2022

Elementary Educators' Perceptions of Common Core Mathematics Standards for English Language Learners

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Walden University
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Abstract

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MS, McDaniel College, 2010

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Doctoral Project Study Submitted in Partial Fulfillment

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Abstract

A problem exists at the local site that classroom practices are not adequately preparing English language learners (ELLs) for academic success in the area of mathematics, and since the implementation of the Common Core State Standards for Mathematics (CCSS-M), there has been a lack of progress in mathematics proficiency for ELLs. The purpose of this basic qualitative study was to explore elementary educators' perceptions of CCSS-M implementation and its impact on math proficiency for ELLs at a Title I elementary school bordering a large urban area. Perceptions may influence beliefs and attitudes regarding CCSS-M implementation with ELLs, but little research has been done on these perceptions, so more research was necessary to understand the way educators perceive the CCSS-M for ELLs. This basic qualitative study was guided by Ernest's theory of knowledge, beliefs, and attitudes of the mathematics teacher. Semi structured interviews were conducted with 13 elementary classroom educators who taught mathematics to provide insight into their perceptions of the implementation of the CCSS-M, math proficiency, and facilitators/barriers to implementation for ELLs. Data were analyzed thematically based on the relevant elements of Ernest's theory. Findings revealed that educators perceived the implementation of the CCSS-M as difficult, which may be due to inadequate preparation, so a targeted professional development was designed. Findings showed that ELLs were making progress with mathematics proficiency, but the majority were still struggling with many of the standards. Language, word problems, and other mathematical issues were barriers, whereas mathematical scaffolds, strategies, and interventions were facilitators. The implications for positive for positive social change and local application will help ELL students become more successful.

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Dedication

I would like to first give honor to God who is the head of my life and without Him, none of this would be possible. I would like to dedicate this to my mother, who has prayed for me and supported me my whole life and even more throughout this entire doctoral process. I would also like to dedicate this to my father, grandparents, brother, and any other family members who are in heaven watching over me. I hope that I have made them all proud.

Acknowledgments

I would like to thank all of my family members and friends who supported and encouraged me to keep going when I wanted to give up and finish what I started. I greatly appreciate everyone who has contributed in any way to keep me accountable and motivated on this doctoral journey. I would like to thank my committee members, Dr. Nancy Williams and Dr. Jean Sorrell, for their valuable feedback and for hanging in there with me during the most pivotal points in this process. I would like to give a special thank-you to Dr. Danett Babb for her guidance, tough love, and encouragement throughout most of my doctoral journey. Lastly, thank you to all of the past and present Walden faculty members who have helped me in any way to reach this point in my academic and professional career.

Table of Contents

List of Tables

List of Figures

Section 1: The Problem

English language learners (ELLs), students learning English as a second language, represent a significant and growing segment of students attending K–12 public schools in the United States (Jiménez-Castellanos & Garcia, 2017). Fillmore and Snow (2018) suggested that the nation's teaching force is encountering an increasing number of children from immigrant families, children who speak little or no English on arrival at school, and children whose families may be unfamiliar with the demands of American schooling. Although the parents of dual language learners (DLL) and ELLs, on average, do not have high levels of formal education, they express interest in enrolling their children in early education programs and in supporting their children through postsecondary schooling (Romo et al., 2018). Many also come from families with low socioeconomic status and have low parental involvement in schools. Attempting to enhance the participation of racialized and minoritized immigrant parents who are emergent bi/multilingual learners appears to be especially challenging (Housel, 2020). ELLs often live in a home environment with parents or caregivers who predominately speak a language other than English. Students attend schools where they are immersed in the English language throughout the school day, as it is the primary language used in instruction (Swanson et al., 2018). Nationwide, K–12 students designated as ELLs must learn both language and content simultaneously, and ELLs score far below the national average in math achievement. Kieffer and Thompson (2018) suggested that, by definition, ELLs are not yet proficient in listening, speaking, reading, or writing English,

and their language skills impact their performance on content-area assessments administered in English.

Spanish is the primary home language of the majority of ELLs in U.S. schools, though aspects of Spanish may vary by country of origin. National Assessment of Educational Progress (2017) suggested that children with Spanish as a first language in the United States have been found to yield low mathematics scores when compared with other groups of ELLs on national assessments across several years. For the purpose of this study, Spanish-speaking ELLs make up the majority of the ELLs at the local site, so they are predominately the issue at the site.

New K–12 standards for mathematics and English language arts and literacy adopted in 2015 in most states are more rigorous and far reaching than most previous state standards. As of 2017, *Education Week* reports that 34 states, including Maryland and the District of Columbia, have kept the standards; 11 have (or soon will) rewrite/replace the standards, one adopted them in English language arts only, and four never adopted them (Ujifusa 2017). However, there is very little concrete information about how state standards are connected to what teachers think and do in their classrooms. Gong and Gao (2018) suggested that it is challenging yet rewarding for math teachers to understand students' language development stages and mathematics learning levels to teach mathematics curriculum in ways that ensure all students, especially ELLs, can understand the content and demonstrate what they have learned. Since the implementation of the Common Core State Standards for Mathematics (CCSS-M), educators at the local site were not given adequate information about how to teach the

standards to, specifically ELLs. With the advent of the Common Core and a broad push to integrate conceptual understanding into general education classrooms, there is some concern regarding the benefit to ELLs of engaging in this work without first developing a strong foundation in written and oral language (Blazar & Archer, 2020).

The Local Problem

A problem exists that classroom practices are not adequately preparing ELLs for academic success in the area of mathematics, and since the 2015 implementation of the CCSS-M in an elementary school bordering a large urban area, there has been a lack of progress in mathematics proficiency for ELLs. The local site is a high poverty Title 1 school with a total of 814 students for the 2018–2019 school year. Of those 814 students, 343 or 42% were ELLs with more than 85% of the entire student population eligible to receive free and/or reduced lunches (Maryland Department of Education, 2019). The 2018–19 Maryland Comprehensive Assessment Program (MCAP), a yearly assessment based on the CCSS-M given at this Title I elementary school bordering a large urban area, shows that 22% of third grade ELLs, less than 5% of fourth grade ELLs, and less than 5% of fifth grade ELLs tested met expectations in mathematics (Maryland Department of Education, 2019). This shows that the population of ELLs in Grades 3 through 5 did not meet the performance levels for mathematics proficiency according to the CCSS-M. Due to the 2019 MCAP scores, there is a need to investigate the educators' perceptions of the CCSS-M and the implementation of those standards. In addition to this, a second grade educator at the elementary school expressed a concern about the K-2 math curriculum missing important foundational information that may pose a problem for

ELLs, so the ELLs may not be adequately prepared for the standardized tests in Grades 3–5. The former principal of the school stated that, the school has one common goal that every student needs to succeed in math, and this includes the large percentage of ELLs. According to the school district's "Comprehensive Five Year Master Plan" (2016), "At the elementary level, mathematics performance for ELLs declined by more than 10 percentage points below the double digit decline for students in the aggregate non-ELLs." (p. 57). In the School Years (SY) 2016-2020 Strategic Plan, the former chief executive officer of the school system stated, "The persistent underperformance of ELLs or Limited English Proficient (LEP) students, who represent a significant and growing presence within the overall student population, is of major concern" (p. 8).

A synthesis of current research literature supports a gap in practice in curriculum and instruction as it relates to ELLs in mathematics. For example, Johnson and Wells (2017) suggested that with the increased language and literacy demands across the curriculum required by the CCSS, the Teaching of English to Speakers of Other Languages (TESOL) International Association advocates that teachers of ELL students will need both pre-service and in-service support to ensure ELL students achieve similar academic success with the CCSS as their peers, but without this kind of support, existing achievement gaps may continue to widen. Gaps between ELLs and their English-speaking peers in graduation rates indicate that ELL students are struggling to keep up with their peers (Johnson & Wells, 2017). The perception of what a teacher says occurs in the classroom may or may not match the reality of actual teaching practice. For example, de Araujo et al. (2018) asserted that one commonsense assumption is that

mathematics should be a safe harbor for students learning the language of instruction because, for the most part, numbers and mathematical symbols do not differ across national contexts, but this assumption does not account for the central role of linguistically complex practices such as defining, explaining, and justifying in school mathematics. In the United States, these practices are central to the CCSS-M. The CCSS-M requires that students explain reactions or interactions based on specific information in the text, solve word problems, describe situations, construct and present arguments using evidence to support a claim, and integrate qualitative information to support a claim (Johnson & Wells, 2017). English language is embedded within mathematics instruction, and ELLs often lag behind native English speakers in performance on standardized mathematics measures involving word problems at the elementary and secondary levels (Driver & Powell, 2017).

Based on the scores from the MCAP (see Table 1), teacher practices in the school district are not leading to progress for ELLs in mathematics proficiency.

Table 1

Maryland Comprehensive Assessment Program (MCAP) for ELLs 2015-2019

School year	Grade	Score (%)
2014-2015	3	<5
	4	<5
	5	<5
2015-2016	3	24
	4	9
	5	<5
2016-2017	3	8
	4	<5
	5	<5
2017-2018	3	13
	4	<5
	5	<5
2018-2019	3	22
	4	<5
	5	<5

Note. Due to the impact of the coronavirus pandemic, Report Card results for the 2019-2020 and 2020-2021 school years were not published. The most recently available Report Card was for 2018-2019.

Rationale

In general, ELLs are the fastest growing student population in U.S. public schools. Lindahl (2019) suggested that with the numbers of ELLs in U.S. public schools continually on the rise—estimated at 4.85 million, or nearly 10% of public school students, the ability of new educators as they enter the work force to reach these students is essential. The local site, which is a Title 1 school had a population of 826 students in 2020. Hispanic students made up 52% of the total population, and of that percentage 43% were ELLs. In 2020, the local area school district had an ELL population of 29,794 students or 22% of the entire population (Maryland Department of Education, 2020).

Limited English proficient (LEP) or ELL youth, as defined by No Child Left Behind (NCLB) and Every Student Succeeds Act (ESSA), are youth who speak a language other than English at home and do not have sufficient mastery of English to excel in the classroom (Spees et al., 2016). The ESSA (2015) mandated that all students, including ELLs, must demonstrate adequate yearly progress in core subjects as well as language skills.

The purpose of this basic qualitative study is to explore elementary educators' perceptions of implementation of the CCSS-M and the impact on math proficiency for ELLs at a Title I elementary school bordering a large urban area. The 2019 MCAP, a yearly assessment based on the CCSS-M given at this Title I elementary school bordering a large urban area, shows that 22% of third grade ELLs, less than 5% of fourth grade ELLs, and less than 5% of fifth grade ELLs tested met expectations in mathematics (Maryland Department of Education, 2019). Due to the 2019 MCAP scores, there is a need to investigate the educators' perceptions of the CCSS-M and the implementation of them.

In the MCAP tests, students solve multistep math problems that require reasoning and address real-world situations. This requires students to reason mathematically, make sense of quantities and their relationship to solve real-world problems, and show their understanding. The data for the MCAP mathematics assessment yielded low scores for ELLs in grades 3 through 5. The numbers 1, 2, 3, 4 or 5 identify the performance levels (Maryland Department of Education, 2019). Level 1 indicates minimal performance at understanding grade level expectations, Level 2 indicates partial performance at

understanding grade level expectations, Level 3 indicates moderate performance at understanding grade level expectations, Level 4 indicates strong performance at understanding grade level expectations, and Level 5 indicates distinguished performance at understanding grade level expectations.

At the local site, the performance levels for ELLs in third grade indicated that 22% had a strong or distinguished understanding of grade level expectations, performance levels for ELLs in fourth grade indicated that less than 5% had a strong or distinguished understanding of grade level expectations, and performance levels for ELLs in fifth grade indicated that less than 5% had a strong or distinguished understanding of grade level expectations. Driver and Powell (2017) stated that English language is embedded within mathematics instruction, and ELLs often lag behind native English speakers in performance on standardized mathematics measures involving word problems at the elementary and secondary levels. The majority of the ELLs at the local site speak Spanish as their first language. Polat et al. (2016) suggested that ELLs are capable of performing substantially well on high-stakes tests if teachers are well equipped to increase mathematical reasoning and literacy among ELLs.

Definition of Terms

Assessing Comprehension and Communication in English State-to-State for English Language Learners (ACCESS): Educators use ACCESS results, along with other WIDA resources, to make decisions about students' English academic language and to facilitate their language development (WIDA, 2020).

Common Core State Standards for Mathematics (CCSS-M): The CCSS-M were released to provide a more centralized and targeted approach to guiding mathematics instruction from kindergarten through high school (Litkowski et al., 2020).

Constructivist approach: Constructivism is an approach that takes a role in developing instruction methods based on the construction of knowledge by an individual, based on their prior knowledge, skills, and competences (Isik, 2018).

English language learners (ELLs): ELL is a general term that refers to students whose native language is not English (Wissink & Starks, 2019).

Every Student Succeeds Act (ESSA): ESSA was signed into law, reauthorizing the Elementary and Secondary Education Act (ESEA) and replacing the NCLB. ESEA, the federal law that authorizes federal funding for K-12 schools, represents the nation's commitment to equal educational opportunity for all students and has influenced the education of millions of children. ESSA has two primary goals: to require states to align their education programs with college and career ready standards and to extend the federal focus on equity by providing resources for poor students, students of color, English learners, and students with disabilities (Young et al., 2017).

Limited English proficient (LEP): This term refers to students who are nonnative English speakers or were born in the United States but speak a language other than English at home and is also based on students' ability to be successful in educational settings and society where the language of instruction or communication is English (Sanders et al., 2018).

Mainstream classroom: A classroom that may have regular education students, students with diverse learning needs, and/or ELLs (Coady et al., 2016).

Maryland Comprehensive Assessment Program (MCAP): Annual statewide assessments to all students in English Language Arts/Literacy and Mathematics in Grades 3–8 and once in high school, as well as in science once in each grade span (3–5, 6–8 and high school), and annual English language proficiency assessments in Grades K-12 for all English learners (Maryland State Department of Education, 2020).

Mathematics proficiency (MP): A student's ability to explore, conjecture, and reason logically in cognitive processes and to understand how to solve mathematics problems, that is, to apply and adopt appropriate strategies to solve the problems and reflect on the process used to solve the problems (Junpeng et al., 2018).

Multilingual learners: Refers to students who come in contact with and/or interact in languages in addition to English on a daily basis, which include ELLs, DLLs, newcomers, students with interrupted formal schooling, long-term English learners, (L-TELs), English learners with disabilities, gifted and talented English learners, heritage language learners, students with English as an additional language (EAL), and students who speak varieties of English or indigenous languages.

National Assessment of Educational Progress (NAEP): NAEP, also known as The Nation's Report Card™, is an assessment program conducted by the National Center for Education Statistics (NCES) to inform the public of what elementary and secondary students in the United States know and can do in various subject areas, including reading, mathematics, and science. (Rahman et al., 2019).

No Child Left Behind (NCLB): NCLB included new school accountability policies and introduced a new phase of educational accountability in the United States, aiming to prompt innovation and better align educator behaviors with the improvement of student achievement (Hunter, 2019).

Professional Learning Community (PLC): A professional learning community as a group of teachers sharing and critically interrogating their practice in an on-going, reflective, collaborative, inclusive, learning-oriented, growth-promoting way (Million & Karin 2018).

Scaffolding: Scaffolding is the act of providing support, followed by the gradual release of support, to the point where the child can control frustration and successfully complete a task without the adult (Brownfield & Wilkinson, 2018).

Title I: Title I is a financial assistance provided to local agencies and schools that have high numbers of children from low-income families based on local census reports. The financial funding is meant to help ensure that all children meet demanding academic standards (U.S. Department of Education, 2018).

World Class Instructional Design and Assessment (WIDA): Advances academic language development and academic achievement for children and youth who are culturally and linguistically diverse through high quality standards, assessments, research, and professional learning for educators (WIDA, 2020).

WIDA English Language Development (ELD) Standards Framework: A language development standards framework for K-12 settings that points out visible expectations for all students, helps bring coherence across educational systems, offers language

expectations, and sets goals for curriculum, instruction, and assessment for multilingual learners (WIDA, 2020).

Significance of the Study

This study addressed a local problem by exploring elementary educators' perceptions of implementation of the CCSS-M and the impact on math proficiency for ELLs at a Title I elementary school bordering a large urban area. By exploring the educators' perceptions of the CCSS-M, insight may be gained into the facilitators and barriers of their use. From this insight, instructional strategies may be found that could be used to improve mathematics instruction for ELLs in order to increase mathematics proficiency. The findings could possibly inform stakeholders including district supervisors, school administrators, educators, and parents on perceptions of curriculum/curriculum standards and discover teacher perceptions, which will provide an understanding of the problem. It is critical that all teachers develop the knowledge and skills to support ELLs in mainstream classrooms at every grade level, but the majority of teachers are not adequately prepared to teach academic content to ELLs and mathematics may be especially challenging for ELLs to learn (Turkan & de Jong, 2018). A common challenge and a demanding task for English learners is that they need to master the English language while at the same time seeking to master academic content (Wilson et al., 2016).

