to students in the classroom. Guided by the conceptual framework, the following themes emerged from the research question: What instructional practices used by third and fourth grade teachers are aligned or not aligned with research-based planning, standards-based instruction, attention to conditions of learning, and professional responsibilities of teachers?

Based on the data collected and analysis of the data from the research question, I concluded that the Grade 3 and Grade 4 teachers at the local school use different instructional practices that are not equating to an increase in student mathematics academic achievement. Therefore, all of the teachers were outliers for using instructional practices aligned with research-based planning, standards-based instruction, attention to conditions of learning, and professional responsibilities.

Although the four participants had access to the Engage New York curriculum, which was available online and provided daily lessons, they chose to use other resources that could be used on a one-on-one computer platform. There was no consistent use of the curriculum available to them.

The first theme revealed that third and fourth grade teachers employed different resources for their mathematics instruction. Although teachers use different resources to teach mathematics, it was unclear how the planned resources were used to facilitate student learning to the rigor required by the standards taught. All of the participants discussed using different resources at any given time in the classroom. Participants

believed that incorporating these resources into their planning helps students with fact fluency and gives them more practice with basic mathematics concepts. Polly (2017) asserted that student achievement is linked to resources and instructional strategies teachers employ during instruction. Since student achievement is related to instructional strategies and resources, the low student achievement data supports that the teachers are not using research-based planning when preparing mathematics lessons.

Theme 2 indicated that teachers are not using the assessment data with fidelity to show student progress. Participants use different formative assessments such as Exit Tickets and Do Now activities after lessons. These assessments were used to construct small groups, reteach, and plan future mathematics lessons. While analyzing the data, I realized that although participants discussed what assessments were being used to drive their instruction, participants did not disclose how in-depth the data was reviewed. Teachers need to review work that shows student thought processes, not just if the answers are right or wrong. Although the teachers mentioned using some degree of assessment, not much detail was given on how the data is collected and monitored to track student growth. The ineffective use of different formative assessments shows that teachers are not using research-based instructional practices to teach mathematics.

Theme 3 indicated that teachers used some of Marzano's conditions for learning. However, it was unclear how teachers used engagement strategies to cognitively engage with the content to move them forward to master mathematics skills. Participants indicated that if the district could provide a pacing guide to help with teaching each standard, they would not get so far behind. The established conditions for learning

teachers are using are not enough to help students master mathematics standards. There is no guarantee the teachers were teaching until mastery because of the different resources each teacher admitted to using.

Finally, teachers recognized that more professional development on specific mathematics content is necessary. Participants recognized the importance of the district making sure they how to use the Google Classroom instruction platform but would benefit from professional development workshops that focused on improving mathematics instruction.

The conceptual framework for this study was designed to grow teacher expertise and encourage teachers to expand their repertoire of classroom strategies beyond a reliance on introducing and interacting with new content. Marzano and Toth (2014) noted in the discussion about the focus teacher evaluation model that:

Since incorporating new and rigorous standards, there is the need for a paradigm shift in the traditional view of K–12 curriculum and instruction. Fundamentally, these rigorous standards require modifications in teaching to ensure the expected student outcomes in English language arts (ELA) and mathematics that far exceed previous expectations. (p. 7)

The framework highlighted the significance of teachers incorporating standards-based planning as the starting point. The framework also emphasized the implementation of critical instructional elements necessary for standards-based instruction, the incorporation of conditions for learning in the classroom for effective standards-based

learning, and professional responsibilities that serve as the foundation for changing pedagogy.

Conclusion

Based on the data collected and analysis of the data, I concluded that teachers at the local elementary school used many different instructional strategies that were not equating to increased student mathematics academic achievement. They were not using instructional practices aligned with research-based planning, standards-based instruction, attention to conditions of learning, and professional responsibilities. Quality mathematics instruction is essential to student academic achievement, and educators must work to remove any obstacles. While teaching, mathematics instruction must be more rigorous and focused, and requires more thoughtful planning and explicit change in instruction.

Based on my research findings, the teachers at the local elementary school admitted to having access to a curriculum, but rarely used it. Theme 1 indicated that all of teachers use different resources to teach mathematics. Theme 4 indicated the teachers recognized the need for more professional development focusing specifically on mathematics. As a result, a 3-day professional development training was designed to provide the training of teachers in the purposes, processes, and strategies needed to effectively and consistently implement the research-based Engage New York mathematics curriculum. I also included the framework of research-based mathematics practices teachers can employ to help increase mathematics instruction. Section 3 explains the project in detail in addition to the project rationale, timeline, and goals.

Section 3: The Project

The project I developed is aligned with the needs of the local elementary school, the study's findings, and the current literature. Through data collection, I captured the instructional practices used by Grade 3 and Grade 4 teachers aligned or not aligned, with research-based planning, standards-based instruction, attention to conditions of learning, and professional responsibilities of teachers. Four themes emerged from the analysis of the data collected from the mathematics teachers: (a) teachers use different curricula resources to teach mathematics standards, (b) teachers' ineffective use of formative assessments, (c) teachers' inability to teach to mastery, and (d) more professional development opportunities needed in teaching mathematics strategies.

Based on the themes, I concluded that the third and fourth grade teachers at Synergizing Elementary School used different instructional practices that were not equating to increased student mathematics academic achievement. The themes indicated that teachers' instructional practices were not aligned with Marzano's focus teacher evaluation model nor was there a consistent use of a curriculum. The 3-day professional development training was designed to provide the teachers with the purposes, processes, and strategies needed to effectively and consistently implement the research-based Engage New York mathematics curriculum that the district has adopted for the new school year. The professional development workshop (See Appendix A) also includes the framework of research-based mathematics practices teachers can employ to help increase mathematics proficiency.

In this section, I discuss the project that was developed to offer a 3-day professional development training that provides teachers with the purposes, processes, and strategies needed to effectively and consistently implement the research-based Engage New York mathematics curriculum. The professional development workshop also includes the framework of research-based mathematics practices teachers can employ to help increase mathematics instruction. In this section, I present a description, the rationale, implementation, and barriers to the project. A second review of the literature was conducted to understand the themes and support the project. This section concludes with the evaluation of the project and a discussion of social change implications.

Rationale

The 3-day professional development training was designed for Grade 3 and 4 mathematics teachers. The project's central goal was to provide teachers with the purposes, processes, and strategies needed to effectively and consistently implement the research-based Engage New York mathematics curriculum. The professional development workshop also includes the framework of research-based mathematics practices teachers can employ to help support student mathematics achievement. The project was developed from the identified themes that (a) teachers are using different curriculum resources to teach mathematics and (b) teachers recognized the need for more professional development focusing specifically on mathematics. All four participants indicated the use of different resources to teach mathematics. The inconsistent use of the resources and lack of use of the curriculum provided by the district warranted a need for

the professional development project. At the end of the training, I anticipate that teacher instruction will be enhanced with evidence-based instruction and a better understanding of how to implement the mathematics curriculum.