Data from this study may be useful in the local setting because it could inform effective instructional strategies for mathematics proficiency for this population of students. The findings can lead to positive social change because the teacher perceptions

may reveal pertinent information to fill the gaps in practice between mathematics instruction for ELLs and the lack of progress in mathematics proficiency, provide professional development opportunities to educators, and lead to improved mathematics proficiency for not only ELLs, but all students. This improvement in mathematics proficiency could provide success in school/college achievement and/or be useful in the workforce. This study could also expand social change by providing information that will add to the body of literature of ELLs and mathematics instruction.

Research Questions

Gaining a greater understanding of the perceptions of elementary educators who teach math of the CCSS-M for ELLs, as well as the educators' perceptions of facilitators and barriers of implementing CCSS-M for ELLs, could both benefit the local school district and inform practitioners nationwide. This information can be used to move forward with necessary revisions or modifications and relevant professional development for educators. The results of the study could be beneficial to stakeholders and potentially provide an outline for future practices in mathematics curriculums. The following research questions (RQ) will be used to guide this study.

1. RQ1: What are the elementary educators' perceptions of implementation of the CCSS-M and math proficiency for ELLs?
2. RQ2: What are the elementary educators' perceptions of facilitators and barriers of implementing CCSS-M for ELLs?

Review of the Literature

The purpose of this basic qualitative study was to gain a deeper understanding of elementary educators' perceptions of implementation of the CCSS-M and the impact on math proficiency for ELLs. To understand how elementary educators feel about the Common Core Math Standards in working with ELLs and the facilitators and barriers to implementation in order to support the academic needs of ELLs, I conducted an extensive review of the current literature. This review is organized into five sections: (a) the conceptual framework, (b) mathematics instructional practices for ELL students, (c) educators' perceptions of ELLs and math, (d) educator training for ELLs and addressing the needs of ELLs, (e) the CCSS-M and facilitators and barriers to implementing these standards for ELLs. This literature review is comprised of peer-reviewed journal articles, which were identified via different databases over the period from 2016 and beyond: Education Research, Eric, ProQuest, and SAGE. I used the following keywords to search for materials relevant to this review: instructional practices for ELLs, perceptions of teachers, teacher training for ELLs, addressing needs of ELLs, and mathematics for ELLs, and mathematics instructional practices, and the word ELLs in general.

Conceptual Framework

The conceptual framework for this study was based on Paul Ernest's (1989) theory of knowledge, beliefs, and attitudes of the mathematics teacher. Ernest is a contributor to the social constructivist philosophy of mathematics, and this study deals with teachers' perceptions on mathematics curriculum standards. Ernest presented a descriptive model that outlined the different types of knowledge, beliefs, and attitudes of

a mathematics teacher and how these three components relate to teachers' models of teaching mathematics. Teacher knowledge represents the cognitive component of this model and, according to Ernest, includes the knowledge of mathematics, teachers' beliefs and practices in other subject matter, pedagogy and curriculum, classroom management, context of teaching, and education. Beliefs and attitudes of teachers represent the affective components of the model. Beliefs include the conception of the nature of mathematics, models of teaching and learning mathematics, and principles of education. Attitudes include attitudes toward mathematics and toward teaching mathematics. From the model, knowledge, attitudes, and beliefs are all posited to have a direct influence on teachers' instructional practices. According to Ernest's model, teachers' mathematical content knowledge has a direct relationship with teachers' instructional practices. The practice of teaching mathematics is the primary function of the mathematics teacher, and the end to which the knowledge, beliefs, and attitudes are directed (Ernest 1989). The framework can enhance the understanding of findings from this study by providing insight into the relationship between elementary educators' perceptions of implementation of the CCSS-M and the impact on practice as it relates to math proficiency for ELLs and facilitators and barriers of implementing CCSS-M for ELLs.

This theory aligns with this study because it focuses on educators' perceptions and beliefs. Ernest (1989) proposed a model of relationships between beliefs and their impact on practice. This model constitutes the dynamic relationships among view of nature of mathematics, espoused and enacted models of learning mathematics, and espoused and enacted models of teaching mathematics (Ernest, 1991). The elements of

the model can be used to help understand how perceptions about the Common Core Curriculum Standards can influence mathematics instruction for ELLs and explain how ELLs can be helped through a constructivist approach.

The interview questions (see Appendix B) for the classroom educators who teach mathematics relate to the conceptual framework because they relate to Ernest's theory of knowledge, beliefs, and attitudes of the mathematics teacher. The interview questions are open ended and designed to allow the participants to share experiences with ELLs and the CCSS-M. The responses to the questions may provide insight into the perceptions of the educators as it relates to the CCSS-M and its impact on ELLs and their mathematics proficiency.

Mathematics Instructional Practices for ELLs

The crucial role of mathematics instructional practices is highlighted in many qualitative studies, especially in connection with research on fostering ELLs' conceptual understanding of mathematics. Questioning, revoicing, and teacher talk come from a range of literature on practices for supporting ELLs during mathematical discussion. Banse et al. (2017) conducted a comparative case study of two educators in Grade 4 classrooms with a high concentration of ELLs. The study suggested that questioning, revoicing, and teacher talk are practices for supporting ELLs during mathematical discussion through using videotaped mathematics lesson data, gathered as part of the Responsive Classroom Efficacy Study to examine how they attempt to facilitate discussions while using a calendar math curriculum. The findings for Banse et al.'s study may not have the same impact as others due to the fact that it compared only two

teachers. Neumann (2016) conducted a case study of one second-third grade multi-age teacher using interviews, observations, and documents to explore whether what a teacher says takes place in the classroom matches the reality of their actual teaching practice. This study suggested that the three aspects of teaching include sharing, listening, and probing students' mathematical thinking to help students build conceptual understanding. The focus of students' learning is based more clearly and explicitly on a holistic picture that defines exemplary mathematics teaching and to help educators schematize the complex work of teaching mathematics. Bahr et al. (2018) conducted a qualitative methodology of self-study to bring together the sociocultural and linguistic perspectives identifying three areas of effective teaching practice. The researchers identified three areas of effective teaching practice: (a) that collaborative learning conditions are beneficial in teaching mathematics, (b) that teachers should be able to engage ELLs in mathematics 'talk' by bridging the divide between students' background experiences and the content of mathematics lessons, and (c) that teachers should engage ELLs in talking and writing the language of mathematics. Retelling as an instructional practice in content areas like science and math can help increase conceptual understanding. In-depth information about mathematical communication as a strategy to develop mathematical understanding and thinking skills. Kaya and Aydin (n.d.) employed a phenomenological approach, intervewing nine experienced elementary mathematics teachers to gain in-depth insight about the nature of mathematical communication in the classroom setting. This study provided a basis for discussion about using mathematical communication to foster students' higher order thinking skills and mathematical understanding. Faggella-

Luby et al. (2016) conducted a multi cohort comparison study of 47 fifth grade ELLs to explore the use of alternative assessments as a way to determine the impact of content instruction on ELLs' abilities to comprehend an informational trade book text, both at the level of reading comprehension and at the level of content understanding. This study explored using retelling as an instructional practice in content areas like science and math can help increase conceptual understanding. Instructional practices as well as the areas/aspects of effective teaching support students and learning will aid the educators as they encourage students in the creation and continued refinement of sophisticated models or ways of interpreting the situations of teaching, learning and problem solving, thus helping the ELL students demonstrate stronger conceptual understanding of concepts.

There are cognitive and personal considerations related to the growth and performance of ELLs. Growth in the executive component of *working memory* is significantly related to growth in math computation among ELL children. Swanson et al. (2018) conducted a quantitative study of 157 ELL students in Grade 1 and determined those components of working memory that play a significant role in predicting math growth in children who are ELLs. The results indicated that growth in the executive component of working memory was related to growth in math performance and shows that ELLs are capable of participating in high-level mathematics discussions and that even students with low English proficiency may benefit. Banes et al (2018) conducted a mixed-method study with 20 third and fourth grade classrooms with 50% ELLs to examine the relationship between classroom discussion and student performance of ELLs using a Linguistically Modified Math Assessment. The results indicated that students'

status as ELLs did not dictate computational growth or mediate the relationship between class discussion and student performance, so that means that mathematical discussion was equally beneficial for ELLs as it was for non-ELLs.

There is limited research on effective culturally and linguistically responsive instruction to improve word problem solving for ELLs even though standardized mathematics items rely heavily on word problems to assess student knowledge and skill. Driver and Powell (2017) conducted an exploratory quasi-experimental study to explore the efficacy of a word-problem intervention for ELLs with mathematics difficulties using a word problem intervention. There was evidence of discrepancies in mathematics performance between ELLs and their native English-speaking peers, but here was some improvement using the Culturally Linguistic Responsive with Schema Instruction (CLR-SI) intervention. Wu and An (2016), in a quantitative study of three schools from three school districts, situated in urban, low-income neighborhoods, suggested that the Model-Strategy-Application with Reasoning (MSAR) approach is a powerful instructional and assessment approach for achieving a balance within mathematics and for developing mathematics proficiency for diverse students. Both Driver and Powell's and Wu and An's studies used interventions beneficial to ELLs because students who participated in the CLR-SI intervention demonstrated improved skill with solving word problems, and the MSAR approach had significant positive effects on students' conceptual understanding, procedural fluency, application, and reasoning. Culturally responsive mathematics instruction is defined in the literature as pedagogical knowledge, teacher beliefs, and instructional practices that promote mathematical thinking, value student funds of

knowledge, and incorporate issues of power and social justice in mathematics education (Driver &Powell, 2017).

Broadening the definition of language in content-area classrooms and for embracing identities created through classroom interactions is an integral part of learning. Arts integration as well as technology can be used as a means of providing effective mathematics instructional practice for ELLs. Ingraham and Nuttall (2016), who conducted a qualitative study of a southwest regional elementary school, suggested that musical arts integration can be used in math instruction to foster integrity, confidence, and collaboration in ELLs, which may increase mathematics proficiency on standardized tests. Xin et al. (2020) conducted a single-subject research design and evaluated the effect of computer-assisted conceptual model-based problem solving (COMPS) tutor on additive word problem-solving performance of ELLs with learning difficulties in mathematics. Findings indicated that all participants improved their performance on researcher-developed criterion test as well as a generalization test following the intervention. Xin et al.'s study may not have the same impact of others, and it seems that features such as conceptual model based visual scaffolding and linguistic scaffolding found in the COMPS tutor may have contributed to students' access to learning mathematics and the positive outcome of this study. Prince (2018) conducted a qualitative study of educators by gathering educator journals, conducted semi structured interviews, engaged in classroom observation, and collected student and teacher artifacts to understand how teachers, working with ELLs, expanded their knowledge and instructional practices as they implemented a one-to-one iPad program. Arts integration

and technology interventions can be a support for ELL students in mathematics and possibly increase mathematics proficiency.

The focus of students' learning is based more clearly and explicitly on a holistic picture that defines exemplary mathematics teaching and to help educators schematize the complex work of teaching mathematics. Vocabulary and explicit language instruction can be used to increase comprehension in reading and in mathematics instruction as well as improve informational writing. Johnston et al. (2018) conducted reading interventions and experimental design to determine whether incorporating vocabulary instruction in individual reading fluency interventions for ELLs would improve reading comprehension of four ELL students in Grades 3 and 5 using intervention. Explicit language instructional practices in writing may have an impact on ELLs' writing because reading fluency has a connection to writing. The increased vocabulary knowledge could help to improve writing in mathematics. Wiley and McKernan (2017) conducted an action research study of two third-grade classrooms with 12 of 28 ELL students in each classroom to determine the impact of explicit language instruction in writer's workshop on ELL student writing and on teacher practice. The ELL students demonstrated better comprehension of untaught passages following vocabulary instruction that included processing questions; however, all effects were of small magnitude. Explicit language instruction has an impact on informational writing of ELLs and on teacher practice.

Educators' Perceptions of ELLs and Mathematics

The perception of educators about mathematics and or ELLs can help generate a multitude of linguistic, content-related, and pedagogical strategies to implement in

classrooms. Turkan and de Jong (2018) conducted an exploratory study that examined what knowledge sources preservice teachers drew from to respond to instructional scenarios related to teaching mathematics to ELLs with varying proficiency levels using authentic teaching scenarios and interviews. The results revealed that pre-service mathematics teachers' instructional decision-making was grounded in their perceptions of ELs as either a homogenous or a markedly heterogeneous group of learners.

Carley Rizzuto (2017) conducted a parallel mixed-methodology study in 10 early childhood classrooms, ranging from pre-K to third grade to examine how the perceptions of early childhood teachers toward their early childhood ELLs shape their pedagogical practices. The study revealed participants were aware of and accepting of all students' funds of knowledge and were eager to draw on their students' cultural backgrounds languages, but most were ill-equipped or unwilling to differentiate their instruction for ELL students. School districts and schools of education can use valuable information about teachers' thoughts, beliefs, and experiences as they develop culturally responsive teachers (CRT) for today's diverse classrooms. Bonner et al. (2018) conducted a mixed methodology study of 430 teachers from three Southern California urban school districts by using quantitative survey and written responses to the four sentence stems to capture teachers' thoughts, beliefs, and experiences. The study revealed teachers' strong commitment to CRT, an understanding of behaviors that constitute CRT, a strong sense of efficacy in teaching diverse students, and anticipation of positive outcomes through proactively addressing diverse students' needs. The Tuckan and de Jong (2018) study revealed that pre-service mathematics teachers' instructional decision making was

grounded in their perceptions of ELLs. Similarly, in Carley Rizzuto's study, the participants were aware of and accepting of all students' funds of knowledge and were eager to draw on their students' cultural backgrounds languages, but most were ill-equipped or unwilling to differentiate their instruction for ELL students which could negatively affect the students. On the contrary, the other the Bonner et al. (2018) study revealed teachers' strong commitment to Culturally Responsive Teaching (CRT), an understanding of behaviors which constitute CRT, a strong sense of efficacy in teaching diverse students, and anticipation of positive outcomes through proactively addressing diverse students' needs.

Educator Training for ELLs and Addressing Needs of ELLs

Teacher training and preparation is imperative when working with ELLs because teachers can get an understanding of instructional practices that will meet and address the needs of ELLs. Hadjioannou et al. (2016) conducted a mixed-methods case study that explored the longitudinal impact of a professional-development program designed to increase teachers' knowledge of second language acquisition and of appropriate instructional practices for supporting ELLs among 34 members of a program cohort. Results suggested that participation in the program had a positive effect on participants' knowledge of language and literacy acquisition, their ability to plan and manage instruction for ELLs, their understanding of appropriate assessment for ELLs, and their classroom practice. Positive changes in participants' understanding of key concepts, knowledge, and understanding of instructional strategies and practices is important to success for ELLs. Bohon et al. (2017) conducted a mixed methods research to assess the

alignment of the ACT-ESL Summer Institute to Kolb's (1984) experiential learning theory and examine whether 230 content teachers increased their knowledge of teaching ELLs during this week-long training. The results showed that the Summer Institute incorporated the cycle of learning and tenets of Kolb's experiential learning theory and evidenced teacher learning that increased their knowledge of teaching ELLs. As classrooms become increasingly linguistically and culturally diverse, teacher preparation programs must ensure that teachers make conscious and informed instructional decisions based on ELLs' learning needs such as scaffolding. Coady et al. (2016) examined the beliefs and practices of teacher graduates of a teacher preparation program that included second language training. Participation in professional development is effective for teacher preparation and may have a positive effect on teacher knowledge of language and literacy acquisition, ability for teachers to plan and manage instruction for ELLs, teacher learning, and specific ELL practices to facilitate the English language development of ELLs.

There are research-based instructional practices that may still be effective to address the needs of ELLs. Polat and Cepik (2016) conducted an exploratory factor analysis of 102 in-service teachers and raised the question as to whether Sheltered Instruction Observation Protocol (SIOP) is an effective instructional model to help address the needs of ELLs. The primary goals of the model are to ensure that content area teachers clearly communicate and support ELLs to meet both language and content objectives in their lessons by making the language constructs and content subjects comprehensible to ELLs. The findings suggest that SIOP seems to still be effective

determining teaching effectiveness that is specifically characterized as “sheltered instruction” for ELLs.

CCSS-M and Facilitators and Barriers to Implementation for ELLs

The ability of preservice teachers to experience the complexities of making adaptations while noting the benefits and obstacles the adaptations had on the ELL’s understanding of mathematical word problems, instructional strategies and practices is important to help address their needs. Kurz et al. (2017) conducted a qualitative study to create a framework for guiding six elementary preservice teachers in adapting mathematics word problems to better meet ELLs’ needs using reflective responses to adapting curriculum and working with the ELLs. The findings revealed that the preservice teachers were clearly able to apply what they were learning in class in adapting the work for their ELLs. The ability of preservice teachers to experience the complexities of making adaptations while noting the facilitators and barriers the adaptations had on the ELL’s understanding of mathematical word problems, instructional strategies and practices is important to help increase mathematics proficiency.