Review of the Literature

Findings from the semistructured interviews provided evidence for the need to have consistent resources, and curriculum teachers can use to teach mathematics. I conducted an exhaustive search and analyzed peer-reviewed articles and journals for the literature review that includes instruction based on curriculums, teacher-developed curriculums, using mathematics curriculums, and collaborative professional learning. The search for resources included various domains such as Walden's metasearch using ERIC, Google Scholar, Google, SAGE, and Education Research Complete. Keywords in the search included *curriculum, curriculum-based instruction, teacher-developed curriculums, mathematics curriculums, mathematics content knowledge, mathematics instruction, conceptual knowledge, best practices for teaching mathematics, professional responsibilities, professional learning, collaborative learning, elementary mathematics instruction, teaching practices,* and *teaching mathematics.* While studies chosen for this literature review were focused on 2017-2021, a few were cited outside of this time. Earlier dated works were included to give a foundational source and establish validity for the theories and concepts employed in this study.

Instruction Based on Curriculum

According to Edgerton and Desimone (2018), a curriculum is a set of lessons, assessments, and other academic material that a teacher teaches at a school, program, or

class. Before lessons can be constructed, teachers must have an established curriculum. Lesson plans are based on a course of study, curriculum materials are aligned with content and objectives, and authentic task development is curriculum-based instruction. Curriculums can be created, adapted, or adopted. Regardless of what is used, the success or failure of a curriculum can be determined by implementation fidelity (Anderson, 2013). When teachers implement a curriculum with fidelity, curriculum, instruction, and assessment are all aligned, according to Goldman and Pellegrino (2015). All three should be working toward the same goal and supporting one another.

Teacher-Developed Curriculums

Teacher-developed curriculums are produced by instructors, which allows them to tailor instruction and standards to the specific requirements of their pupils. According to research, teachers who create curriculums organize lessons based on prior classroom interactions, personal opinions, and observed student needs, according to research (Gay, 2013). Since students learn in different ways, curriculums should be set up in the same manner. Lenski et al. (2016) noted curriculums must be adaptable so that teachers may create lessons that are engaging for their specific groups of students and actively engage them in creating knowledge. Dixon et al. (2014) added rather than expecting students to adjust to the curriculum, teachers must modify their approach to teaching and adjust the curriculum to accommodate diverse learners.

Voogt et al. (2016) conducted a study where he analyzed 14 doctoral theses. The theses investigated relationships between sustainable curriculum innovation and collaborative design in teams of teachers. According to teachers and management, the

results indicated that teachers' participation in the design process resulted in enhanced curriculum design methods and, as a result, higher-quality curricula. Additionally, Voogt et al. (2016) also discovered that according to teachers and management, teachers' participation in the design process resulted in improved curriculum design methodologies and, as a result, higher-quality curricula.

According to Davis et al. (2017), educational materials should facilitate student learning across various domains. They say that educational resources can influence both the teaching experience, practice, and mindset, as well as the learning experience of students. According to Graue et al. (2015), teachers must be able to design and change lessons to fulfill the needs of their students depending on their interests and the knowledge they bring to school, which is referred to as improvisational teaching. A teacher-created curriculum would allow teachers to do so.

Mathematics Curriculums

Students' low accomplishment levels and huge achievement gaps in mathematics, and the lack of rigor indicated in state educational standards have been criticized in American public schools (Lee and Woo, 2017). Many academics agree that high-quality, standards-aligned curriculum materials can translate standards into practice by focusing teacher practice on standards-based content and strategies (Pak et al., 2020). More specifically, to improve the quality of mathematics instructions, states and districts sought to align instruction to these standards, often encouraging teachers to use standards-based curriculum materials (Hill et al., 2019). Koedel et al. (2017) conducted a study that investigated teachers using different mathematics curriculums and how those

curriculums affected student achievement. The researchers concluded when teachers used mathematics curriculums with fidelity, student achievement improved.

In contrast, Pak et al. (2020) argued although the positive claims of teacher use of standards-aligned curriculums, a variety of obstacles hinder these materials from having a positive impact on instruction. Polikoff (2018) agreed and summarized the barriers as determining high-quality materials, getting schools and districts to buy into and adopt those high-quality materials, and teacher efficacy in using those materials. Null (2017) elaborated that regardless of the barriers, it is self-evident that teachers are at the heart of the curriculum. It is the teachers who use the written curriculum to direct their instruction to improve student accomplishment. The teachers need to be efficient in implementing the selected curriculum. In a study conducted by Koedel et al. (2017), the researchers found that when teachers used an adopted mathematics curriculum that they had input in choosing, student mathematics achievement increased. Koedel et al. also found that teachers were more prone to implement a curriculum with fidelity when they had the option to help choose the curriculum or resources to teach from.

Some teachers and school districts opt to use scripted curricula to help improve mathematics achievement. Scripted curricula are standardized curricula that give teachers instructions for delivering content to students (Tomlinson, 2014). In a study where teachers used a scripted curriculum, Timberlake et al. (2017) found that teachers believed using a scripted curriculum, such as Engage New York, offers a window into good teaching practices. The researchers also found that teachers believed a significant strength of a scripted curriculum provides a structure for implementing state standards.

Twyman and Heward (2018) added that scripted curriculums provide consistency by employing systematic teaching content to ensure that students have enough information to create appropriate answers.

Mathematics is a cohesive field, arguably unique in that it has essential logical and conceptual linkages between concepts and themes. These linkages are critical for students to fully comprehend and apply the mathematics required to meet the situations, issues, and challenges they face as workers, citizens, and consumers in their daily lives (Cogan et al., (2019). Cogan et al., (2019) also noted a quality mathematics curriculum, one that represents the discipline's coherence, building concept upon concept, competency upon competency, from one year of schooling to the next, is critical to acquiring this understanding.

Collaborative Professional Learning

Teachers draw on the ideas of others in their learning network, and they require time in professional learning settings to collaborate (Anderson et al., 2019). De Simone (2020) adds effective professional development is one where collaboration with other colleagues exists. Teachers participating in cooperatively solving rich tasks, examining representations, and communicating mathematical reasoning through argument are all components of successful professional development programs (Biccard, 2019). Elementary teachers engage in a relearning process that entails revisiting and recreating their knowledge as they seek to strengthen their mathematical understandings. Therefore, Barlow et al. (2014) conclude that collaborative professional learning is essential, as is meaningful participation in immersion and practice-based experiences.