The professional needs of educators during this critical time of transition to the standards and the scant research on this national-scale reform in mathematics education are illuminated by results of Swars and Chestnutt (2016) who conducted a mixed methods study that explored 73 elementary teachers’ experiences with and perspectives on the recently implemented CCSS-M at a high-needs, urban school. The findings revealed educators had familiarity with and preparation to use the standards;

implementation of the standards, including incorporation and teacher change; and tensions associated with enactment of the standards. Educators believed in the merit of the standards but were constrained by their inadequate content knowledge, limited aligned curricular resources, lack of student readiness, and a perceived mismatch with ELLs which most likely contribute to ineffectiveness. CCSS and teacher effectiveness are among the issues in education today. Johnson and Wells (2017) conducted a case study focused on California that outlined the current problem, which includes the complexity of the CCSS, the achievement gap between ELLs and their peers, and ill-equipped teachers. Gaps between ELLs and their English-speaking peers in graduation rates and results indicate that ELL students are struggling to keep up with their peers. Furthermore, many educators claim to be unprepared for literacy demands connected to CCSS and with the increased language and literacy demands across the curriculum required by the CCSS, the teachers of ELL students will need both pre-service and in-service support to ensure ELL students achieve similar academic success with the CCSS as their peers. The findings recommended targeted policy changes, which include preservice teachers' participation in extensive fieldwork with ELLs, in-service teachers' comprehensive professional development connected to practice, as well as a systematic evaluation process to measure ELL teacher effectiveness. CCSS recognizes that ELLs require additional time, appropriate instructional support, and aligned assessments," and teachers should be "well prepared and qualified to support ELLs but CCSS does not provide detailed guidelines. Szpara (2017) conducted a descriptive case study that explored the evolution of one cohort of 15 practicing teachers and three future teachers in the Philadelphia area, who

sought to improve outcomes for ELLs faced with increased pressures of Common Core State Standards and assessments, with little professional support using the SIOP model. The key findings are relevant to my study because the teachers explored the linguistic and cultural needs of ELLs; worked collaboratively to adapt their own and colleagues' lesson plans; and shared community resources with ELL families as a means of advocacy and support. In addition to that, the researcher provided specific examples of changes in language objectives and lesson plans, before and after the application of SIOP model. Teachers should collaborate to adapt to the linguistic and cultural needs of ELLs and share community resources with ELL families as a means of advocacy and support. Filippi and Hackmann (2019) conducted a case study using leadership for learning as a conceptual framework, examined the leadership behaviors of one superintendent in a Midwestern state, whose district was an early CCSS adopter. Similar to Szpara, this study showed the collaboration of superintendent to successfully develop a shared CCSS vision; expand district capacity through distributed leadership; provide professional development and instructional coaching supports; and respond to implementation challenges, which included maintaining open communications channels with stakeholders and managing teacher stress. School district officials should continually collect and analyze student learning data, using information to assess the quality and effectiveness of curricular reforms and to make revisions, as necessary. Future research should investigate the extent to which the school district's implementation of Common Core State Standards influences teachers' classroom practices and whether they promote equitable learning for all students.

Implications

The purpose of this study was to explore elementary educators' perceptions of implementation of the CCSS-M and the impact on math proficiency for ELLs at a Title I elementary school bordering a large urban area. The findings of this qualitative study may be important for policy, practice, theory, and future research. By exploring the facilitators and barriers of educators' use of the mathematics standards, instructional strategies may be found that could be used by policy makers to improve mathematics instruction for ELLs in order to increase mathematics proficiency. This basic qualitative study of educators' perceptions, possible facilitators and barriers of mathematics curriculum standards, and mathematics proficiency for ELLs can also provide information about effective curriculum and instructional strategies that can be implemented in the practice of working with ELLs. The findings could benefit stakeholders in other schools including students, parents, educators, school administrators in the area of policy and practice. The findings from the local site could influence changes in practice and policy for district administrators in a shared effort to incorporate policies to increase mathematics proficiency for ELLs throughout the school district. The findings can also lead to increased interest in further research on a local, state, or national level in regards to the CCSS-M for ELLs.

Implications for possible project direction based on anticipated findings of the data collection and analysis would be a professional development opportunity for the educators at the local site. Million and Karin, (2018) suggested that teacher learning in professional learning communities is generally accepted as a teacher professional

development approach that can significantly impact teachers' mathematical knowledge and practices. The project deliverable would be to implement a Professional Development, Professional Learning Community (PLC), and/or Professional Learning Experiences (PLEs) meetings for K-5 mathematics educators of ELLs at the local site. Research on professional learning communities has focused mainly on understanding what and how practicing educators learn in such communities and the extent to which such learning might improve teachers' practices (Million & Karin 2018). Within this Professional Learning Community, the educators would be able to discuss topics regarding ELLs and mathematics.

Summary

Research demonstrates that the academic performance levels of ELLs in mathematics are significantly below those of their peers in nearly every measure of achievement. Classroom practices are not adequately preparing ELLs for academic success in the area of mathematics, and since the 2015 implementation of CCSS-M, ELLs are still lacking in mathematics proficiency. A yearly assessment of the CCSS-M administered since 2015 resulted in low mathematics performance in grades 3 through 5 which most likely means that the teacher practices in the school district are not leading to progress for ELLs in mathematics proficiency.

This basic qualitative study was designed to gain a deeper understanding of classroom educators' perceptions of the CCSS-M at a Title I elementary school bordering a large urban area. This study is also intended to provide insight into the impact from grade to grade on ELLs' mathematics proficiency. This will inform stakeholders

including district supervisors, school administrators, educators, and parents on perceptions of curriculum/curriculum standards and the impact it has on ELLs moving towards mathematics proficiency.

The conceptual framework for this study was based on Ernest's (1989) theory of knowledge, beliefs, and attitudes of the mathematics teacher. According to Ernest's model, educators' mathematical content knowledge has a direct relationship with teachers' instructional practices. The elements of the model can be used to help understand how perceptions about the Common Core Curriculum Standards can influence mathematics instruction for ELLs and explain how ELLs can be helped through a constructivist model.

A basic qualitative approach was used for this project study. The data analysis was done of the responses to the interview questions for the participants based on the relevant elements of Ernest's theory of knowledge, beliefs, and attitudes of the mathematics teacher. Teacher knowledge represents the cognitive component of this model and, according to Ernest, includes the knowledge of mathematics, teachers' beliefs and practices in other subject matter, pedagogy and curriculum, classroom management, context of teaching, and education.

The findings from this study can lead to positive social change. Knowledge, attitudes, and beliefs are all posited to have a direct influence on educators' instructional practices. The teacher perceptions may reveal pertinent information to fill the gaps in practice in Title 1 education and mainstream mathematics instruction of ELLs. This may lead to improved mathematics literacy for ELLs.

Section 2: The Methodology

Research Design and Approach

In this basic qualitative study, I explored the experiences of kindergarten through fifth grade elementary educators with mathematics expertise in using the CCSS-M with ELLs. A qualitative study involves systematic and conceptualized research processes to interpret the ways the humans view, approach, and make meaning of their experiences, contexts, and the world (Ravitch & Carl, 2019). This basic qualitative project study helped identify educators' perceptions using the CCSS-M for ELLs. The research questions are driven by Ernest's (1989) theory of knowledge, beliefs, and attitudes of the mathematics teacher. The aim of the first research question was to gain information about elementary educators' perceptions of implementation of the CCSS-M and the impact on math proficiency for ELLs. The intention of the second research questions was to gain information about the elementary educators' facilitators and barriers of implementing CCSS-M for ELLs.

A quantitative research design could have been considered because it may have been practical to collect data by conducting online surveys; however, this research methodology was not aligned with the research questions, as quantitative research focuses on relationships between two or more variables. Quantitative data would not allow the in-depth understanding into elementary educators' perceptions of the CCSS-M and the facilitators and barriers of implementation with ELLs in their classrooms.

Basic qualitative methodology was the appropriate design because documentation is needed on elementary educators' perceptions of the CCSS-M for ELLs and barriers or

facilitators of implementing Mathematics Common Core Standards for ELLs. Qualitative research is recursive in that is it often informed by personal and professional experiences, literature that has been read, and the ways that people view and understand the world (Ravitch & Carl, 2019). This basic qualitative study will help to understand educators' experiences using the CCSS-M with ELLs. The descriptive and explanatory type research questions of this study support a qualitative study rather than an experimental quantitative study that is testing a theory (Burkholder et al., 2016). The purpose of descriptive qualitative research is to explore and describe a phenomenon through observation and research (Burkholder et al., 2016). Although all qualitative research is descriptive in nature, the type of descriptive research varies (Burkholder et al., 2016). Descriptive qualitative research was not appropriate for this basic qualitative study since observations will not be used as a form of data collection.

Ravitch and Carl (2019) suggested that qualitative research is incredibly valuable in knowledge construction in a variety of ways. A basic qualitative study design was used for the study because it allowed for an in-depth explanation of elementary educator's experiences with using the CCSS-M Standards with ELLs. Alternative qualitative designs include ethnographic, phenomenological, and narrative. An ethnographic approach was not appropriate because it deals with the study of diversity of human cultures in their cultural settings over time (Burkholder et al., 2016). This doctoral project study was not to understand the culture of participants, but rather to investigate how elementary educators' perceived the CCSS-M for ELLs. A phenomenological design was not considered for this basic qualitative study. The participant educators in this study were

from one location, unlike phenomenological studies where many educators from multiple locations can be interviewed in order to develop themes around the shared experiences of the group (Burkholder et al., 2016). The focus of this study was to develop a deep understanding of kindergarten through fifth grade elementary educators' practices using the CCSS-M at one setting. Qualitative research focuses on context, interpretation, subjectivity, representation, and the non-neutrality of the researcher (Ravitch & Carl, 2019). A narrative study is meant to tell the chronological story of a participant's life, which would not have provided an in-depth explanation of educators' experiences in using the CCSS-M with ELLs (Burkholder et al., 2016).

The interview questions (see Appendix B) are based on Ernest's (1989) theory of knowledge, beliefs, and attitudes of the mathematics teacher which outlined the different types of knowledge, beliefs, and attitudes of a mathematics teacher and how these three components relate to teachers' models of teaching mathematics. The questions are descriptive because they seek to describe kindergarten through fifth grade elementary educators with mathematics expertise experiences using the CCSS-M with ELLs. The data was collected at the local site, which is an elementary school. Data were collected in the natural setting, a commonality of qualitative research (Burkholder et al., 2016). Interviews were used for data collection to paint a comprehensive picture of educators' experiences, a distinct feature of qualitative studies (Burkholder et al., 2016). Since this doctoral study was aimed at gaining a deeper understanding of elementary educators' perceptions of the CCSS-M and the facilitators and barriers of implementation with ELLs, a basic qualitative project study research design was appropriate.

Participants

This basic qualitative project study took place in one elementary school site. The elementary school site has pre-kindergarten through sixth grade and is located in a school district bordering a large urban area. The participants for this study were selected from teachers of kindergarten through fifth grade since the sixth graders are using a middle school mathematics curriculum.

Criteria for Selecting Participants

The purpose of this basic qualitative study was to explore elementary educators' perceptions of implementation of the CCSS-M and the impact on math proficiency for ELLs at a Title I elementary school bordering a large urban area. The data sources for this study were a population of mathematics educators in grades kindergarten to fifth grade who teach math. Purposeful or convenience sampling was used to acquire the participants for this study because mathematics educators at the local site with experience teaching ELLS using the CCSS-M would provide the best information for this study. Purposeful sampling is implemented in qualitative research as opposed to random probability sampling used in quantitative studies because purposeful sampling provides context-rich and detailed accounts of a specification population (Ravitch & Carl, 2016). The desired number of participants from the potential participants was 13 classroom educators and specialists who have taught mathematics with ELLs using the CCSS-M for one year or more to collect a sufficient amount of data for analysis. The selected participants were representative of at least two participants from each of the grade levels kindergarten through five. This means that at least two participants were selected from

kindergarten, at least two from first grade, at least two from second grade, at least two from third grade, at least two from fourth grade, and at least two from fifth grade. The participants had experience teaching mathematics to ELLs using the CCSS-M for at least 1 year. Approval from administration at the local site was gained prior to participant selection.

Justification for Selecting Participants

The participants chosen for this doctoral project study were elementary classroom educators and specialists who have experience teaching mathematics to ELLs using the CCSS-M for at least 1 year. I distributed 30 participation flyers to potential educators who met the criteria. Thirteen of the educators were selected to participate in this doctoral project study. I selected these 13 educators because they were able to provide key knowledge information about perceptions of the CCSS-M and the facilitators and barriers of implementation with ELLs. Of the 13 elementary classroom educators and specialists I interviewed, three were European American, four were Asian American, and six were African American.

Table 2 represents the selected participants' number in the study, role or title at the site, and the grade level they taught. The 13 selected participants for the site included eight classroom educators and five specialists.

Table 2

Participant Demographics

Participant	Role/Title	Grade level
1	Classroom educator	2
2	Classroom educator	2
3	Classroom educator	1
4	Classroom educator	3
5	Classroom educator	3
6	Classroom educator	4
7	Classroom educator	5
8	Classroom educator	5
9	Specialist	1
10	Specialist	3
11	Specialist	2
12	Specialist	K-6
13	Specialist	K-6

Other demographic information collected included years of teaching experience, years at the local site, and years teaching mathematics to ELLs. The pie graph for teaching experience (see Figure 1) illustrates that, of the 13 participants, three had 5–10 years teaching experience, whereas six had 10–15 years of teaching experience, and four had more than 15 years of teaching experience. The pie graph for years at the local site (see Figure 2) shows that, although three of the educators have been teaching there for less than 5 years, four have been teaching there for 5–10 years, and six educators have been teaching at the local site for 10–15 years. The pie graph for years teaching mathematics to ELLs (see Figure 3) shows that only one educator had been teaching mathematics to ELLs more than 15 years, whereas four had done so for 10–15 years, six had done so for 5–10 years, and two had less than 5 years of this experience.

Figure 1

Teaching Experience

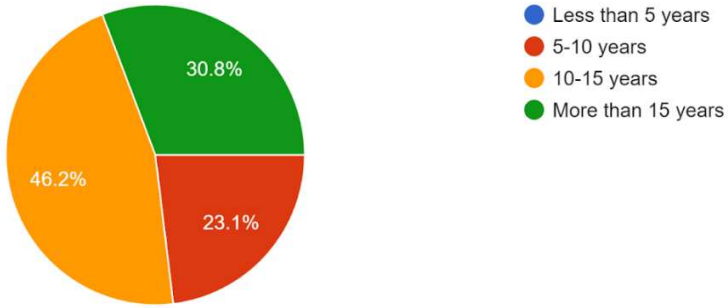


Figure 2

Years Teaching at Local Site

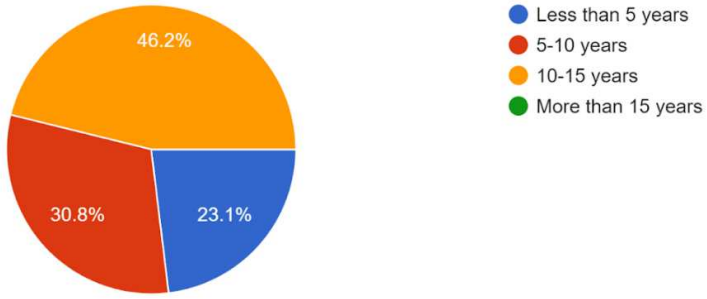
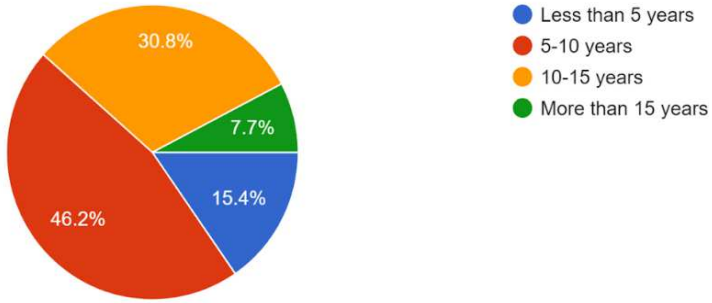


Figure 3

Years Teaching Mathematics to ELLs



Access to Participants

Before conducting the study, I obtained permission from the Walden University Institutional Review Board (IRB; Approval No. 11-01-21-0603844), which ensured that the research procedures are ethical for the study. Any risk factors associated with this study were identified and addressed during the IRB application process to ensure minimal risk to the participants in the study. Approval to conduct this study was granted by the Supervisor of Research and Evaluation in the school district. This written conditional approval letter was included with the IRB application.

Once IRB approval was obtained, I sent a Google Forms participant flyer with a clear explanation of the study via email to each educator in the participant pool obtained from the employee directory. The flyer contained a brief overview of the research goals, a statement about the voluntary nature of the study, a list of the requirements for participation, and my contact information (Ravitch & Carl, 2016). The potential participants were asked to respond to me within 1 week via email by completing the Google Form stating whether they wish to participate in the study or not. To provide confidentiality, potential participants were encouraged to respond using a personal or private email address instead of the district email address. Email addresses were also not captured or tracked via the Google Form. Within the 1-week period, potential participants had time to ask questions and voice objections or concerns about aspects of the study (Ravitch & Carl, 2016).

Once confirmation was received, I contacted each of the participants via email based on the contact information they had provided on the completed Google form and

the date the confirmation was received. All potential participants were notified of selection or non-selection for the study. Participants not selected included educators who submitted an incomplete response, submitted the Google Form after the 1-week deadline, or there were already too responses from potential participants. All responses from nonselected participants were retained in case a selected participant was unable to participate and a new participant was needed. The 13 participants were selected randomly from the pool of potential participants who have taught mathematics with ELLs using the CCSS-M for 1 year or more.