Teachers' professional progress is influenced through collaboration, which includes sharing ideas, lesson planning, and reflection on teacher and student learning (Gee & Whaley, 2016). Teachers' learning is aided by active engagement and cooperation, which can also influence how their teaching approaches change (Garcia et al., 2018). Garcia et al. (2018) conducted a study on how peripheral engagement in basic mathematics teaching and concentrated professional development affects teachers' actual practice and the characteristics that support it, such as their capacity to recognize the specific labor of teaching and children's mathematical strengths. The findings from this study revealed that three out of four teachers expanded their use of techniques: probing, orienting, establishing connections, and making contributions after engaging in a collaborative professional development specifically designed to improve mathematics achievement.

Auletto and Stein (2020) noted despite the rising focus on inquiry-based professional learning, many instructors continue to receive heavy doses of more traditional kinds of professional development, such as workshops, presentations, and isolated trainings, which are ineffective at changing teaching practices. Based on the research, what has been shown to change teaching practices is a hands-on approach to learning during professional development. Additionally, Polly (2017) noted when teachers are given the opportunities to engage in significant exploratory mathematics professional development, there is an increase in teachers' knowledge of facilitating teaching practices with students. A study conducted by Tallman (2020) effectively linked teacher collaboration to student achievement. The researcher found when teachers

were provided opportunities to collaborate on curriculum, instruction, and professional development for school improvement, they were satisfied, and the results were advances in student accomplishment on high-stakes testing.

Summary

Whether teacher-made or scripted, mathematics curriculums play an instrumental role in student academic achievement when aligned with state standards and implemented with fidelity. As discussed in the literature review, teachers require adequate learning opportunities through collaborative professional development to deepen their enactment of successful pedagogies, acquire increased self-efficacy in teaching mathematics, and develop skills linked to formative assessment. Desimone et al. (2019) noted local districts are filling the policy void left by states by creating more specific, standards-aligned professional development and supporting materials to assist teachers in applying the standards.

Project Description

Implementation

The project I developed is aligned with the needs of the local elementary school, the study's findings, and the current literature. Through data collection, I captured the instructional practices used by Grade 3 and Grade 4 teachers aligned or not aligned, with research-based planning, standards-based instruction, attention to conditions of learning, and professional responsibilities of teachers. Four themes emerged from the analysis of the data collected from the mathematics teachers: (a) teachers use multiple different curriculum to teach mathematics standards, (b) teachers' ineffective use of formative

assessments, (c) teachers' inability to teach to mastery, and (d) more professional development opportunities needed in teaching mathematics strategies. The project was created based on two of the themes: (a) teachers use different curriculum resources to teach mathematics standards (b) teachers need more professional development opportunities needed to teach mathematics. Therefore, a 3-day, 6-hour per day, professional development project was developed to provide teachers with the purposes, processes, and strategies needed to effectively and consistently implement the research-based Engage New York mathematics curriculum. The Engage New York curriculum will be adopted by the local school to implement for mathematics instruction. The professional development workshop will also include the framework of research-based mathematics practices teachers can employ to help support student mathematics achievement. Before attending the 3-day professional development training, teachers will be asked to bring the laptops provided by the district. Teachers will need access to the internet.

Day 1 will begin with me explaining the professional learning objectives and an overview of the 3-day professional development schedule. The objectives include curriculum importance, evidence-based mathematics curriculum Engage New York, and the framework for evidence based mathematics practice. Teachers in Grades 3 and 4 and mathematics coach administrators will be grouped and assigned tables by grade level. Once all participants are grouped and seated, I will introduce myself as the project facilitator and all participants will be welcomed. Teachers and administrators will then engage in a team building activity. During the team-building activity, participants will

review an Engage New York module lesson. Participants will have to identify the content standards from the lesson and determine what prerequisite skills students need before the lesson. After the answers are given for each grade level, I will present a segment on "Why Engage New York?" I will present archived test scores from another school district currently implementing the Engage New York curriculum. The sample schools will have similar demographics as the local school. After the lunch break, I will introduce the two invited teachers from the sample school to give testimonials. There will be one teacher from Grade 3 and one from Grade 4. Teacher testimonials will be shared from the neighboring school in the district. During this time the local school will engage in a question and answer session with the sample school personnel about the curriculum. Lastly, administrators, that consist of the grade level mathematics coaches will share a consistent, collaborative planning schedule for each grade level to continue receiving support for implementing the district curriculum. Day one will conclude with participants completing the Day 1 evaluation.

Day 2 will consist of reviewing the South Carolina mathematics standards and how they align with the Engage New York curriculum. Participants will sign in and report to the same groups from day 1. Once grouped, I will guide participants with a Power Point presentation of a review on information presented from day 1. Next, I will lead an activity that includes a review of the third and fourth grade mathematics standards. Participants will be provided with a copy of the South Carolina College and Career Ready mathematics standards for their grade level. Participants will also be provided with two mathematics modules from Engage New York curriculum.

Participants will work together in groups to find (a) the standard associated with the modules (b) prerequisite skills needed (c)academic vocabulary (d) assessments for the module and student mathematical practices. Teachers will be provided with the following materials to complete the assignment: binders, highlighters, Engage New York modules, index cards, post it notes, sheet protectors, pens and pencils. Teachers will use their binders to organize and store standards, modules, and other resources. The teacher binders will be used for the remainder of the professional development. After a 10-minute break, teachers will examine the resources associated with the Engage New York curriculum. Teachers will go on a scavenger hunt of one of the Engage New York modules to identify any resources used during the lessons. Each group will highlight and make a list of the resources on chart paper. After a group discussion of resources found, teachers will collaborate to make an additional resource list of resources they already have in the classroom that can be used in the module lessons. After 10 minutes of collaboration time, participants will be randomly selected to present the additional list of resources and how they connect to the lessons. After a 10-minute break, teachers will be given the opportunity during a chat and chew to ask questions, make comments, and voice concerns about the curriculum. Myself and the administrators, which consist of grade level mathematics coaches, will answer these questions and help teachers create a chart paper of ideas to ensure concerns and ideas are noted. To wrap-up day 2, all participants will take the evaluation survey.

Day 3 will consist of an overview of days 1 and 2 in addition to the framework of evidence-based mathematics practices that align with the mathematics standards. I will

provide a presentation over the research-based framework that includes research-based planning, standards-based instruction, attention to conditions of learning, and professional responsibilities of teachers. During the presentation, teachers will engage in several hands-on activities that will be added to their binders. Teachers will use their computers to complete collaborative activities on each of the four components of the framework. The activities include reviewing and documenting where they find each component of the framework within Engage New York lesson modules. Participants will also watch videos from the Engage New York website that shows teachers in action implementing and teaching the curriculum. After watching the videos, I will present information and provide teachers with a sheet of websites and additional resources teachers can use to implement the curriculum. Day 3 ends with the administrators outlining the expectations for teachers to implement the Engage New York curriculum. Teachers will be provided with the first nine weeks of Engage New York module lessons to add to their binders.

By the end of the 3-day professional development, participants will have increased knowledge of the Engage New York curriculum adopted by the district. Teachers will also have knowledge of the framework that supports instructional approaches for teaching mathematics. Participants will have a binder of mathematics standards, and the first nine weeks of module lessons needed to implement the curriculum. Participants will complete the final evaluation during the last 15 minutes of the professional development.

Possible Barrier and Solutions

The findings of the study revealed that teachers were using different curriculum resources to teach mathematics. The teachers needed evidence-based resources they can use consistently. However, teacher-buy-in is a possible barrier. The teachers admitted to having access to the Engage New York curriculum, yet all of them used other curriculum resources for instructional purposes. The teachers may feel as if they should continue pulling resources as they have in the past. With 10 professional development days built into the school calendar, teachers will be given the opportunity to spend some of that time learning how to use a curriculum. Ten teachers would be required to attend the professional development, yet only four teachers participated in the semistructured interviews. Some of the other teachers may not feel the need for other types of professional development since the curriculum is already written they could simply follow the script. To increase teacher- buy-in, the administration could provide more support for the implementation of the curriculum in the form of professional development. As the researcher and facilitator of the project, I will also offer to come back to facilitate more professional development on implementing the Engage New York curriculum.

Another potential barrier to the project is funding. Teachers must have the technology, space, supplies, resources, and other material for the 3-day professional development. A facilitator must also present the project. A possible solution to save money would be to ask teachers to use any supplies they have available from their classrooms for the professional development workshop. The local school could also ask

the district for funds set aside for professional development days to help purchase any curriculum material. The school will save money by using me as the project facilitator. The teachers will not need any personal technology since the district has provided each teacher with a laptop.

Timetable for Implementation

The proposed timetable for project implementation is August 9-11, 2022. The 3-day professional learning will begin at 8:30 a.m. and end at 3:00 p.m. The sessions will include collaborative planning and time to ask and answer questions. The local elementary school's students will be out of school during this time, and teachers will be completing pre-planning activities. Teachers may be more willing to buy in if the suggested timetable allows them to work on scheduling, address concerns, and time to understand the curriculum before the new school year begins.

Roles and Responsibilities of Stakeholders

The Researcher

The results of data collected and analysis may be provided to the local school to provide a rationale for the professional development sessions included in the project. Participants will also have the opportunity to request copies of the results as outlined in the consent form. The project will also be presented to key stakeholders other than the teachers if they desire. The key role of the researcher is to develop the project for the local elementary school.

The Project Facilitator

If administrators request the project to be presented, I will act as the facilitator. I will work with the teachers and administrators to ensure all materials are available before the 3-day professional development. An outline of needs for the professional development will be given to the administration to ensure teachers have what they need. Some essentials include space to hold the workshop, Grade 3 and 4 mathematics standards, modules from the Engage New York curriculum, chart paper, access to computers for teachers, approval of dates and times, agendas, smart board, and the project. The goal is to provide the support needed for teachers to begin implementing the Engage New York mathematics curriculum with fidelity in Grades 3 and 4 and provide the framework for evidence-based instruction.

Teachers

Grade 3 and Grade 4 mathematics teachers are expected to attend the 3-day professional development. They will be expected to arrive on time, work in grade-level groups, share ideas, and work in collaborative groups throughout the training. Teachers will be responsible for bringing the district-provided laptops each day. Electronic evaluations will be emailed to each participant after each session (Appendix A).

Administrators

Administrators, such as the grade level mathematics coaches, will be expected to attend the 3-day professional development to support the teachers and the facilitator. The mathematics coaches will also be responsible for collaborating with the facilitator to ensure all significant materials needed for the project are available. Access to passwords,

meeting space, smart board, and any technology passwords the facilitator will need is also the responsibility of administrators. The mathematics coaches must also approve the additional dates and times teachers will need to implement the curriculum and collaborate on other professional development needs of the teachers based on the project evaluations.

Project Evaluation Plan

Evaluations will be emailed to participants and the administration at the end of each professional development day. The data collected from the evaluations will allow the project facilitator to make any adjustments to the next days' workshop. The evaluations will focus on levels of engagement and needs of participants.

Teachers at the elementary school admitted to using different mathematics curricula and resources to teach math. I hope administrators structure time for teachers to continue weekly collaborative planning meetings to continue supporting them with implementation of the curriculum. If this occurs, teachers will continue to meet consistently to plan teaching the mathematics modules and resources. During this time, a survey will be given (see Appendix A), and teachers will submit evaluations on the progress of the curriculum implementation and student progress. The responses will be given to administration for them to provide any needs of the teachers and students.

During the 3-day professional development, participants will be given an evaluation survey. The survey questions will focus on participant satisfaction and impact on professional practice. The responses will be shared with administrators to determine other curriculum planning days or if more workshops will help the teachers implement

the curriculum. Teachers can also make any needed adjustments during planning for the following weeks and months.

Finally, at the end of the 2021-2022 school year, one final survey will be sent via email (Appendix A). The purpose of the final evaluation is to determine if teachers have seen any changes in student academic proficiency due to the project. I want to determine if teachers implemented the curriculum based on what was presented in the project and what effects has it had on the students' academic achievement. Data collected from the questions will determine if the proposed project positively affects the local elementary school or if more training is needed.

Project Implications

The Local Community

In response to teachers using different curriculums and resources to teach mathematics, the 3-day professional development workshop was created. Upon completing the 3-day workshop, participants will have the knowledge and skill on the importance of instruction guided by a curriculum in Grade 3 and Grade 4. The teachers will be equipped with the framework of evidence-based mathematics practices and resources to teach mathematics that include evidence-based planning, standards-based instruction, conditions for learning, and professional responsibilities. They will collaborate with other mathematics teachers and administration to ensure planning is taken place and resources are aligned with the standards.

Administrators should be involved with the implementation of the curriculum. Administrations should make sure any resources the teachers used to teach mathematics

is evidence-based and aligned with the standards. Collaborating with teachers, administration should be involved in creating an implementation timeline and expectations for teacher use. One way the administrators can affect school change is by ensuring the project meets the needs of the local elementary school.

Beyond the Community

Other schools in the local district and throughout South Carolina have implemented the Engage New York curriculum. The project study results can be shared with other schools that are struggling with teachers using evidence-based mathematics practices in the classroom. The team could collaborate with other schools who are also implementing the same Engage New York mathematics curriculum. The training could provide collaborating opportunities where schools can share ideas and strategies for improvement in the curriculum. Teachers and administrators who are having issues with curriculum fidelity could find the project useful.