I distributed the informed consent form to the 13 participants and provided directions for returning the signed consent form. To build trust, I explained the purpose of the study and how the data would be used. Being in this study would not pose risk to their safety or wellbeing beyond what they may encounter in their daily life. Demographic information was gathered though introductory questions asked during the interviews. Participants were told that they did not have to sign any forms and cultural, religious, gender, and other differences would be respected. To ensure confidentiality, I assigned numbers to each participant, so that individuals could not be identified. The relationship between researcher and the participants was one in which I ensured that participants knew exactly what was being asked of them, could ask questions if needed, and felt completely comfortable participating in the study.

In my relationship with the participants, I also sought to avoid harm occurring to them as a result of their involvement in the research study and was one which demonstrated respect for participants through a concern for their dignity and privacy.

Reports coming out of this study did not share the identities of individuals who participated. Details that might identify participants, such as the location of the study, also were not to be included in data collection process. I did not utilize the personal information of participants for any purpose outside of this research project. I secured the study data in a password-protected computer. The interviews were recorded, and only I have access to the audio file, which has been transcribed, removing any identifiers during transcription. The audio file for this study was deleted after transcription was completed. Data for this study will be stored for a duration of 5 years, as required by the university, before it is destroyed. The identities of participants of this study will be kept confidential and would not be revealed at any time.

Data Collection

Interviews were used as the main source of data collection in this doctoral project study. I asked the participants 10 questions during the interviews and used each of the questions to gain insight into the following research questions:

1. RQ1: What are the elementary educators' perceptions of implementation of the CCSS-M and math proficiency for ELLs?
2. RQ2: What are the elementary educators' perceptions of facilitators and barriers of implementing CCSS-M for ELLs?

One-on-one interviews were conducted using the semistructured interview protocol for the participants (see Appendix B). I conducted these interviews via the online conferencing system Zoom (https://zoom.us)with 13 classroom educators in Grades K-5 using researcher-created open-ended questions based on Ernest's (1989)

theory of knowledge, beliefs, and attitudes of the mathematics teacher. This way, interviews were recorded automatically and downloaded so that the recorded transcript could automatically be compared to the audio. The semistructured interview included key or main questions that are most related to the research questions, conceptual framework, and purpose of the study. The interview questions provided insight into the perceptions of elementary educators of the CCSS-M, the facilitators to implementing the CCSS-M, and the barriers to implementing the CCSS-M for ELLs and related to Ernest's (1989) theory of knowledge, beliefs, and attitudes of the mathematics teacher. The script for the interview also included introductory questions (relatively neutral eliciting general and nonintrusive information and that are not threatening), transition questions (linking the introductory questions to the key questions to be asked), and closing remarks (questions that were easy to answer and provide opportunity for closure). In semi structured interviews, either or all of the questions are more flexibly worded or the interview is a mix of more and less structured questions because specific information is required from all of the respondents (Merriam & Tisdell, 2016). Due to COVID-19 protocols and restrictions, the interviews were conducted one on one via Zoom using the record feature within Zoom with no camera or a recording device because this ensured that everything said would be preserved for analysis. The interviews were downloaded and the recorded transcript were compared to the audio to ensure validity. The interviews were transcribed, and transcripts of the interviews were analyzed using thematic analysis.

The participants were contacted via email with available dates and times for interviews. The one on one interviews were scheduled based on participant availability

within a 2–4 week time period based on information from consent forms collected. All one-on-one interviews took place via Zoom due to COVID-19 protocols and restrictions. These one on one interviews took no longer than an hour and were dependent on the participant's schedule. Participants were asked to provide their permission to audio record the interview and audio-recorded interviews were transcribed after the interviews were conducted. The written transcripts are vital to rigorous data collection and analysis (Ravitch & Carl, 2016). Participants' names did not appear on the transcripts. The participant names were replaced with numbers on the transcripts. All data collected is being stored on a USB drive. The audio file will be deleted after transcription is completed. Data will be stored for a duration of five years, as required by the university, before it is destroyed.

Role of Researcher

The local site has been my place of employment for 8 years and I teach in a non-supervisory role as an English for Speakers of Other Languages (ESOL) educator. The interview participants are coworkers and my relationship with them is as colleagues. The participants vary as far as length of employment, years teaching mathematics, and expertise in mathematics. As an ESOL educator whose main focus is reading language arts (RELA), there is an interest in the mathematics proficiency because reading is needed in order to do mathematics. For this basic qualitative project study, I took the role of a researcher because I don't teach mathematics and may only work with the students as an ESOL teacher. This role was taken on in order to learn about kindergarten through fifth grade educators' perceptions of the CCSS-M for ELLs.

Data Analysis

The themes, patterns, or categories and relationships between the data were identified using thematic analysis. Thematic analysis is a six step method of analyzing qualitative data and it is usually applied to a set of texts, such as interview transcripts (Judger, 2016). Thematic analysis includes familiarization, coding, generating themes, reviewing themes, defining/naming themes, and writing up an analysis of the data. The researcher will closely examine the data to identify common themes, ideas and patterns of meaning that come up repeatedly.

The first step in thematic analysis is familiarization is and might involve transcribing audio, reading through the text and taking initial notes. This step is for getting a thorough overview of the data before starting to analyze individual items. This step, is for reading, taking notes, and generally looking through the data to get familiar with it (Judger, 2016).

Coding is the process of making notations next to bits of data that strike you as potentially answering your research questions (Merriam & Tisdell, 2016). This can be done using single words, numbers, letters, phrases, colors, or combination of these so that specific pieces of the data can be retrieved easily. The researcher wants to be thorough at this stage because they go through the transcript of every interview and highlight everything that jumps out as relevant or potentially interesting (Judger, 2016). After going through the text, all the data can be collated together into groups identified by code. These codes allow the researcher to gain a condensed overview of the main points and common meanings that recur throughout the data (Merriam & Tisdell, 2016).

Generating themes takes place when codes created are looked over to identify patterns among them and the researcher starts coming up with themes. Themes are generally broader than codes and most of the time, several codes are combined into a single theme. At this stage, it might be decided that some of the codes are too vague or not relevant enough so they can be discarded or described as discrepant data and other codes might become themes because the researcher wants to create potential themes that tell something helpful about the data for their purposes (Judger, 2016).

When the researcher is reviewing themes, they have to make sure that the themes are useful and accurate representations of the data. In this step, the researcher will return to the data set and compare themes against it to see if anything is missing, if these themes are really present in the data, and what the researcher can change to make the themes work better. If the researcher encounters problems with the themes, they might split them up, combine them, discard them or create new ones: whatever makes them more useful and accurate (Judger, 2016).

While defining and naming themes the researcher should have a final list of themes and be ready to name and define each of them. Defining themes involves formulating exactly what the researcher means by each theme and figuring out how it helps understand the data. Naming themes involves coming up with a succinct and easily understandable name for each theme (Judger, 2016).

Finally, the researcher will write up an analysis of the data addressing each theme in turn, describing how often the themes come up, what they mean, and including examples from the data as evidence (Judger, 2016).

Evidence of Quality and Procedures

Ravitch and Carl (2016) described establishing credibility by using more than one source for data collection, member checking, presenting thick description, discussion of discrepant cases, and the use of peer debriefers or reviewers. To assure accuracy and credibility of the findings, member checks were used to check assumptions and to ensure internal validity. After all interviews were completed, participants were asked to member check the transcriptions for accuracy of interpretation of data in order to identify and resolve discrepancies. This approach, in most qualitative studies, involves taking data, analyses, interpretations, and conclusions back to the participants so that they can judge the accuracy and credibility of the account (Creswell & Poth, 2017). Participants were asked to check for accuracy of interpretation of data in order to identify and resolve discrepancies. Member checking was also used to test the validity through the convergence of information since interviews are the only data source. Member checking occurred throughout the research process. Participants were asked by the personal email they provided to review draft findings to check for the accuracy of their own data used in the findings. These were brief reviews and took no longer than 10 minutes. Member checking and triangulations is a process that will occur during the research and data analysis (Ravitch & Carl, 2016). Each time a member check occurred, participants were asked to review and comment within a specific time period. No discrepant information that runs contrary to the themes was identified during the stage one data collection and analysis. If discrepant cases had been identified during member checks, the discrepant cases would have been discussed through evidence about the theme because most evidence builds a case

for the theme and it adds to the credibility of an account. Researchers can present information that contradicts the general prospective of the theme and by presenting this contradictory evidence, the account becomes more realistic and valid (Creswell & Poth, 2017).

Limitations

There are several limitations to this basic project study about kindergarten through fifth grade educators' perceptions of the CCSS-M for ELLs. The sample size of 13 may not be large enough to give an accurate picture of educators' perceptions of the CCSS-M. Due to COVID-19 protocols, the interviews were conducted via Zoom with cameras off, so it was hard to limit distractions and make sure to gain the full attention of the participants. Since this study is based on ELLs, cultural and other type of bias had to be considered during the data collection process. Due to the open-ended interview questions, participants have more control over the content of the data collected so it may be difficult for the researcher to objectively verify the results. The researchers' own subjective feelings may influence the study which is known as researcher bias. This study required the researcher to obtain a considerable amount of data from the participants and conduct a-thorough data analysis process. This study was perception based so the responses given are based on opinion and may or may not be honest. The responses given are not measured, comparisons cannot be made, and the results cannot be generalized to the wider population.

Data Analysis Results

A problem exists that classroom practices were not adequately preparing ELLs for academic success in the area of mathematics and since the 2015 implementation of the

CCSS-M in elementary school bordering a large urban area, there had been a lack of progress in mathematics proficiency for ELLs. The 2018-19 MCAP, a yearly assessment based on the CCSS-M given at this Title I elementary school bordering a large urban area, shows that 22% of third grade ELLs, less than 5% of fourth grade ELLs, and less than 5% of fifth grade ELLs tested met expectations in mathematics (Maryland Department of Education, 2019). The purpose of this basic qualitative study was to explore elementary educators' perceptions of implementation of the CCSS-M and the impact on math proficiency for ELLs.

The data for this basic qualitative study was collected during a 3-week period where I interviewed 13 classroom educators in grades K-5 who taught mathematics to ELLs using the CCSS-M. The one-on-one interviews were conducted via the online conferencing system, Zoom. The data collected for this doctoral study were organized, recorded, transcribed, analyzed, and coded for themes based on Ernest's (1989) theory of knowledge, beliefs, and attitudes of the mathematics teacher. Qualitative researchers discover concepts and theories after data have been collected and use analytic induction to analyze data (Smith, 2021). I analyzed the data collected by transcribing participants' recordings from interviews within 24 hours of conducting the interview using a transcription program.

I began analyzing using thematic analysis which is a method used in qualitative research to identify patterns, or themes, within a given data set. This is one of the simpler and more accessible methodologies of qualitative research, open to researchers at any level of experience (Miller, 2020). My first step was to by repeatedly read the data in

order to become thoroughly familiar with it before making any assessments of potential patterns or themes within it. Next, I began coding or grouping the data by highlighting like themes. After the coding was completed, all data points that have been identified with the same code were grouped together under broad themes. Then, I reexamined the data points under each theme to confirm they fit logically into the pattern serving as the basis of the theme and consider relationships between the various documented themes. After that, I assigned meaning and defined the themes and the narrative of the data emerged, within each theme individually and across all data as a whole. Last, I created the formal report that documented the themes. I began sorting codes into possible themes and the themes emerged from the coding process. During the coding process, I managed and sorted all data into small chunks to easily manage the coding process. Transcripts were meticulously analyzed throughout the data analysis to build on themes.

The research questions were designed to be answered through data gathered during semistructured one-on-one interviews. Through the analysis of interview data, themes emerged to address the research questions regarding elementary educators' perceptions of implementation of the CCSS-M, math proficiency, and perceptions of facilitators and barriers of implementing CCSS-M for ELLs.

Five themes emerged from the data to answer the research questions. The five themes were the following: (a) educators' perceptions of difficulty to implement CCSS-M, (b) inadequate preparation to implement CCSS-M to ELLs (PD), (c) mathematical barriers of CCSS-M for ELLs, (d) use of mathematical scaffolds, and (e) educators'

perceptions of the mathematics achievement of ELLs. A description of the themes is in Table 3 below.

Table 3

Themes

Themes	Number of participants who reported this
Theme 1: Educators' perceptions of difficulty to implement CCSS-M	11
Theme 2: Inadequate preparation to implement CCSS-M to ELLs (PD)	8
Theme 3: Educators' perceptions of mathematics achievement of ELLs	13
Theme 4: Mathematical barriers of CCSS-M for ELLs	13
Theme 5: Use of mathematical scaffolds, strategies, and interventions for ELLs	13

The themes mentioned above played an important role in the elementary educators' perceptions of implementation of the CCSS-M and the impact on math proficiency for ELLs. The findings are organized according to themes and presented according to the research question. The findings contain data from the participant's interviews.

Research Question 1

Research Question 1 asked the following: What are the elementary educators' perceptions of implementation of the CCSS-M and math proficiency for ELLs? The interview protocol (Appendix B) used in the study involved questions intended to provide participants with the opportunity to express their opinions regarding the implementation of the CCSS-M, their preparedness, beliefs about how they help ELLs understand the

math material based on the CCSS-M, whether the CCSS-M help or hinder the progress of ELLs, perceptions about their responsibility to bring your ELLs up to the same level mathematically as the other students using the CCSS-M, and the impact on math proficiency for ELLs. During the interviews, I had conversations with the participants about their perceptions and beliefs about mathematics instruction when teaching ELLs using the CCSS-M, asked questions for more explanation of information, and identified the themes that emerged from their answers. The three themes that emerged to help connect the results of the study to Research Question 1 (RQ1) were Theme 1: educators' perceptions of difficulty to implement CCSS-M, Theme 2: inadequate preparation to implement CCSS-M to ELLs (PD), and Theme 3: educators' perceptions of mathematics achievement of ELLs.

Theme 1: Educators' Perceptions of Difficulty to implement CCSS-M

The first theme the data revealed to help connect the results of the study to RQ1 was the different educators' perceptions of the difficulty to implement the CCSS-M to support ELLs in mathematics. The data revealed that 11 out of 13 educators stated that it was difficult to implement the CCSS-M for ELLs in the mainstream classroom. Some of the educators who believe that it was not difficult to implement the CCSS-M and the ones who felt it was difficult reported they wanted to engage in professional development that provides them with instructional strategies to address the mathematical needs of their ELLs. As Participant 6 stated,

> I guess, to be honest, overall, I'm on the fence about it. I do understand what Common Core was, you know, implemented for and I definitely understand what

> it was intended for. And again, the, the overall idea was good. In regards to English language learners, again, yes, the intended intentions of it is good. On the other hand, I do believe that to a certain extent, Common Core, for at least, the grade level that I'm familiar with for lack of a better term, asks too much.

Participant 6 was a teacher with 10-15 years of teaching experience and 5-10 years teaching the CCSS- M to ELLs. He has also been at the local site for 10-15 years and the same amount of years teaching mathematics to ELLs. He is very familiar with teaching third grade because that's where the bulk of his teaching career has been spent. He is presently teaching fourth grade and 11 of his 23 students are ELLs. Participant 7 also stated that the CCSS-M was difficult for ELLs. As Participant 6 stated,

> I feel like a lot of times the common core standards are just are not tailored to fit those students. What I mean by that is, oftentimes, they're difficult for our Gen Ed students that are not ELLs just in visualizing, like even when they're visualizing using like base 10 blocks to do the same in fifth grade.

Two out of 13 educators reported no difficulty with the implementation of the CCSS-M to instruct ELLs. Educators who did not have difficulty with the implementation of the CCSS-M had less 5-10 years teaching experience, less than 5 years at the local site, and less than 5 years teaching mathematics to ELLs using the CCSS-M. These four participants stated that they had not received any ESL PD during the school year which could be a factor that influenced the way they felt about instructing ELLs in regular education. For instance, Participant 8 stated,

> I think that they're okay. It seems like it is just math that we have to learn in United States, and they're going to have to adapt and learn it. That seems like they're pretty straightforward. But I think that the teaching is different. I didn't grow up with all these models and manipulations. You know, we just did straight math. But I find that the ELLs know math more than they know, English, because I guess numbers are international, perhaps. But I think that the standards are good.

Theme 2: Inadequate Preparation to Implement CCSS-M for ELLs (PD)

A second theme that emerged from the data analysis to help connect the results of the study to RQ1was the educators' preparation to implement the CCSS-M for ELLs. When comparing educators' perception of their preparation to support ELLs using the CCSS-M, the trends that emerged were prepared, somewhat prepared, and not prepared. The majority of the educators who felt somewhat prepared to instruct ELLs using the CCSS-M reported a more advanced educational background, more than 10 years of teaching experience and more years teaching mathematics to ELLS using the mathematics standards. Educators with more years teaching using the CCSS-M and several years of teaching experience reported to feel more confident in working with ELLs using strategies and they would benefit from more mathematics PD opportunities designed to address the unique needs of their limited English proficient students. 10 out of 13 educators felt somewhat prepared in their teaching abilities to teach mathematics to ELLs using the CCSS-M. Some of these educators stated that they felt they had the abilities to teach ELLs with strategies they've used for years and they continue to engage

in professional development, but they do not feel it provides them with the tools they need to become successful teaching many of the standards. Participant 1 stated,

> I might feel very prepared to teach, but what actually comes out and what the kids actually comprehend now there's a different story. We are working on it. I'll be honest with the Common Core, if one child doesn't understand something, then you have to make Plan B, you have to be able to think on your feet. Some days, I honestly have to take a back seat and say, "Hey, hold on a moment, we're coming back to this after I get another strategy in place." So, I think you have to be prepared to say, wait a moment, things aren't going quite the way I want it to go. That there is something that is different because in Common Core, it is taught differently. The expectations are different in Common Core then they were before Common Core and that's something in math that you have to get used to. You can have a lot of different instructional strategies, different meetings, different conferences, in services and what really I like is when I see it being done. I'll be honest, I learned more from seeing it being done than just sitting there and having someone explain it.

Participant 1 was an educator with 10-15 years at the local site, more than 15 years of experience teaching, more than 15 years teaching ELLs, and had been teaching the CCSSM since they were first implemented. Some educators who did not feel well prepared in teaching ELLs felt confident with particular grade levels or standards. For instance, Participant 13 stated,

> I would say I feel prepared for our primary students K through two. When it comes to the upper grades, I feel like I think somewhere between moderate, and not very somewhere around there because it's harder to teach the older students again, with that reading and writing piece. So more prepared for the younger kids not so prepared to moderate for the older kids.

Participant 13 was a specialist with an advanced degree, 10-15 years of teaching experience, and 5-10 years teaching ELLs using the CCSS-M. Two out of 13 educators reported that they were not prepared to implement the standards to ELLs even with PD opportunities offered by the school district because the focus was not on the mathematics standards. Participant 10 stated,

> I have been teaching for quite a while and I had the opportunity to teach the Common Core State Standards for more than five years and in my personal view, then, then the county really prepared us for that. I really wanted to further my skills, so what I did this that I enrolled in different Professional Development catering to students who are ELLs. So, our county is providing that but what I've noticed is that they cater more on how to teach the ELL students reading and writing instead of focusing on how to teach these children with regard to the Common Core Math. So they focus more on how are you going to be teaching the students in to increase their reading and writing skills rather than although they go hand in hand in math as well, but it's not really 100% that I'm an expert.

Participant 10 is a specialist with an advanced degree as well as a National Board Certification. She has 10-15 years of teaching experience and 5-10 years teaching ELLs

using the CCSS-M. The educators appreciate the PD opportunities offered by the school district and feel they have somewhat helped implement the CCSS-M, but need more strategies to help the ELLs in mathematics. Participant 8 stated,

> I feel like I feel like I'm winging it. I know, we do have a lot of ELL seminars and stuff, but I don't feel like they really helped me. I think I would like more specific, ones that show like, "this is a good way to teach math." I think and feel like the ones we get, at staff meetings are too broad.

Participant 8 has a total 5-10 years of experience teaching and the same amount of years teaching ELLs using the CCSS-M. The educators who felt prepared to teach the ELLs using the CCSS-M reported that using their teaching experience as well as strategies and interventions to help them teach.

Theme 3: Educators' Perceptions of the Mathematics Achievement of ELLs

A third theme that emerged from the results to help connect the results of the study to RQ1 was the perceptions of the mathematics achievement of ELLs. All 13 participants reported that the ELLs were making progress, but the majority are struggling as a whole with many of the CCSS-M. Many of the educators reported that their ELLs felt comfortable enough to take risks in mathematics in the classroom, but the challenges outweighed the strengths. Participant 10 stated,

> A lot of our children, a lot of ELL children are falling behind. Not because they don't really know how to do it, but it's because they lack the understanding of how they're going to do it. So, some students relied on procedures and in a Common Core, some problems are presented in a different way. So they have to

> understand what it's really asking. For example, there is one problem where you're supposed to multiply, but it did not say what is the product or something like that. So a lot of our ELLs when you teach them when you show them the procedure, they try to rely more on how to do it by doing it step by step, but not everybody did and everybody can't do that.

Several educators expressed that they felt that it was their responsibility to bring their ELLs up to the same level mathematically as the other students, but the CCSS-M make it complicated and not designed for their mathematics abilities. They felt that the mathematics standards did not help them do that.

Ten out of 13 educators reported that they felt that the CCSS-M hindered the progress of ELLs. Participant 4 stated,

> I definitely feel they're hindering them because I feel like it's just too much in a small amount of time. I feel like, if number one, there wasn't so many requirements on this one standard if it was just straight to the point If it was just, "Hey, how these are shapes the same?" What characteristics do these shapes share?" It would be better if it was just more straight to the point and less fluff with so much vocabulary. Yeah, just so much fluff!

Some participants actually felt like the CCSS-M hindered and also helped ELLs. Participant 3 shared,

> So, the idea behind Common Core looks really good on paper, but it was designed to be like stepping stones. So, the kids are supposed to master one stair to move on to the next grade level. However, it's rushed, so they can't get enough time to

practice the skill. For example, we spent three days on time and the next time they see time again is in second grade. So I also think the standards help because with the standards, it allows students to see a lot more strategies to use. So they can pick which strategy they want to use versus the old way where you just add and subtract with the algorithm. They can use their learning of how to use the number lines and10 frames. They're able to pull at least one of those strategies to show how to add and how to subtract, which helps them.

Research Question 2

Research Question 2 asked the following: What are the elementary educators' perceptions of facilitators and barriers of implementing CCSS-M for ELLs? The interview protocol (see Appendix B) used in the study involved questions intended to provide participants with the opportunity to express their opinions regarding perceptions of facilitators and barriers of implementing CCSS-M for ELLs, adaptations they believe they may make to instruction, and modifications (if any) they make to assignments. During the interviews, I had conversations with the participants about their perceptions and beliefs about mathematics instruction when teaching ELLs using the CCSS-M, asked questions for more explanation of information, and identified the themes that emerged from their answers. The two themes that emerged to help connect the results of the study to Research Question 2 (RQ2) were Theme 4: Mathematical barriers of the CCSS-M for ELLs and Theme 5: Use of mathematical scaffolds, strategies, and interventions for ELLs.

Theme 4: Mathematical Barriers of CCSS-M for ELLs

A fourth theme that emerged from the data analysis to help connect the results of the study to RQ2 was mathematical barriers of the CCSS-M for ELLs. All participants in this doctoral study believed that there were issues with the standards which was a barrier to ELLs' mathematical understanding and competence with mathematics concepts. One of the barriers educators reported was English language or English language proficiency was a barrier because many of the students had difficulty with concepts and encountered problems with mathematics vocabulary. Many of the students had a firm grasp on basic number sense and were willing to take risks, but had difficulty understanding all the mathematics vocabulary without extensive assistance. The students are learning English as a second language and the mathematics materials are in English so it's hard for them to understand. As a result, English becomes a barrier for them in regards to the CCSS-M. As Participant 2 stated,

> They understand some of the vocabulary as long as it is being read to them. I also will ask are there any words when I'm reading that they do not understand. I try to explain to them what it means. Today, they did not understand the word collect. They had some knowledge of it, but they didn't understand exactly what it was. The person was a collector of fans and I had to explain to them was that a collector is like a person who collect stamps. So, one student gave me an excellent example of a Pokémon card and that's exactly what a collector is. They have a certain thing that they're collecting, but they have a variety of it of the items in their collection.

Participant 2 is an educator with 5-10 years of teaching experience and less than 5 years of experience teaching mathematics to ELLs and also less than 5 years using the CCSS-M. Another barrier that the educators reported was student comprehension and mathematical difficulties with word problems. Participant 5 stated,

> The language and I don't even know what to say sometimes with the wording. I guess you could say it's some vocabulary, but sometimes it's more than that. Just like if it's a two-step word problem, for example like trying to tell me you have to do this first before you can get to that. I also know they struggle with the language that is posed on the tests and things like that. The tests do provide visual manipulatives, a computer drawing, and calculator. I think when it comes to some of these many of these problems, which like word problems and things like that they still struggle with the language written into those tests.

Participant 5 is a classroom educator with 10-15 years teaching experience and the same amount of time teaching ELLs using the CCSS-M, but has been at the local site for less than 10 years. Some educators believed that some of the standards are unnecessarily difficult for the ELLs to understand which also caused a barrier with mathematical difficulties and comprehension of the problems. Participant 4 stated,

> I think some standards are easier than others because it's easier to attach something concrete to it, but other standards it's a little more difficult because it's more abstract and like I spoke about before having to decompose something, you have to recognize the difference between a rhombus or rectangle and having to recognize words like attributes that's difficult for them. Those are some things

> that they specifically need to know. For example, talking about attributes I can always say, "How are these shapes the same? What's similar about these two shapes?" They'll be okay, and eventually they'll get it. I also incorporate the word attribute because then they're tested on this standard and it specifically says, "Put the shapes that have the same attributes in the circle or something like that." It's like because the word attributes is there, but if you were in class, and I said, "Okay, let's group similar shapes or groups that share something". So the question doesn't have to be insanely worded in crazy rigorous way.

Participant 4 is an educator with 10-15 years of experience teaching, 10 -15 years at the local site, 10- 15 years teaching ELLs, and has been using the CCSS-M since they were implemented in 2015.

Theme 5: Use of Mathematical Scaffolds, Strategies, and Interventions for ELLs

A fifth theme that emerged from the data analysis to help connect the results of the study to RQ2 was the necessity for educators to provide scaffolds in order for the ELLs to better understand the CCSS-M. Scaffolding is a term used to describe appropriate assistance provided to students to learn what alone would have been too difficult for them to learn on their own. All educators stated that they had to scaffold mathematics materials by using different instructional strategies and interventions in order to meet the needs of their ELLs. Many of these ELL students are considered at a high risk academically because they come from low socioeconomic status and educational support at home since their families do not understand English and most of them speak primarily their native language. Some of the educators stated that they had to

make additional instructional adaptations or modifications to mathematics materials, activities, or assignments to help the ELLs complete them. Participant 11 stated, “Some assignments need to be reworded into simpler language easier for them to understand. Sometimes, I need to shorten the homework because the parents cannot help them at home.” Participant 11 is a specialist with 15 years or more of teaching experience, 5-10 years teaching mathematics to ELLs, and 5-10 years teaching ELLs using the CCSS-M.

Preteaching Vocabulary. Some of the educators reported that they used this instructional strategy to scaffold materials, activities, and/or assignments for the ELLs in their classrooms or on their caseloads. Pre-teaching vocabulary (also called frontloading) typically involves introducing a small set of key words and their definitions at the beginning of instruction which include both general-purpose vocabulary and content-specific vocabulary that are essential to an upcoming lesson or unit so that instruction will be more comprehensible for ELs because they are familiar with the words before they come up as part of instruction (Grapin, Llosa, Haas, & Lee, 2021).

Participant 6 stated,

> I guess honestly, it was all about the pictorial representation. I really understand not just myself in teaching, but I really, really, really saw the power of pictures. The visuals really help with the English Language Learners. So we did it today as well when we started a new unit. We have a list and I gave them a vocabulary list that I’m going to turn into a big poster. They got all the word definitions on a label and there’s a picture for each of the vocabulary terms.

Participant 7 shared,

> I will highlight key vocabulary terms, and try to connect those words to like addition and subtraction by making sure that they know this word, and then they can see the division symbol on the paper and pulling up the quantities. I have all of my ELLs seated right near my math board and on my math board, I have like huge addition, subtraction, multiplication and division symbols. On them is all of the words that mean each operation to so they can use that as a reference and see equal parts or divide will be on the division symbol.

Visual Aids. Some of the educators reported that they used this instructional strategy to scaffold materials, activities, and/or assignments for the ELLs in their classrooms or on their caseloads. Visual Aids are nonlinguistic modes of representation (e.g., pictures, charts, realia) that assist ELLs in comprehending or producing language and allows students to express their understanding through drawing instead of written language so they will be able to participate more fully in content area instruction with the support of nonlinguistic modes than through language alone (Grapin, Llosa, Haas, & Lee, 2021). Participant 9 stated,

> I help my ELL students understand math materials based on common core standards by explaining to them how they will use them to support their understanding in my problems. For example, using visuals. For example, when I give them a number line, I have to model for them how to use it. Also to let them understand that skipping forward is addition and skipping backward is subtraction. So I do a lot of modeling and use lot of visuals for the students.

Participant 3 shared,

> To help the students I use a lot of visuals. And so when they have those visuals and can see the pictures, it helps them understand the concepts more. That and also using videos helps them understand the concepts more versus just saying things in writing. So for example, with measurement, you have to use a lot of visuals to show small, long and tall, because if they just see the words, they're not going to understand what it means. My students use their math strategies a lot. So by them, being able to show their thoughts with visuals, it helps them a lot. So they use their visuals more.

Sentence Frames/Sentence Starters. Some of the educators reported that they used this instructional strategy to scaffold materials, activities, and/or assignments for the ELLs in their classrooms or on their caseloads. Sentence Frames/Sentence Starters are partial sentences that guide student to express ideas in writing or speaking because ELLs may not yet have the language to respond to writing prompts or to engage in academic discussions and can expose ELs to meaningful chunks of language that they can use independently in subsequent writings and discussions (Grapin, Llosa, Haas, & Lee, 2021). Participant 1 stated,

> With our sentence starters, sentence frames, we do that all the time. I have to, because that's the only way they're going to actually get what we're doing. If I put the sentence frame in front of them and we come up with the frames or the sentence starters, either one, we will come up with them together as a class, if we have enough time. Then we talk about what would be appropriate for the blank

areas and that is always a good thing to do. It helps them understand what is expected.

Participant 2 also explained,

With the sentence frames, it gives them the support how to word their response in answering. It gives them with using the word bank what words to use. With the math, they ask them about equation and to explain in their own words, how they arrived at the answer. For an example, I use the 10 frame to help me get my answer. I provided them with the sentence frame and word bank for 10 frame counting 10s and ones.

Graphic Organizers. Some of the educators reported that they used this instructional strategy to scaffold materials, activities, and/or assignments for the ELLs in their classrooms or on their caseloads. Graphic organizers are visual organizers that represent a way of showing a relationship among concepts on paper and is a way of breaking down information (Sunseri & Sunseri, 2019). One educator reported using graphic organizers in conjunction with several other strategies or interventions to help implement the CCSS-M for ELLs. Participant 4 shared,

So when I give them the words, I always pull a small group of students, I try to do at least two groups, but I always pull at least and we go over everything. We circle the words, and we take the word problem or whatever the problem is one sentence at a time. We pull out what's important and we draw a picture together as an example. We practice or if we do that on Monday, then they work on their own on Tuesday. They have the graphic organizers, sentence starters, word banks,

models, charts, and manipulatives are always available. Everyone kind of gets extra time so if I think it's going to take them 10 minutes to do I give them like 20 minutes. Sometimes, because most of time they are given like, maybe 15 minutes so I try to give them as much time as possible. I also try to have them use the visuals that are there so if you know you're supposed to do eight times eight, they should know one of our strategies they can use. There's a big chart in front of them, they can draw an array, they can try adding, try skip counting, or they can use equal groups. Just trying to encourage them to use everything that's around them to kind of get their ideas, and then think about writing on their paper.

Procedures to Assure Accuracy and Credibility of the Results

To ensure data was accurate and credible in this doctoral project study, data was collected from audio recorded interviews. To assure accuracy and credibility of the findings, member checking was used to check assumptions and to ensure internal validity. After all interviews were completed, participants were asked to member check the transcriptions for accuracy of interpretation of data in order to identify and resolve discrepancies. This approach, in most qualitative studies, involves taking data, analyses, interpretations, and conclusions back to the participants so that they can judge the accuracy and credibility of the account (Creswell & Poth, 2017). Member checking was also used to test the validity through the convergence of information since interviews are the only data source. Member checking occurred throughout the research process. Participants were asked by the personal email they provided to review draft findings to check

for the accuracy of their own data used in the findings. These brief reviews took no longer than 10 minutes.

In this doctoral project study, I employed the basic qualitative study research design to gain a deeper understanding of how classroom educators felt about the CCSS-M for ELLs. All participants were purposely selected to participate in this study. Participants who participated in this project study were classroom educators and specialists who have taught mathematics with ELLs using the CCSS-M for one year or more. The data collection process relied on one-on-one interviews and used a semi-structured interview protocol. This protocol allowed me to stay focused throughout the interview process to gain a deep understanding of elementary educators' perceptions of the implementation of the CCSS-M and math proficiency as well as their perceptions of facilitators and barriers of implementing CCSS-M for ELLs. After carefully analyzing the data, I created a table for all the themes that emerged. I listed the possible themes that were aligned or related with the research questions or to the framework. The table helped me organize and analyze data more accurately and effectively because I made a strong connection with the research questions.