Conclusion

The goal of this professional learning project is to provide teachers with the tools to create evidence-based curriculums. The research question aimed to answer what instructional practices used by third and fourth grade teachers are aligned or not aligned with research-based planning, standards-based instruction, attention to conditions of learning, and professional responsibilities of teachers? The data analysis showed teachers using different curriculum resources, ineffective use of formative assessments, inability to teach to mastery, and the need for more professional development opportunities on mathematics instruction. The project seeks to eliminate these barriers to teaching

mathematics by providing a collaborative professional development workshop where teachers are provided the purposes, processes, and strategies needed to effectively and consistently implement the research-based Engage New York mathematics curriculum. The professional development workshop also includes the framework of research-based mathematics practices teachers can employ to help increase mathematics instruction.

Section 3 outlined the professional learning project, the plan for evaluating the project, and project implications for the school and beyond. Section 4 will provide reflections on the entire project.

Section 4: Reflections and Conclusions

This qualitative case study aimed to investigate how teachers implement instructional practices to support students' achievement in mathematics. Based on the data collected and the data analysis, I concluded that teachers at the local elementary school were using different instructional strategies that did not equate to increased student mathematics academic achievement. They were not using instructional practices aligned with research-based planning, standards-based instruction, attention to conditions of learning, and professional responsibilities. I created a 3-day professional development project based on these findings.

Section 4 includes a discussion of the project's strengths and limitations; recommendations for alternative approaches; my reflections on my growth as a project developer, scholar, and leader; discussion of the importance of the work; and a consideration of the project's impact on social change, applications, and directions for future research.

Project Strengths and Limitations

The main strength of the project is the ability to address the challenge presented in the study. The problem of the study concerns teachers not using instructional practices aligned with research-based planning, standards-based instruction, attention to conditions of learning, and professional responsibilities. Based on the data analysis, I concluded that the teachers use different instructional strategies to teach mathematics that have not helped students increase mathematics achievement. Providing teachers with the opportunity to learn about a curriculum the district has provided is needed. Another

strength is the opportunity for teacher collaboration during professional development. Tallman (2020) noted that when people work together to attain a common goal, they will modify their habits significantly and that working and planning together is a valuable professional development tool in and of itself. Teachers will be able to bring together ideas and resources during the professional development. Participants will also have the opportunity to reflect on the project and how it affected their teaching practices by completing the project evaluations.

One of the main limitations to the professional development project is teacher-buy-in. Based on the data, teachers admitted to using different resources to teach mathematics. By participating in the professional-development project, teachers will be provided training and resources that each grade level can use consistently. Since the local school has professional learning days built into the school year calendar, teachers will have the option to use some of those days for ongoing training for the implementation of the district adopted curriculum. In addition to those professional development days, the school has allotted additional days for grade levels to collaborate with the technology specialist. The interview participants may participate and encourage other colleagues to do so as well.

Recommendations for Alternative Approaches

Since schools are being cautious with face-to-face interactions, an alternative approach could be taken to present the project. Teachers at Synergizing Elementary school have been taught to use the online platform Google Classroom to present lessons to their students. As the facilitator, I could use the same platform to present the project to

the participants. The Google Classroom platform also has built in break out rooms so that each grade level can collaborate together. Using an online platform to present the project will allow teachers to stay safe in the midst of the pandemic and provide them with unlimited access to the project because it can be recorded.

Scholarship, Project Development and Evaluation, and Leadership and Change

As I investigated what instructional practices used by Grade 3 and Grade 4 teachers are, aligned or not aligned, with research-based planning, standards-based instruction, attention to conditions of learning, and professional responsibilities of teachers, I had to apply strong inquiry skills. Through engagement with the participants, I had to remove myself as a third grade teacher and transform myself into the role of sole researcher. I reminded myself daily that the focus had to be on the research and how I could create a project directed to the needs of the participants as it would be the only way to address the research problem.

During the research process, I faced many challenges. First, the issue with social distancing and COVID-19 made it challenging to collect data in a way that would show more triangulation of data. For instance, the time frame that I had to recruit participants was shortened because I never knew if teachers would be available or if the school would be open due to quarantine issues. Lancaster et al. (2020) assert that researchers are forced to generate information in a short time window, requiring faster design, recruitment of participants, and data collection and analysis. To address this issue, I first made myself available for interviews during times that benefited the participants. Another issue I encountered was the ability to get more participants for my study. Teachers were hesitant

to participate because of COVID-19 restrictions, issues with being quarantine, or not being able to devote the time for an interview.

As a recent graduate of Walden University and a current student, I have taken many courses that have helped prepare me to complete this qualitative research study. One course that was the most beneficial was Qualitative Research, where I learned the various aspects of qualitative research, such as data collection and ways to analyze the data. I also utilized Walden's library and databases to find relevant, peer-reviewed articles related to my research study. The amount of support I received from my professors, chair, and cochair has been immeasurable.

This project study has allowed me to re-evaluate myself as a mathematics teacher. I am now more capable of finding literature and research that supports any instructional strategies and procedures I use in my classroom. I can also collaborate better with my team and focus more on mathematics content and the students' data to formulate ideas surrounding teaching mathematics. Developing this research project has allowed me to grow as a researcher and educator committed to continuous learning.

Reflection on Importance of the Work

Analysis of Self as A Scholar

Mathematics has always been an area where I underperformed. As I got older, I made learning about mathematics and its concepts a top priority. With a master's degree in K-6 mathematics, I knew I needed to continue my studies and ultimately examine how other teachers use strategies within their classrooms to increase student achievement for me to become more effective with the practices I use. Being a researcher has also forced

me to remove preconceived notions about how I felt mathematics is supposed to be taught. I had to focus on the facts given to me by the participants and what the research said.

The tedious process of transcribing the data from the interviews was an experience I will never forget. The amount of patience and attention to detail for each interview took many days of listening and writing to ensure accuracy. This part of the research was one of the most important parts because it allowed me to create a meaningful project for the participants who took the time to get involved with the project study.

I am now more knowledgeable in the area of instructional mathematics practices since conducting this research study. I will provide insight to my school during data meetings to help incorporate instructional teachings strategies directly related to the student data. As teachers use the current mathematics curriculum used in my school, they can analyze ways to incorporate pacing guides to help stay on target with teaching for mastery of standards.

The growth I have seen in myself as a researcher has surpassed my expectations. The task was not always easy as I continued to work, teaching students virtually and face-to-face full time while managing a household with my husband and two daughters. In addition to these responsibilities, I had to put my study on hold while battling COVID-19 myself for almost 2 months. My timelines to complete my project was indefinite until my health was in better conditions.