Outcomes

During the data collection process of this qualitative study, I applied the conceptual framework based on Ernest's (1989) theory of knowledge, beliefs, and attitudes of the mathematics teacher. Ernest is a contributor to the social constructivist philosophy of mathematics and this study deals with educators' perceptions on mathematics curriculum standards. Ernest proposes a model of relationships between

beliefs and their impact on practice which constitutes the dynamic relationships among view of nature of mathematics, espoused and enacted models of learning mathematics, and espoused and enacted models of teaching mathematics. The problem that this study addressed was that classroom practices are not adequately preparing ELLs for academic success in the area of mathematics since the implementation of the CCSS-M, so there has been a lack of progress in mathematics proficiency for ELLs. With ELL students performing below the proficiency level assessed by the state-mandated tests in a high school at a school district in Florida. The purpose of this basic qualitative study was to gain a deeper understanding of elementary educators' perceptions of implementation of the CCSS-M and the impact on math proficiency for ELLs. To effectively implement the CCSS-M, participants need to feel prepared to use the CCSS-M with ELL students, and they would benefit from a professional development that provides strategies to address the language and mathematical barriers of this diverse group of students. If the participants were well-prepared to offer direct instruction with effective mathematics instruction that caters to the needs of the ELL students, the latter would be more likely to develop better mathematics skills and gain mathematics proficiency. Barrio (2017) confirmed that ELLs require an extra push in the learning of the English language. The author suggested that direct instruction in the mathematical academic language facilitate the understanding of abstract concepts and different types of vocabulary words. While participants shared their use of some mathematics instructional strategies specific to the ELL students, they would be more prepared to apply even more strategies if provided with targeted professional development that focused on mathematics strategies and

techniques that better address the needs of ELL students. Johnson and Wells (2017) suggested that ELLs with teachers who receive nine or more hours of professional development focused on ELL strategies had higher mathematics achievement than those students with teachers who had not attended such training and without this kind of support, existing achievement gaps may continue to widen. Additional support and development is needed, especially with the rapid growth in the ELL population in the district in this study. It is very crucial that ELL students are offered direct instruction about mathematics academic vocabulary to ensure their success mathematically. The most recent professional development program that was offered to the educators was about mathematics instruction, but it did not cover direct instructional strategies specifically for ELL students. Without an emphasis on mathematics instructional strategies for ELLs, mathematics educators will continue to struggle with how to help increase the mathematics proficiency of ELLs. Participants would also have the opportunity to collaborate with their colleagues during the professional development to design lessons with other educators on their grade level in case they want more time for cooperative planning. Because of the findings from the study, I created a project that will consist of a 3-day professional development series. The series is designed to support mathematics educators of ELLs in their implementation of CCSS-M with effective instructional strategies that promote mathematics proficiency through direct instruction and scaffolding. The findings from this study serve as a vehicle that will drive the development of the project. Additionally, monthly follow-up meetings may be scheduled to provide more support to the educators and to ensure that the mathematics strategies are

implemented. The findings of this doctoral project study demonstrated that the classroom educators and specialists felt that they needed more targeted professional development that would increase their knowledge and skills about effective mathematics instructional strategies to support the academic needs of ELLs. The majority of the participants felt that the Common Core Math Standards in regards to ELLs for their grade level or level of expertise were difficult to implement. Even participants who felt that the CCSS-M for ELLs was not difficult, demonstrated a need for a more targeted, differentiated, and personalized professional development.

Conclusion

In this basic qualitative study, I explored elementary educators' perceptions of implementation of the CCSS-M and the impact on math proficiency for ELLs. Using a basic qualitative research design, data was gathered through interviews to explore the following research questions: What are the elementary educators' perceptions of implementation of the CCSS-M and math proficiency for ELLs? What are the elementary educators' perceptions of facilitators and barriers of implementing CCSS-M for ELLs? Eight classroom educators and five specialists who taught mathematics to ELLs for at least one year using the CCSS-M were included in the sample of participants for this study.

Research Questions 1 and 2 were evaluated using thematic analysis to determine perceptions of implementation of the CCSS-M and the impact on math proficiency for ELLs. Findings from the coding yielded thought-provoking and anticipated results mainly focused on the fact that ELL students' mathematics proficiency was less than

their non-ELL counterparts due to their lack of understanding of the English language and academic mathematics vocabulary. Language plays a central role in teaching and learning. Kalinowski et al. (2019) suggested that academic achievement and educational attainment are lower for students who grow up in a setting in which the predominant language is not the language used in the institutions in which they are educated when compared with students who have access to this language at home. ELL students require more instruction, assistance, and ways to understand academic language and vocabulary than non-ELL students.

The five themes that emerged from the interviews were (a) educators' perceptions of difficulty to implement CCSS-M, (b) inadequate preparation to implement CCSS-M to ELLs (PD, (c) educators' perceptions of mathematics achievement of ELLs, (d) mathematical barriers of CCSS-M for ELLs, and (e) use of mathematical scaffolds, strategies, and interventions for ELLs. All participants in this doctoral study believed that there were issues with the standards which was a barrier to ELLs' mathematical understanding and competence with mathematics concepts. The participants seemed to agree that mathematics instruction needed to be more individualized per student, so each student can accomplish the same goals using the CCSS-M, whether ELL or non-ELL. The results indicated there was the necessity for educators to provide scaffolds in order for the ELLs to better understand the CCSS-M. The data revealed the perceptions of the mathematics achievement of ELLs in regards to the CCSS-M being more of hindrance than a help to students. After analyzing educators' responses, the data revealed that education, training, and experience did not make much difference in the way educators

felt about their ability to implement the CCSS-M for ELLs. Many of the educators who stated that the implementation of the CCSS-M was difficult for teaching ELLs had advanced degrees and more than 10 years of teaching experience. Additionally, some of the educators who stated that the implementation of the CCSS-M was difficult for teaching ELLs, continue to seek professional growth by attending professional development whenever possible. They believe that training and professional development can increase their knowledge and skills and help them become highly effective in teaching ELLs.

Section 2 described the methodology and results from the basic qualitative study for this project. Indeed, this section included the study research design, criteria, and justification for selecting participants, access to participants, data collection, data analysis, and validity and reliability procedures. A detailed narrative that explained the study findings was also in Section 2. I used the findings from the study to create a project to promote positive social change by better preparing educators to teach the CCSS-M to students who have English as a second language and to use effective mathematical instructional strategies to teach ELL students. Improvement in educators' use of effective mathematical instructional strategies when teaching ELL students may increase mathematics achievement as well as students' overall ability to reach proficiency in mathematics, which will promote positive social change. The description and details of the project are outlined in Section 3. Section 3 includes the description and goals of the project, the rationale behind it, the review of literature, theoretical framework, project description, and project implications.

Section 3: The Project

Introduction

The problem that I addressed in this project study was that classroom practices were not adequately preparing ELLs for academic success in the area of mathematics, and since the 2015 implementation of the CCSS-M, there has been a lack of progress in mathematics proficiency for ELLs at a high-poverty Title I elementary school with more than 42% ELL population. Thirteen K-5 classroom educators or specialists who taught mathematics to ELLs using the CCSS-M for least 1 year participated in the study. The educators who participated also had from 5 to 15 years or more of teaching experience. The results of this doctoral study revealed that educators felt that it was difficult to implement the CCSS-M for the ELLs that they teach. Some of the educators who believed that it was not difficult to implement the CCSS-M and the ones who did believe it was difficult reported they wanted to engage in professional development that provides them with instructional strategies to address the mathematical needs of their ELLs. Additionally, educators reported different levels of preparation to implement the CCSS-M for ELLs. Educators also reported mathematical barriers of the CCSS-M for ELLs. The results of this study revealed that due to language barriers, there is a need to better prepare educators to implement the CCSS-M so that there is an increase in mathematics proficiency for ELLs. This can be accomplished by providing a targeted mathematics professional development (PD) for educators in kindergarten–fifth grade who work with ELL students. The purpose of this virtual mathematics PD would be to help educators (a) increase preparation to implement the CCSS-M by using the WIDA English Language

Development Standards Framework when working with ELLs, (b) increase knowledge of strategies/interventions for effective vocabulary instruction for ELLs, and (c) provide effective instructional strategies and interventions for word problems that not only promote mathematics proficiency, but also linguistic skills. In Section 3, I describe the purpose and benefits of the project. Martin et al. (2019) suggested that when professional development aligns with local school improvement efforts, there is greater impact on classroom practices because of the cohesive nature of their PD activities. I opted for the targeted mathematics PD with ELL mathematics strategies that would help with the language barriers because the educators stated that they felt they had the abilities to teach ELLs with strategies they've used for years and continue to engage in PD, but they do not feel it provides them with the tools they need to become successful teaching many of the common core math standards. To address this issue, the PD is targeted to educators of ELLs and features mathematics techniques to help make implementation more comfortable regardless of prior training or experience. If educators have the necessary knowledge, skills, and tools, they can develop mathematics lesson plans and learning activities that promote student achievement regardless of English language skills for ELLs. For educators to become more effective in implementing the CCSS-M for ELL students, they need a PD to increase their knowledge and skills about language and effective instructional strategies in order to meet the academic and linguistic needs of ELLs.

Rationale

The rational for developing this 3-day virtual mathematics PD is to increase educators' knowledge and skills in order to promote mathematics proficiency of ELLs by meeting linguistic needs in mathematics instruction. This mathematics PD is virtual due to COVID-19 protocols in place within the school district where the project study was conducted. In this mathematics PD, educators will be provided with information, strategies, and interventions necessary to be more prepared to implement the CCSS-M for ELLs. It is important that educators are prepared to address the academic and linguistic needs of ELLs in mathematics to facilitate the learning process and to close the achievement gap with non-ELLs. Smith and Robinson (2020) suggested that success in all disciplines requires literacy skills in order to read, write, and speak about complex content, so content-area literacy requires content-area teachers to be trained in literacy skills for their discipline as well as confident in their ability to teach and evaluate students as they use these skills. PD can help educators become highly effective in teaching not only core subjects, but also highly effective in addressing the linguistic needs of ELLs. The data I gathered through this doctoral project study suggested that even with different levels of mathematics PD, there was still a gap between the educators' preparation and practice in the mathematics classroom. Educators who participated in this doctoral study believed that that they did not feel very prepared to implement the CCSS-M for ELLs regardless of teaching experience and experience teaching mathematics to ELLs. If there is to be a close of the achievement gap between ELLs and non-ELLs, educators need to have the necessary preparation and skills to

effectively instruct ELLs the mathematics using the CCSS. Therefore, it is important that meaningful and helpful PD in order to improve classroom instruction in mathematics for ELLs. The 3-day PD I describe in Section 3 will be provided to K-5 classroom educators and specialists who teach mathematics to ELLs in order to expand and to increase their preparation, knowledge, and skills to implement the CCSS-M. In the first day, educators will learn how to promote the linguistic needs of ELLs using the 2020 edition of WIDA English Language Development Standards Framework, which serves as a resource for planning and implementing language instruction and assessment for multilingual learners as they learn academic content. In the second day, educators will learn about strategies and interventions for effective vocabulary instruction. In the third day, educators will learn about the implementation of effective instructional strategies and interventions for word problems that will support the mathematics needs of ELL students in the mainstream classroom.

Review of the Literature

In this doctoral project study, I investigated elementary educators' perceptions of implementation of the CCSS-M and mathematics proficiency for ELLs. As a result, I developed a 3-day PD from the findings from Section 2. In this section, I present an intensive literature review that focused on the sociocultural theory of cognitive development by Lev Vygotsky (1978) with an emphasis on mathematics instruction. To conduct this literature review successfully, I gathered information through the Walden University's Online Library. This literature review is comprised of peer-reviewed journal articles, which were identified via different databases over the period from 2017 and

beyond. The databases used were Education Research, ERIC, ProQuest, and SAGE Journals, and Taylor and Francis Online. The keywords I used for this literature review were mathematics for ells, professional development, teachers' knowledge and skills for teachers of English language learners, effective teachers for English language learners, WIDA standards, mathematics difficulties for ELLs, and word problems for ELLs.

Theoretical Framework

The professional development project will be based the founder of socio-cultural theory of cognitive development, Vygotsky (1978, 1989). This sociocultural view of language and learning is based on Vygotsky's key idea that interaction facilitates language learning and leads to language acquisition. Through this interaction, learning gradually and continuously takes place but varies from one culture to the next. All learning is considered a social process founded in sociocultural settings, and language is a mediator of meaning (Vygotsky, 1978). Vygotsky (1989) argued that "social instruction actually produces new, elaborate, advanced psychological processes that are unavailable to the organism working in isolation" (p. 61). Vygotsky (1978) believed that language develops from social interactions and for communication purposes. He saw that students internalized complex ideas, but he extended the general constructivist approach by arguing that the internalization of knowledge could be better achieved when students were guided by good, analytic questions posed by the teacher (Vygotsky, 1978). Vygotsky (1978) argued that an expert teacher is central to Vygotskian theory and the teacher's role is to identify the student's current mode of representation and then through the use of good discourse, questioning or learning situations, provoke the student to move

forward in thinking. Vygotsky (1987) emphasized the importance of concrete goal-directed activities in his discussions of development. What this means for professional development is that it has to be fundamentally linked in sustained and intentional ways to the everyday activities of teaching and learning that goes on in the classroom. The professional development program will offer support to educators, an opportunity to learn with other educators, as well as time for reflection and feedback. This supports Vygotsky's theory because the social interaction with the presenter and each other will help them continue to learn new concepts. Many of the educators in the study expressed concern about not being prepared to teach the ELL students properly using the CCSS-M. The recognition of a student's representation or thinking was seen as his/her zone of proximal development and the teacher's actions for supporting learning was described as scaffolding. The zone of proximal development has been defined as

> the distance between the actual developmental level as determined by independent problem solving and the level of potential development as determined through problem-solving under adult guidance, or in collaboration with more capable peers. (Vygotsky, 1978, p. 86)

Vygotsky believed that when a student is in the zone of proximal development for a particular task, providing the appropriate assistance will give the student enough of a "boost" to achieve the task. To assist a person to move through the zone of proximal development, educators are encouraged to focus on three important components which aid the learning process:

- the presence of someone with knowledge and skills beyond that of the learner (a more knowledgeable other)
- social interactions with a skillful tutor that allow the learner to observe and practice their skills
- scaffolding, or supportive activities provided by the educator, or more competent peer, to support the student as he or she is led through the zone of proximal development (McLeod, 2019)

When working in the zone of proximal development particular attention is paid to the language being used since the language of the student influences how he will interpret and build understandings (Vygotsky, 1978). The data showed that teachers believed that language was a barrier to ELLs in mathematics using the CCSS-M. Within a Vygotskian approach, it is seen to be important that teachers use and build considerable language and communication opportunities within the classroom environment in order to build mathematical understandings (Vygotsky, 1978). The sociocultural theory emphasizes the social interaction that occurs during the training sessions as the main mechanism for teacher development. This social interaction of sharing and justifying their mathematical reasoning and strategies with their peers is what Vygotsky calls socially constructing new knowledge−they are developing the cognitive skills needed to learn new information (Wertsch, 1984). The educators would learn more if they had the opportunity to interact with other peers who are having the same difficulties using the CCSS-M for ELLs. Eun, (2019) suggested:

> Furthermore, this theory would argue for the use of various mediators to guide the internalization process. The more competent (e.g., the presenter or workshop leaders) should mediate the development of the less competent (i.e., the teacher participants engaging in professional development) via technical tools and other symbolic means.

As I collected data for my doctoral project study, the data revealed that, regardless of teaching experience, many educators felt the offered PD opportunities were not aligned to their professional needs and still felt unprepared to implement the CCSS-M for ELLs. As a result, they wanted a PD that would provide them with the mathematical instructional strategies needed to support the academic needs of their ELLs. This project PD was created based on the findings from Section 2. Vygotsky's sociocultural theory of cognitive development guided how this project was created because social interaction is an important part of this theory. During this mathematics PD, participants would have several opportunities to use social interaction to collaborate with their colleagues to design lessons with other educators on their grade level. Social interaction can also be used by participants in case they want more time for cooperative planning with other colleagues during the PD.

Effective PD is a key component for students' success because educators learn how to implement different teaching strategies in the classroom and are able to add more to their "teacher toolbox" of ideas. Educators can gain more valuable information to add to their educational expertise which will help them reach all students academically, emotionally, and socially. When educators receive enough hours of effective professional

development, they gain different instructional strategies that promotes student achievement. According to Guskey (2000), there are seven major models of professional development which relies on large group presentations and discussions, workshops, seminars, colloquia, demonstrations, role-playing, simulations, and microteaching.

Professional Development

The findings of this doctoral project study revealed inadequate preparation to implement CCSS-M to ELLs among most of the participants with or without professional development. Sanford et al. (2020) suggested four recommendations for supporting the language needs of ELLs: (a) an intense focus on teaching academic vocabulary words using a variety of instructional approaches, (b) systematic integration of English language instruction into content-area teaching, (c) regular opportunities for students to develop written and language skills, and (d) small-group instruction focused on English language development. A one-time PD delivered to a large group of teachers is unlikely to influence classroom practice (Darling-Hammond et al., 2017). When structured follow-up opportunities are provided, they are associated with beneficial outcomes on teachers' knowledge, skills, and practices as well as student outcomes (Basma & Savage, 2018). Babinski et al. (2018) suggested that while the intent and need for the PD are clear, the intended outcome is rarely reached—that is, instructional adjustments that significantly impact student learning outcomes are rarely attained.

The increasing diversity in classrooms throughout the United States calls for teachers who are culturally competent and have quality professional development in working with DLLs in order to ensure children from diverse groups are receiving

equitable and high-quality education (Ramirez et al., 2019). Besterman et al. (2018) suggested that the rising numbers of students classified as ELLs in the K-12 education system has amplified national attention on helping teachers support the academic success of language minority students and despite the increased focus on this group of learners, teachers are not yet well prepared to meet the needs of this emergent learner population. Overall, teachers feel prepared to teach the CCSS or CCSSM, but this level of preparedness varied by school location as well as when the focus of that instruction involves particular student groups such as English-language learners (Davis et al.,2017). There is a need for schools and teachers to create inclusive and equitable mathematics classrooms that requires all teachers to be prepared to be able to support these students in their classrooms, including content teachers, like mathematics teachers, but few teachers have had content-specific preparation to support ELLs in their classrooms effectively (Roberts, 2020). Shea et al. (2018) suggested that given that many teachers in U.S. schools are underprepared to meet the linguistic, academic and cultural needs of English learners, professional development that targets the integration of language and content is particularly important to increase student achievement in content-area literacy and improve student comprehension and production of academic vocabulary.

To be able to support ELLs effectively in their classes, teachers of science and mathematics require particular forms of theoretical and practical knowledge including pedagogical content knowledge of how to promote scientific understanding and inquiry in their classes so they must learn techniques for helping their students to develop a deep understanding of concepts, use evidence while reasoning logically, conduct thoughtful

investigations, and provide thorough justifications for their conclusions. In mathematics education, the adoption of the CCSS-M by many states in the United States continued the ongoing emphasis of designing and implementing professional development projects aimed at preparing teachers to include more opportunities for problem solving, reasoning, and high-level mathematical tasks in their classrooms (Martin et al., 2019). Educator preparation in comprehension strategy instruction (CSI) is essential to meeting the needs of ELLs in contemporary schools. Although many educators receive PD with CSI in reading, very few receive preparation with CSI in mathematics and problem solving for ELLs (Orosco & Abdulrahim, 2018). The literature agrees that there is a need to improve teacher preparation programs for ELLs in the United States. A majority of U.S. teachers and teachers-to-be in mathematics courses specifically struggle to adequately prepare ELLs for academic success. This is because they have little to no training to support ELLs and may lack resources.

Educators' Perceptions of CCSS-M Implementation Difficulties for ELLs

The findings of this project study indicated that the majority of the participants believed that it was difficult to implement the CCSS-M for ELLs. The CCSS-M go beyond specifying mathematical content and also include eight Standards for Mathematical Practice, with an emphasis on applying mathematical concepts and skills in the context of authentic problems and understanding concepts rather than merely follow a sequence of procedures. The CCSS for mathematics articulate eight mathematical practices that are inherently multimodal so students must also become proficient with conventional representations of mathematical ideas, such as coordinate planes and

algebraic notation and such disciplinary ways of making meaning are critical to engaging in mathematical practices as well as those practices traditionally considered language based like constructing viable arguments (Grapin, 2019). Language standards need to define what language proficiency in a given language entails and accomplishing this task requires (a) a view of a language as an autonomous entity, pure and distinct from other languages (b) the separation of language use into either the "four skills" (reading, writing, listening, and speaking) or the receptive and productive domains and (c) the setting of normative expectations related to more formal uses of a standardized language variety so effective instruction also has to endorse multilingual students' dynamic language practices, which involve fluid movement across multiple named languages (Molle & Wilfrid, 2021). Leung and Valdés (2019) suggested that language standards must also support effective instruction for multilingual students and reflect the multimodal, multilingual, and contextual nature of language use so they need to promote a view of language as a tool for sense making and position the "four skills" as inextricably connected and interdependent. Unlike language domains and proficiency levels, which fall squarely within the realm of EL education, alignment of ELP standards with content standards is less likely to be familiar to EL educators, since it requires extensive knowledge of multiple sets of content standards and underlying disciplinary norms so the challenge of ensuring alignment is intensified by the arrival of college and career-ready standards that are both academically rigorous and language intensive with all students, especially ELLs (Lee, 2019).Savage et al. (2018) suggested that the high expectations of a standards-based curriculum such as CCSS-M to significantly impact the achievement of

all students creates classroom challenges for many teachers, particularly teachers of African American and Hispanic American students.

Despite the demands of the Common Core State Standards, content-area teachers report that they lack the resources or skills to include classroom practices helpful to Emerging Bilingual (EB) students who are acquiring a second language and most eventually will become bilingual, but not replacing their first language with their second language (Sarris & Chavez, 2020). Song & Coppersmith (2020) stated that as many mathematics ideas and concepts do not translate easily, ELL teachers need appropriate mathematics pedagogical skills for instructing students in technical mathematics discourses, help ELLs understand that there are diverse registers, and that they have to learn when to use particular mathematical languages (e.g., everyday versus technical mathematical language) with proper reasoning processes.

Teachers with ELs need to receive more systematic and intensive preparation on what it means to possess and demonstrate linguistically responsive teaching competences, which embrace pedagogical and cultural competences (Kim et al., 2018). The CCSS means mathematics can no longer be conceived of and taught as a set of discrete skills and the CCSS require teachers in all content areas to know how to teach all students how to read, write, and critically discuss the types of extended texts students are routinely required to read and write in school as a way of developing students' content knowledge and disciplinary literacies (Accurso et al., 2017). Current research on second language acquisition and mathematics learning shows that learners go through similar processes when acquiring both subjects, namely they need to actively use comprehensible input, to

process language through interactions, to produce new linguistic elements in meaningful contexts and to receive feedback to integrate new knowledge into their existing knowledge systems (Ledibane et al., 2018). The literature is in agreement with the findings that the CCSS-M is difficult to implement for ELLs due to language barriers and demands of the standards.

Mathematical Barriers of CCSS-M for ELLs

The participants in this project study reported language, vocabulary, and word problems as mathematical barriers to implementing the CCSS-M for ELLs. Song & Coppersmith (2020) stated that the new assessments for Common Core State Standards require "students to show their work and explain it" and in order for ELLs to develop the skillset necessary to do so, teachers need to support them when they solve equations and word problems in class develop procedural demands under mathematics content competence. The challenges for many ELLs are not only overcoming a language barrier, but also achieving academically and Spanish-speaking ELLs make up a large percentage of the ELL population and represent a substantial number of students who do not demonstrate proficiency in mathematics (Orosco, & Abdulrahim, 2017). Buono & Jang (2021) suggested that much like language, mathematics is a symbolic system in which elements have abstract, but precise and distinct meaning so understanding mathematical relations requires the cognitive representation and manipulation of a basic system of number-symbols.

The CCSS for mathematics articulate eight mathematical practices that are inherently multimodal; one practice expects that students use appropriate tools

strategically, where tools include modes such as tables, graphs, flowcharts, and formulas so to carry out this practice, students must consider the affordances and limitations of different modes in deciding when and how to use them (Grapin, 2019). The language of mathematics not only requires a list of vocabulary, grammatical patterns, and equations with numbers and/or words with precise meanings, but also requires communicative competence or mathematics discourse sufficient for active participation in meta[cognitive]-mathematical thinking and reasoning procedures (Song & Coppersmith, 2020). Linguistic complexity of word problems, which pose reading comprehension challenges, is one important factor that presents more difficulty for ELs when compared with their English-proficient peers with comparable math ability (Kong and Swanson 2019). Valley (2019) concluded that while math problems help some students' comprehension, the written format in English combined with the students' lower English reading ACCESS scores prevented many from benefiting in regards to comprehension and that daily implementation of math word problems in the classroom greatly increased use and understanding of English math vocabulary.

Word problems (WP) can be challenging because students must be able to transform linguistic (syntax) and schematic (problem structure) content into a quantitative, graphic, or symbolic representation and then apply a strategy to solve the problem, so finding a solution might entail applying a meta-cognitive strategy that specifies steps in the WP process and includes a self-regulation aspect, such as asking oneself questions to determine the problem and extract relevant information (Shin et al., 2021). Powell et al. (2018) suggested that mathematics vocabulary may present

challenges for many students and the volume of mathematics-vocabulary terms complicates the learning of mathematics vocabulary but so does the complexity of mathematics-vocabulary terms.

Difficulties in text comprehension have been consistently documented in the literature for ELL children with Spanish as a first language and text comprehension significantly predicts performance on math problem-solving measures (Swanson et al., 2019). Students may experience difficulty because mathematics-vocabulary terms (a) may have a shared meaning in mathematics and general English, (b) may have different meanings in mathematics and general English, (c) may have multiple meanings in mathematics, (d) may have a shared meaning with another content area, (e) may be homonyms with other terms, or (f) may be confused with terms from another language (Powell et al., 2020). Kangas, 2019 suggested ELLs experience a dually challenging task of learning the language along with academic content. Although they may appear to be verbally fluent in English, they may still struggle with complex academic material that requires producing specific academic discourse or vocabulary that differs from social language in use (Morita-Mullaney & Stallings, 2018. The literature supported the findings regarding language, vocabulary, and word problems posing a barrier for ELLs.

Use of Mathematical Scaffolds, Strategies, and Interventions for ELLs

The participants in the doctoral study reported using scaffolds as instructional strategies/interventions to meet the needs of their ELLs. Gomez et al. (2020) suggested that many English learners struggle with learning English because they do not yet have the basics and foundations of their native language, making the building and scaffolding

from those missing basics much more difficult because children searching within their schema for terms in their language will not be successful if their native vocabulary is lacking (i.e., children trying to interpret the term denominator when they have yet to learn it in their native language). Mathematics instruction that uses multiple types of mathematical representations reinforces the learning of concepts, processes, language, and norms of mathematical communication so making mathematical thinking visible can play a central role in enriching mathematics education for ELLs (Nikula et al., 2019). Scholars in the fields of English learning and bilingual education have recommended the use of instructional scaffolds to help convey meaning to students at varying levels of English proficiency (Lei et al., 2020). Moleko and Mosimege (2020) suggested that challenges related to lack of English proficiency, limited knowledge of mathematical vocabulary, the effects of "out of context" meanings and lack of understanding mathematical language and structure to be the sources of difficulty for teaching and learning mathematics word problems so the learners' experiences should be regarded as important guidelines for informing better teaching of mathematics word problems. In a bilingual educational setting, even when mathematical word problems are presented in one's first language, students may still perform poorly if cognitive constraints such as working memory limitations are not taken into consideration because both language and mode of instruction matter.

For students with inadequate English proficiency, it is necessary to provide linguistically related support as well as content-specific interventions in a timely manner to promote academic growth and address persistent achievement gaps in mathematics

among ELs. (de Araujo, Roberts, Willey, & Zahner, 2018). Luevano and Collins (2020) examined the effectiveness of culturally appropriate problem-solving instruction (CAPSI) incorporating elements from schema instruction, video modeling, and vocabulary instruction as well as explicitly incorporating culturally relevant information and the students' native language into math problem-solving instruction throughout the duration of intervention implementation that resulted in problem solving and math vocabulary acquisition improvements. Goodrich and Namkung (2019) suggested that there was a significant direct effect of Spanish expressive vocabulary on English reading comprehension and the possibility for interdependence of literacy-related skills across languages because the results of analysis of word-problem solving outcomes indicated that decoding and expressive vocabulary knowledge were equally predictive of reading comprehension and word-problem solving skills so these findings have important implications for assessment and intervention of reading and mathematics skills of DLLs.

Visual scaffolding provides the support that includes images, graphic organizers, and words that mediate learning beyond just verbal and text-based literacy and language because it serves the purpose of supporting learners' access to content knowledge or specifically making the target content more comprehensible (ESL workshop, 2019). Xin et al. (2020) recommended the use of instructional scaffolds to support the learning of diverse student populations involving ELs with different levels of English proficiency. Scaffolds are the support teachers and students use throughout the learning process to facilitate more effective and/or efficient mastery of targeted knowledge. Lei et al. (2018) described four types of instructional scaffolds that teachers can use and students can

appropriate to create understanding around target content which include visual, linguistic, interactive and kinesthetic scaffolds. Many education scholars agree that high quality mathematics lessons should encourage students to use and coordinate resources, such as visual/physical materials, embodied actions, and linguistic representations, to support communication and reflection Saxe & Sussman (2019).

Paraphrasing information has been identified an effective strategy to improve problem-solving accuracy. Kong and Swanson (2019), found that paraphrasing relevant information and constructing the appropriate problem statement improved third grade ELL students' problem- solving performance when compared to baseline conditions and although the magnitude of the effect sizes were in the low to moderate range, a visual analysis indicated that all students displayed in problem-solving accuracy as a function of the paraphrasing intervention. Most interventions follow best practices with a core feature of explicit instruction. The research demonstrates that ELL learning and instructional approaches toward ELL students' learning must be broken down significantly—into explicit, systematic, comprehensive, and organized segments, focused on comprehensive skill building and acquisition—in order to improve learning outcomes (Arizmendi et al., 2021). The findings are in agreement with the literature in regards to the need to provide scaffolds, strategies, and interventions for ELLs during mathematics instruction.

Educators' Perceptions of the Mathematics Achievement of ELLs

The majority of participants in the project study reported the CCSS-M hindered the progress of their ELLs and the mathematics proficiency was low. According to the CCSS, mathematically proficient students should be able to apply the mathematics they

know to solve problems arising in everyday life, society, and the workplace through the use of equations, graphs, computer tools, reading, and writing (Accurso et al., 2017). One way to provide equal access to the curriculum is through educators understanding ELLs from a holistic perspective taking into consideration linguistic, academic, cognitive and socio-cultural aspects of children that may impact their schooling because factors that may impact their' educational achievement, include previous schooling and literacy, and language proficiency in their first and second language so Instruction and interactions with ELLs should be modified according to the students' levels of English proficiency (Alexandrowicz, 2021). The complexity of teaching diverse groups of ELL students within the mainstream classroom who vary not only by language and culture but also by multiple, interrelated factors such as levels of English language proficiency and literacy, native language schooling, socioeconomic status, life experiences in the students' home countries, and immigration (Von Esch & Kavanagh, 2018).

Saxe &Sussman, (2019) stated that national and state assessments show that English learners (ELs) in elementary and secondary grades score lower in mathematics compared with their matched English proficient (EP) peers. Students classified as ELs show lower test scores in mathematics relative to EP students at fourth and eighth grades on both national assessments and state assessments (Carnoy & García, 2017). The EL-EP achievement gap points to persistent inequities in mathematics learning opportunities for ELs, and educators are only beginning to understand how to address concerns about differential opportunities (Jensen, 2017). Soland, & Sandilos (2021) suggested that due in part to the challenges associated with learning a new language, ELLs typically begin

school with lower achievement than their non-ELL peers, and those achievement gaps often close slowly if at all. ELLs have been found to lag behind their non-ELL peers on large-scale, standardized assessments, largely due to the high language demand in content areas, such as mathematics, science, reading comprehension, writing, and social studies (Liu & Bradley, 2021). The literature is in agreement with the findings from this doctoral study regarding the perceptions of the participants about the mathematics proficiency of ELLs.

Project Description

The developed professional development will be facilitated virtually in the form of a 3-day training for K-5 classroom educators and specialists who teach mathematics using the CCSS-M for ELLs. The COVID-19 pandemic has forced all meetings and professional developments at the local site to be done virtually. The enhanced focus on online teacher professional development (oTPD) can be seen in conjunction with the economy, is more accessible and flexible, and provides new opportunities for distance collaboration (Lay et al., 2020). This project will be facilitated over the course of three PD days already built into the school calendar or at the beginning of the school year to prepare educators to implement the CCSS-M for ELLs in order to effectively meet the needs of these culturally and linguistically diverse students in mathematics. There is a detailed description of how the project will work (see Appendix A). The purpose of this mathematics PD to help educators increase their preparation to implement the CCSS-M by using the WIDA English Language Development Standards Framework, increase knowledge of strategies/interventions for effective vocabulary instruction for ELLs, and

provide effective instructional strategies and interventions for word problems that not only promote mathematics proficiency, but also linguistic skills. Educators will learn how to use the WIDA framework in conjunction with the CCSS-M to plan engaging activities and develop lesson plans that promote mathematics content knowledge that meets the instructional and linguistic needs of ELLs in order to increase mathematics proficiency. This mathematics PD has been developed from the findings of the doctoral project study in section 2. In this mathematics PD, participants will learn (a) about the WIDA English Language Development Standards Framework, (b) strategies and interventions for effective vocabulary instruction, and (c) the implementation of effective instructional strategies and interventions for word problems that will support the mathematics needs of ELL students. One of the main goals of this mathematics PD is help prepare K-5 educators to implement the CCSS-M by learning how to develop meaningful lesson plans and activities that promote mathematics proficiency as well as meet the linguistic needs of ELLs.

Resources and Existing Supports

The resources needed to successfully implement this professional development will be available virtually via Zoom and other online tools. This will be an advantage to the local site because it will be cost effective to implement and not need any funds since it will be virtual. While there are challenges to implementing virtual learning, virtual teacher PD can be widely adaptable and replicable for many institutions, especially in situations in which distance or finances deter in-person participation (Chandran et al., 2021). The virtual platform of the mathematics PD will also be in line with COVID-19

protocols and ensure the safety of the participants and presenters. The potential resources this PD will need to successfully implement it are: laptops or other device (iPad, tablet, etc.), WIFI or wireless internet access, access to the district mathematics curriculum, the CCSS-M, and the WIDA English Language Development Standards Framework, 2020 Edition. Participants will need a fully charged laptop to access the district mathematics curriculum and CCSS-M. Participants will receive an online/electronic copy of the WIDA English Language Development Standards Framework, Sample English language proficiency levels, instructional strategies Google Slides handouts, and any other resources shared during the mathematics PD (Appendix A). Participants can feel free to download, save, and or print any of the resources or handouts from the PD sessions. Additionally, the participants will also have the option to request electronic copies of any and all resources, handouts, or presentations used by the presenter of the mathematics PD. The requested resources, handouts, or presentations will be sent to participants via email and/or shared with them via Google Slides or Docs.