Analysis of Self as A Practitioner

As a third grade teacher of all subject areas, I must continue to learn about all of the changes that continue to occur in education. As a scholar-practitioner, it is my job to provide students with the best instructional strategies to increase their achievement. Student performance in mathematics continues to be described as being in a state of crisis. Part of this stems from students' less than stellar performances on standardized tests (Tran, 2017). This study allowed me to listen to the needs of the participants and create a project that could help increase student mathematic achievement. Evidence provided by Jordan and Schwartz (2018) and Shernoff et al. (2017) showed that when the needs of educators are met, their instruction and quality of teaching improves.

In conducting the project study, I was able to identify mathematics strategies that help students achieve academic achievement. By expanding my knowledge in research-based content, I was more aware of myself as an educator who is responsible for learning with the ever-changing developments in education.

Analysis of Self as a Project Developer

The goal of the professional learning project derived from the results of the semistructured interviews was to provide teachers with support in teaching mathematics. My sole focus was on the data collected, all of the research, and analysis of the information supplied by the participants to create the project. The data revealed that participants used different resources to teach mathematics. Since the district has provided the participants with a curriculum for the new school year, I wanted to provide them with a 3-day professional development training that contained the purposes, processes, and

strategies needed to effectively and consistently implement the research-based Engage New York mathematics curriculum. The professional development workshop also includes the framework of research-based mathematics practices teachers can employ to help increase mathematics instruction.

I wanted to ensure that each section of the professional development was filled with meaningful information where teachers were actively engaged in learning, hands-on, and specific to the needs of the teachers. The 3-day professional development project allows teachers to continue their professional responsibilities that ensure ethical behavior, continued growth, and contribute to the profession. As the project developer, I was satisfied with the finished project because it precisely aligned with the needs of the participants at the local elementary school.

Implications, Applications, and Directions for Future Research

This qualitative study contributes to investigating teacher use of specific mathematics strategies to help increase student achievement and professional development for teaching mathematics. The problem at the local school is that teachers were challenged to implement instructional practices to support students' achievement in mathematics. By collecting data from four Grade 3 and Grade 4 mathematics teachers, I captured their thoughts, experiences, and usage of mathematics strategies aligned or not aligned with research-based planning, standards-based instruction, attention to conditions of learning, and professional responsibilities to teachers.

After analyzing the data derived from the semistructured interviews, four themes emerged. The four themes were (a) different curriculum resources used to teach

mathematics, (b) ineffective use of formative assessments, (c) inability to teach to mastery (d) more professional development opportunities needed on mathematics strategies. These themes were used to structure and create a 3-day professional development training that will provide the teachers with the purposes, processes, and strategies needed to effectively and consistently implement the research-based Engage New York mathematics curriculum. The professional development workshop will also include the framework of research-based mathematics practices teachers can employ to help increase mathematics instruction. The professional development sessions were designed to meet the needs of the teachers; however, students would ultimately benefit from better instructional mathematics practices.

The need to continue future research in the area of mathematics instruction will always be present. Polly (2017) pinpointed that research studies cite the most significant influence in student achievement is the classroom teacher, and educational reforms must be grounded on the premise that teacher professional development and teacher preparation are critical components of student academic achievement.

Impact on Social Change

Teachers have the potential to modify the course of students' academic performance. Providing students with research-based effective mathematics instruction like those identified in this project is a movement in that direction. Through the project, teachers gain the opportunity to acquire a deeper understanding of mathematics strategies aligned with research-based planning, standards-based instruction, attention to conditions for learning, and professional responsibilities. Taking advantage of participating in the

professional development workshop, teachers can increase student mathematics academic achievement and eventually change the way students learn mathematics (Anderson & Palm, 2017).

The project was developed to address the problem that teachers at Synergizing Elementary School were challenged to provide students with instructional practices to support students' achievement in mathematics. The project initiates social change by giving the site school insight into the importance and implementation of the Engage New York curriculum the district adopted. In addition to helping students and teachers, this project may serve as a model for developing other professional development programs needed. The findings of this case study may also lead to positive social change for students in the form of higher achievement and feelings of success in mathematics.

Conclusion

The problem that inspired this qualitative study was that teachers at Synergizing Elementary were challenged to implement instructional practices to support mathematics achievement. Four semistructured interviews took place to collect data and investigate the problem. Data were transcribed and analyzed to develop a project that would assist the local teachers in helping students reach a higher level of mathematics achievement. The project created was included in section 4.

This qualitative case study's key research question was what instructional practices used by Grade 3 and Grade 4 teachers are, aligned or not aligned, with research-based planning, standards-based instruction, attention to conditions of learning, and professional responsibilities of teachers. The research question allowed me access to

information regarding mathematic instructional practices, resources, and strategies used by teachers in Grades 3 and 4.

Based on the data collected and the data analysis, I concluded that teachers at the local elementary school use different instructional strategies that are not equating to increased student mathematics academic achievement. To support teachers who struggled with teaching rigorous mathematics standards, research that seek to explore what instructional practices they are already implementing to increase student mathematics achievement was essential. Based on the data collected and analysis, a 3-day professional development training that will provide the teachers with the purposes, processes, and strategies needed to effectively and consistently implement the research-based Engage New York mathematics curriculum was created. The professional development workshop also includes the framework of research-based mathematics practices teachers can employ to help increase mathematics instruction.

A limitation of the project is teacher buy-in to participate in the professional learning sessions. Administrative and project facilitator support could be a possible solution to this problem. The project chronicled my personal reflections and progress as a researcher. Implications, applications, and directions for future research are also presented. The study's and project's objectives remain the same: to improve teachers' experiences with new curriculum through a project that is both relevant and appropriate to students, instructors, and meets the requirements of administrators. The information from the project can be shared with other schools as well. Ideally, the strategies outlined in project will be used to improve mathematics instruction and student achievement.

Furthermore, teachers will avoid using resources that are not evidence-based or aligned with the Engage New York curriculum. Students suffer catastrophic consequences due to utilizing a curriculum that does not ensure that students master one year's competencies before moving on to the next. Over time, slight gaps in mathematics competency can swiftly mount.

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Appendix A: The Project

Four themes emerged from the analysis of the data collected from the mathematics teachers: (a) teachers use different curriculum resources to teach mathematics standards, (b) teachers' ineffective use of formative assessments, (c) teachers' inability to teach to mastery, and (d) more professional development opportunities needed in teaching mathematics strategies. The project was created based on two of the themes; (a) teachers use different resources to teach mathematics standards (b) teachers need more professional development opportunities needed to teach mathematics. A 3-day, 6-hour per day, professional development project was developed to provide teachers with the purposes, processes, and strategies needed to effectively and consistently implement the research-based Engage New York mathematics curriculum. The professional development workshop will also include the framework of research-based mathematics practices teachers can employ to help support student mathematics achievement.

Proposed Activities

The project I developed is aligned with the needs of the local elementary school, the study's findings, and the current literature. Through data collection, I captured the instructional practices used by Grade 3 and Grade 4 teachers aligned or not aligned, with research-based planning, standards-based instruction, attention to conditions of learning, and professional responsibilities of teachers. Four themes emerged from the analysis of the data collected from the mathematics teachers: (a) teachers use different curriculum resources to teach mathematics standards, (b) teachers' ineffective use of formative

assessments, (c) teachers' inability to teach to mastery, and (d) more professional development opportunities needed in teaching mathematics strategies. The project was created based on two of the themes; (a) teachers use different curriculum resources to teach mathematics standards (b) teachers need more professional development opportunities needed to teach mathematics. Therefore, a 3-day, 6-hour per day, professional development project was developed to provide teachers with the purposes, processes, and strategies needed to effectively and consistently implement the research-based Engage New York mathematics curriculum. The Engage New York curriculum will be adopted by the local school to implement for mathematics instruction. The professional development workshop will also include the framework of research-based mathematics practices teachers can employ to help support student mathematics achievement. Before attending the 3-day professional development training, teachers will be asked to bring the laptops provided by the district. Teachers will need access to the internet.

Session Schedule Day 1

Time	Activity	Method
8:30-9:00	Sign-in, materials pick-up, grade-level seating	Library Conference Room. Sign-in at the door. After sign-in, PD materials will be given and grade-level table assignments given.
9:00-9:30	Chat and Chew	Rear of Library Conference Room
9:30-10:00	Welcome, Introductions, 3-Day PD overview, goals, and learning outcomes	Facilitator lead with Power Point Presentation
10:00-10:40	Ice Breaker-Protocols and Module Overview	Review PD ground rules with the participants
10:45-12:00	Why Engage New York?	Lead by PD facilitator
12:00-1:00	Lunch	Own Your Own
1:00-2:00	Teacher Testimonials	Lead by PD Facilitator
2:00-3:00	Closing Session	Collaborative Planning Schedule and Exit Ticket

Session Schedule Day 2

Time	Activity	Method
8:30-9:00	Sign-in, materials pick-up, grade-level seating	Library Conference Room. Sign-in at the door. After sign-in, PD materials will be given and grade-level table assignments given.
9:00-9:30	Chat and Chew	Rear of Library Conference Room
9:30-10:30	Review of Day 2	Facilitator lead with Power Point Presentation
10:30-11:45	College and Career Ready Mathematics Standards alignment with Engage New York Curriculum	Lead by PD Facilitator, group collaboration
11:45-12:00	Break	
12:00-12:30	Whole Group Overview: What Did You Find?	Lead by PD Facilitator
1:00-2:00	Lunch	Own Your Own
2:00-2:30	Resource Scavenger Hunt	Lead by PD facilitator and collaborative work in groups
2:30-3:00	Closing Session	Chat and Chew question answer session lead by PD

Session Schedule Day 3

Time	Activity	Method
8:30-9:00	Sign-in, materials pick-up, grade-level seating	Library Conference Room. Sign-in at the door. After sign-in, PD materials will be given and grade-level table assignments given.
9:00-9:30	Chat and Chew breakfast	Rear of Library Conference Room
9:30-10:30	Review of Day 1 and Day 2	Facilitator lead
10:30-11:45	Presentation: Research-Based Mathematics Framework	Power Point presentation lead by PD facilitator
11:45-12:00	Break	
12:00-1:00	Find the Framework in the Curriculum	Collaborative group work
1:00-2:00	Lunch	On your own
2:00-2:45	Engage New York in Action	Facilitator lead and videos
2:45-3:00	Closing Session	Lead by PD Facilitator, discussion, module handouts, evaluations

Engage New York Curriculum

3-Day Professional Learning Workshop

Professional Learning Objectives

- Describe the framework of research-based mathematics practices
- Provide support for implanting the Engage New York curriculum
- Educate teachers about evidence-based mathematics resources related to the Engage New York curriculum
- Demonstrate standards alignment to evidence-based resources

Workshop Overview

- Day 1
- -Curriculum Importance and Support
- Day 2
- -Alignment
- Day 3
- -Evidence-Based Practice

Day 1-Why Engage New York

8:30-9:00	**Where's the evidence? What research says about evidence based resources**
9:00-9:30	**Evidence-based resources: How can we use them?**
9:30-10:00	**Welcome, Introductions, 3-Day PD overview, goals, and learning outcomes**
10:00-10:40	**Module Icebreaker: What's Needed Before the Lesson?**
11:45-12:00	**Why Engage New York? What Does the Data Say?**
12:00-1:00	**Lunch**
1:00-2:00	**- Neighboring school Testimonials - What does their data say?**
2:00-3:00	**-Collaborative planning other professional development days. -Day 1 Evaluation**

Day 2-Alignment

8:30-9:00	Sign-in, materials pick-up, and seating
9:00-9:30	Chat and Chew Ice Breaker
9:30-10:30	Let's Review Day 1
10:30-11:45	A Closer Look: College and Career Ready Mathematics Standards and How They Align with the Engage New York Curriculum
11:45-12:00	Break
12:00-1:00	Let's Regroup: What Did You Find? (Whole Group Activity) Video: https://www.engageny.org/resource/teacher-develops-engaging-activities-and-assignments-example-5
1:00-2:00	Lunch
2:00-2:45	What Does the Curriculum Use? (Group scavenger hunt of module to find resources and materials used throughout some of the modules)
2:45-3:00	Closing Session -3-2-1 Activity -Day 2 Evaluation

Day 3-Evidence-Based Framework

8:30-9:00	Sign-in, materials pick up, groups
9:00-9:30	Chat and Chew Breakfast
9:30-10:30	Review of Day 1 and 2 using the 3-2-1 activity from Day 2.
10:30-11:45	Presentation of Evidence-Based Mathematics Framework : Why It Works
11:45-12:00	Break
12:00-1:00	How does Engage New York line up with the framework? (Collaborative grade-level activity)
1:00-2:00	Lunch
2:00-2:45	Engage New York in Action https://www.engageny.org/resource/teacher-communicates-directions-and-procedures-example-14 -Additional resources that align with Engage New York
2:45-3:00	Closing Session District Expectations for Implementation Evaluation

Professional Learning Workshop Evaluation

- A daily evaluation form will be completed by each participant.
- Results will be used to modify each professional learning workshop day where needed.

Professional Development Evaluation

Check one: ☐ Educator ☐ School Leader

Facilitator: _____Session Date: _____ Grade Level: _____

Please respond to each item by selecting the number which best describes your opinion (5=excellent; 1=poor).

A. Participant Satisfaction

Questions	Rating
Course/Activity was well organized	5 4 3 2 1
Course/Activity objectives were clearly stated	5 4 3 2 1
All necessary materials/equipment, resources were provided or made readily available.	5 4 3 2 1
Overall instructor performance	5 4 3 2 1

B. Impact on Professional Practice

Questions	Rating
This activity enhanced the educator's/school leader's content knowledge in the area of certification.	5 4 3 2 1
This activity increased the educator's/school's teaching skills based on research of effective practice.	5 4 3 2 1
This activity provided information on a variety of assessment skills.	5 4 3 2 1
This activity provided the participants the knowledge and skills to think strategically and understand standards-based school reform.	5 4 3 2 1
This activity enhanced the participant's professional growth and deepened your reflection and self-assessment of exemplary practices.	5 4 3 2 1


A. What was the most useful part of this professional development and why?
B. What was the least useful part of this professional development and why?
C. How will you use what you have learned?
D. What additional professional development or support do you need?

Appendix B: Interview Protocol

Teacher: _____ Position: _____

Date: _____ Time: _____

Interviewer: Doctoral Student

The purpose of this interview will allow me to gather information related to strategies used in the mathematics classroom. This study is voluntary, and the participant will be held in the highest confidentiality. I appreciate your participation in this study and your willingness to be interviewed. This interview will last 30 – 45 minutes and will be recorded with the participant's permission. Recording the interview ensures a non-biased approach by the researcher and accurately depicts the participant's responses. Do you have any questions for me before we get started?

1. How do you use data to plan for mathematics lessons?

2. How do you plan for differentiated instruction when students do not grasp concepts?

3. What type of instructional procedures do you use when teaching mathematics?

    c. What strategies have you found to be most beneficial to students?
    d. What strategies have you found to be the least beneficial to students?

4. How do you design instruction to fit with mathematics standards?

    b. What happens when students are not grasping mathematics concepts?

5. What do you typically do to establish and maintain classroom rules and procedures to foster positive classroom conditions for learning?

    b. What happens when students do not follow the rules and procedures you have in place?

6. How do you actively engage students during a mathematics lesson?

   b. Do you use instructional resources such as manipulatives or technology? Why or why not?

7. As an educator, what do you do, outside of the classroom, to maintain expertise in mathematics content and pedagogy?

   c. Do you have opportunities to collaborate with other colleagues?
   d. If so, what happens during the collaborations?

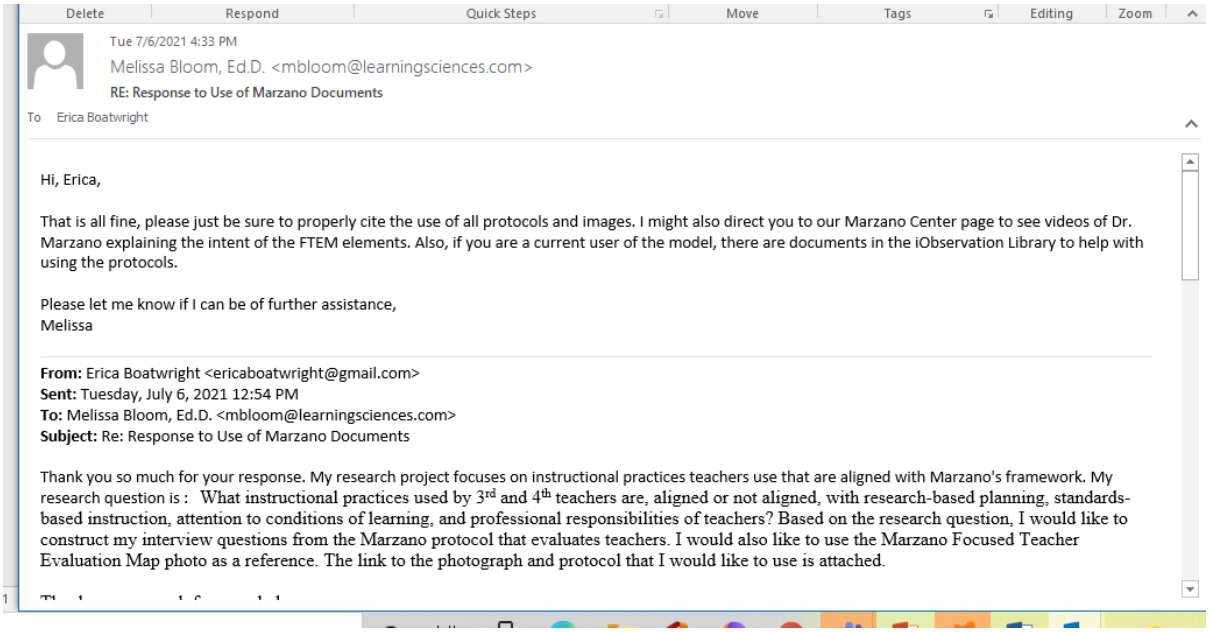
8. What would an ideal mathematics lesson look like to you?

   a. Describe the classroom setting.

Thank you for your time?

Do you have any questions for me before we end the interview?

Appendix C: Permission to Use Marzano's Protocol



Delete | Respond | Quick Steps | Move | Tags | Editing | Zoom

Tue 7/6/2021 4:33 PM

Melissa Bloom, Ed.D. <mbloom@learningsciences.com>

RE: Response to Use of Marzano Documents

To Erica Boatwright

Hi, Erica,

That is all fine, please just be sure to properly cite the use of all protocols and images. I might also direct you to our Marzano Center page to see videos of Dr. Marzano explaining the intent of the FTEM elements. Also, if you are a current user of the model, there are documents in the iObservation Library to help with using the protocols.

Please let me know if I can be of further assistance,
Melissa

From: Erica Boatwright <ericaboatwright@gmail.com>
Sent: Tuesday, July 6, 2021 12:54 PM
To: Melissa Bloom, Ed.D. <mbloom@learningsciences.com>
Subject: Re: Response to Use of Marzano Documents

Thank you so much for your response. My research project focuses on instructional practices teachers use that are aligned with Marzano's framework. My research question is : What instructional practices used by 3rd and 4th teachers are, aligned or not aligned, with research-based planning, standards-based instruction, attention to conditions of learning, and professional responsibilities of teachers? Based on the research question, I would like to construct my interview questions from the Marzano protocol that evaluates teachers. I would also like to use the Marzano Focused Teacher Evaluation Map photo as a reference. The link to the photograph and protocol that I would like to use is attached.