Proposal for Implementation

I propose to implement this professional development plan in three days over the course of three PD days already built into the school calendar or at the beginning of the school year to increase educators' knowledge to prepare to implement the CCSS-M by using the WIDA English Language Development Standards Framework, use strategies/interventions for effective vocabulary instruction for ELLs, and use effective instructional strategies and interventions for word problems that not only promote mathematics proficiency, but also linguistic skills. Educators will be given the

opportunity to attend this PD over the course of three PD days already built into the school calendar or during the first week of teacher duty days which requires school principals to provide educators with PD to prepare them for the school year. Additionally, there will be monthly Professional Learning Experience (PLEs) meetings to monitor the implementation of instructional strategies/interventions that support the mathematics and linguistic needs of ELL students. Professional learning experiences (PLEs) provide educators with opportunities to improve their understanding of mathematics content and teaching practices. Based on the feedback gathered from educators, additional PD opportunities or materials will be created to enhance this PD for future presentations.

Project Evaluation Plan

When implementing a new professional development opportunity, it is important to evaluate its implementation, effectiveness, and to adjust the implementation as needed for better results. In this professional development implementation, there will be formative and summative evaluations to determine the effectiveness for participants, presenter, and presentations. These evaluations will be an important component of the effectiveness of this professional development because I will be able to make a determination of what is effective or beneficial and what needs to be revised or changed. The project evaluations will address weaknesses and strengths of the PD created to increase K-5 educators' knowledge of the WIDA English Language Development Standards Framework, strategies/interventions for effective vocabulary instruction for ELLs, and effective instructional strategies and interventions for word problems for ELLs. There will be a formative evaluation at the beginning of the professional

development implementation and a summative evaluation at the end to improve future presentations of this PD. In addition to evaluation in the beginning and end of the PD, participants will be asked to complete a daily formative evaluation in order to get determine how informative or beneficial educators found this PD. The information will be used to make revisions to PD content as well as plan possible future PD opportunities. All of the evaluations (formative, summative, daily) will be confidential and only shared for informational purposes.

Formative Evaluation

The first evaluation for the professional development will be the formative evaluation (Day 1). The formative evaluation will be given to participants at the beginning of the first session to gather information regarding educators' abilities, knowledge and skills teaching and working with ELLs in mathematics using the CCSS-M (see Appendix A). The purpose of this formative evaluation is to assess what mathematics instructional knowledge and skills educators already possess regarding ELLs in order to enhance future professional development presentations. Educators will provide feedback about how confident or knowledgeable they feel about working with ELLs in mathematics instruction. The results from this formative evaluation at the beginning will used to guide the PD and will also be compared to the summative evaluation at the end in an effort to gather data about perceptions of educators and also help to plan future meetings and opportunities upon the completion of this professional development.

Summative Evaluation

The second evaluation will be the summative evaluation which will be given to participants at the end of the last session (Day 3). In the summative evaluation participants will provide feedback about the presenter and the presentations (professional development). In this evaluation, participants will provide feedback about the way the material was presented, effectiveness of the professional development, organization, and an overall rate of the presenter. The feedback gathered in this evaluation will help improve the implementation of future presentations to ensure educators are receiving high-quality professional development to foster their knowledge and skills for mathematics instruction of ELLs. In this evaluation, participants will provide information regarding whether this professional development increased their knowledge and skills about teaching ELLs. Based on the data collected, future presentations will be adjusted to enhance the learning and expertise of participants. The evaluations will be an important part of this PD because educators will provide feedback as to how presentations might be improved for future offerings. Participants will also complete an evaluation daily via an "exit ticket" to provide feedback to the presenter. The purpose of the PD is to enhance their knowledge and skills, so they can prepare engaging, meaningful and appropriate lesson and activities for their ELLs during mathematics instruction. The project evaluation will provide useful information as to whether participants are learning mathematics instructional techniques through the PD sessions to help them feel more prepared to implement the CCSS-M for ELLs. Additionally, these evaluations will test

the effectiveness of the project and to make recommendations for future planning, improvements, and implementations of the project.

Project Implications

When implementing a professional development, there is an anticipation of some barriers that may arise. Two potential barriers that may arise in the implementation of this PD are finding adequate time to implement the project and educators' willingness to invest the time and energy into it. At the beginning of the school year, the educators have to return for at least 7 duty days which includes extensive mathematics PD. Additionally, educators need to set up their classrooms for the upcoming school year and although the PD is virtual, they may feel this mathematics PD will be additional work for them. Another barrier will be that educators may not invest the time and energy into the proposed mathematics PD. If educators are overwhelmed with other things and not willing to actively participate in this mathematics PD, the information will not be as useful as it should be. It is imperative that educators participate willingly in this mathematics PD with a positive mindset and commit to it in order to have a successful implementation in their classrooms. A prerequisite for professional development is that teachers are willing to participate and engage both cognitively and emotionally in the activity and also that the teachers find the activity meaningful is also essential in these professional development processes (Lantz-Andersson et al., 2018). This project was developed from the findings in Section 2 which revealed that a more targeted mathematics PD was needed to prepare educators to work with ELLs in order to address their mathematics and linguistic needs. Educators who teach mathematics to ELL

students using the CCSS-M need a high-quality PD that will increase their preparation, knowledge, and skills. In this PD, educators will learn about the WIDA English Language Development Standards Framework, strategies and interventions for effective vocabulary instruction, and effective instructional strategies and interventions for word problems that will support the mathematics needs of ELL students. Wyatt et al. (2021) explained that content teachers also need to be aware of the linguistic needs of their ELLs and know how to create the kind of environment in which academic language learning can develop together with the learning of science and mathematics, so if the linguistic needs of ELLs are neglected, content learning will likely be inhibited. K-5 mathematics educators and specialists who lack knowledge and skills in regards to English as a Second Language (ESL), may overlook the importance of ELL students' speaking, listening, writing, and reading abilities in their academic and linguistic progress towards mathematics proficiency. This PD will provide educators with the necessary knowledge and skills to effectively instruct ELL students in mathematics using the CCSS-M.

Section 4: Reflections and Conclusions

Project Strengths and Limitations

Strengths

This PD is intended to help the district mathematics curriculum writers, elementary school administrators, and mathematics educators/specialists increase their knowledge and skills to meet the mathematics and linguistic needs of their ELLs in order to more confidently implement the CCSS-M. This should help increase the mathematics proficiency of ELLs and close the achievement gap with non-ELLs. By addressing the professional needs of elementary educators who work with these culturally and diverse students, mathematics proficiency and student achievement can increase. Through this PD, educators can learn to plan developmentally appropriate lesson plans and learning activities that target both mathematics content knowledge and the linguistic needs of ELLs.

The data collected during this doctoral project study revealed that the educators did not feel prepared to implement the CCSS-M for ELLs, so they encountered difficulties and barriers to effectively implementing the standards for these culturally and linguistically diverse students. A strength of this project is that educators can learn the necessary knowledge and mathematical skills to effectively implement the CCSS-M by attending this PD. Educators' knowledge and skills, as well as their perceptions, can influence the way they evaluate students' mathematics knowledge, plan mathematics instruction, and the delivery of mathematics instruction. Another strength of this project is that it was developed from the findings in Section 2. By understanding ELLs'

mathematical, academic, and linguistic needs, educators can also challenge each student academically by using their English proficiency level to develop appropriate mathematics learning activities that may result in mathematical, academic, and linguistic growth. According to Mohammadi and Moradi (2017), well-designed PD can help teachers become highly effective in the subjects they teach because they become core subject experts. If educators who teach mathematics to ELLs using the CCSS-M have the knowledge and skills needed to address the mathematical, academic and linguistic needs of ELLs, they will be more prepared to instruct ELLs in their classroom, which can increase mathematics proficiency. The strength of this project is that PD can provide K-5 mathematics educators and specialists with the appropriate knowledge and skills to support the mathematics needs of ELLs and boost educators' preparation to implement the CCSS-M with culturally and linguistically diverse students.

Limitations

Although this project can be beneficial to curriculum writers, school administrators, educators, and ELL students, the project also has some limitations. One limitation is that only 13 K-5 educators who teach mathematics to ELLs using the CCSS-M were interviewed during the data collection process. The limited number of participants does not represent a large body of the educators/specialists at the local site. This PD is meant to be presented to classroom educators and specialists who teach mathematics to ELLs using the CCSS-M; therefore, the results of this doctoral project study cannot be applied at a larger scale since the results may be different. Additionally, school administrators who may provide this PD may not be knowledgeable about English

as a second language mathematics instruction; therefore, they might need to hire an outsider who is knowledgeable in this area of expertise to effectively conduct this PD. With budget limitations or constraints, many school administrators may not have the funds to pay a specialist outside of the school district to provide a meaningful and effective PD. This PD was created with the purpose to be implemented at the beginning of the school year or during scheduled PD days throughout the year, and educators may see this as an extra obligation added to their workloads while they are preparing for the upcoming school year. This could cause additional stress and anxiety while trying to set up their classrooms and attend other mandatory school district PD offerings. Adding this PD could also create conflicts with the district's PD schedule since it may already be set and changes cannot be made. Educators may not be willing to invest time and energy into this PD because they may feel they already have enough to do in order to prepare for their students. If educators are not willing to open to new learning opportunities, then this PD may not be as effective as it should be.

Recommendations for Alternative Approaches

The problem this doctoral project study sought to investigate is that at the local site classroom practices are not adequately preparing ELLs for academic success in the area of mathematics and since the implementation of the CCSS-M there has been a lack of progress in mathematics proficiency for ELLs. To successfully implement this PD, educators need to invest time and energy and be willing to learn the mathematics instructional strategies/interventions that will promote ELL students' mathematical, academic and linguistic needs. School administrators will have to explain to the K-5

mathematics classroom educators/specialists the benefits of attending this PD and how it will benefit the ELLs in their mathematics classrooms. An alternative approach to implementing this PD in the proposed way would be to offer it once a month in 1-hour increments during the virtual staff meetings. Another alternative approach is to provide this PD through weekly virtual Professional Learning Communities (PLC). A final alternative is since the PD is virtual, it can be offered after school hours and offer workshop pay for participants.

Scholarship, Project Development and Evaluation, and Leadership and Change

Scholarship

Scholarship involves academic study or achievement and learning at a high level. Enrolling at Walden University to pursue a Doctor of Education degree in Curriculum, Instruction, and Assessment is an example of scholarship and learning at a high level. The intensive doctoral study class which I started in October of 2017 has been a challenge to my academic study and achievement because it has not gone as smoothly as planned. This has not deterred me from continuing to persevere and learn at a high level. Scholarship to me involves lots of time, hard work, determination, resilience, and patience. This doctoral project study has required lots of time, hard work, determination, resilience, and patience going from prospectus to final study. Scholarship throughout this doctoral study project helped me learn how to collect data though interviews, analyze data through thematic analysis, and disaggregate data to make informed decisions based on results. While interviewing educators, I learned how important it is to be a good listener so that I can ask probing or clarifying follow-up questions if necessary. Through

my data collection process, I learned that participants had many important things to share about their experiences teaching mathematics to ELLs. They wanted their experiences to be heard and understood by providing feedback about the implementation of the CCSS-M in order to enhance mathematics educational programs for ELLs. The willingness to pay close attention to details can spark individuals to make informed decisions that will not only impact themselves, but also the whole school community. As a scholar who values scholarship, I try my best to make knowledgeable decisions that will benefit not only me but also my colleagues and students by implementing research-based, developmentally appropriate mathematics instructional strategies.

This doctoral program has given me a passion for learning because I realized that the more I read, the more I learn. As a student, I strive to learn as much as I can to be an effective educator because I know it can influence my teaching and leadership abilities. Schools are very culturally and linguistically diverse, so students come to our classrooms with different learning needs; therefore, as educators and scholars we need to be ready to learn the necessary knowledge and skills to help our student scholars grow academically and socially. The journey of scholarship and learning about effective mathematics instructional strategies to support the academic needs of diverse learners affords an opportunity to see education through a different lens.

Throughout my 9 years as an English for Speakers of Other Languages (ESOL) educator and during this doctoral project study, I have tried to learn as much as possible about effective instructional strategies for all subject areas that classroom educators can incorporate in their daily lessons to support ELLs. Even though I know educators are

stretched in many directions, I developed the PD project with the hope that a group of educators would be eager to learn about mathematics instructional strategies and interventions to help implement the CCSS-M for ELLs. While I collected data, I noticed that the participants had instructional strategies and interventions they were using to support the needs of all their ELLs, but they weren't consistently effective. However, the strategies/interventions weren't being used with fidelity or consistently effective. Through this doctoral study, have grown even more as a scholar, educator, and leader. This journey of data collection, analysis, project development, and implementation has taught me how to be more organized and persistent because there will definitely be obstacles, so everything needs to be in order when things do not go as planned.

Project Development and Evaluation

Using the findings of my study to develop a project to benefit educators in the area of mathematics instruction for ELLs gave me the opportunity to grow in the area of project development. I had the opportunity to develop a project for K-5 classroom educators and specialists who taught mathematics to ELLs using the CCSS-M. I had never developed a professional development project before, so I wanted it to be high quality, effective, useful, and relevant for participants. Based on the results of my doctoral study, I knew I had to do something that would increase educators' knowledge and skills so that they would be more prepared to implement the CCSS-M for ELLs. In this doctoral project study, I learned that perceptions can play an important role in how educators deliver mathematics instruction to culturally and linguistically diverse students. It is important that educators feel prepared to do their job, especially implementing

mathematics content that is assessed regularly within the district and the state. I developed a PD that will hopefully increase educators' knowledge and skills in order to implement the CCSS-M for ELLs.

I am currently working as an ESOL educator, but my long-term goal is to write ESL curriculum or help develop culturally and linguistically appropriate assessments for ELLs. This project development has given me the opportunity to plan a PD training workshop that can be used in the future to train elementary mathematics educators who work with ELLs. This project development taught me how to use data to develop relevant PD for the targeted audience and intended purpose. The experience of planning a PD opportunity for educators with the aim of offering strategies and interventions designed to help with the implementation of the CCSS-M for ELLs gave me the confidence that I could use the same process for future development projects and/or programs.

Leadership and Change

My doctoral journey at Walden has forced me to become a leader and think about ways that I can make positive change in the field of education. I have spent almost 25 years of my career in education using my leadership to make changes in the classroom for my students. Effective leaders are proactive and not reactive in their approach different situations and are able to lead by example which allows them to positively influence people. Good leaders are able to get others on board with their ideas because they exude confidence and give other a willingness to trust them. I have always been one to go out of my way to help others, and I would characterize myself as a servant leader. This doctoral program has taught me is how to be an effective leader by learning how to

conduct qualitative research using the step-by-step process of planning, collecting, and analyzing data. While collecting data from educators during my interviews, my leadership skills were very helpful because my approachable nature made the participants feel comfortable and willing to share their experiences. After the data collection, I had to use my leadership skills to make decisions about the development of the project for the educators based on the data analysis results. I was able to think as a leader when I developed a PD for K-5 classroom educators and specialists who teach mathematics to ELLs using the CCSS-M. This same leadership thinking was used as I created a 3-day PD that would allow educators to learn mathematical strategies/interventions to meet the academic and linguistic needs of ELLs in order to increase mathematics proficiency. An effective leader has to be willing to develop and support PD opportunities that will enhance educators' knowledge and skills in order to promote the academic success of all students regardless of culture, language, etc.

The knowledge gained from this doctoral study made realize that as a leader, I have an important role in my school community, and I have a responsibility to make an impact that fosters social change. Over the course of my doctoral journey and this project study, I was able to change the lens that I view myself though and am now able to see myself as a future leader in the area of curriculum, instruction, and assessment. Through this new perspective, I can see myself finally completing this journey that I have been on for over 6 years as a leader in education planning, organizing, and implementing more PD opportunities for educators working with culturally and linguistically diverse students.

Reflection on Importance of the Work

As an ESOL educator in my school, my ultimate goal is to ensure that all my ELL students are provided with developmentally and linguistically appropriate instruction so that they can be successful in school and in life. I also hope that I can provide the right tools to help colleagues plan and deliver lessons in the classroom that meet instructional and linguistic needs of our large ELL school population. It is important that educators or ELLs have the right instructional strategies to improve students' mathematics proficiency and feel well equipped and confident to implement the CCSS-M. When educators use the right mathematics strategies, interventions, and tools to teach ELLs, the students will eventually learn and hopefully increase their mathematics proficiency. Through interviews with educators, I was able to listen to their concerns about implementing the CCSS-M in regard to the instructional needs of ELLs. I tried to let them know that they had a supportive listening ear by making them feel that their concerns were valid and empowering me to find a solution to their concerns. If educators are equipped with the right strategies and feel supported, they are more successful in their jobs. Teachers who feel confident in their capability to promote student achievement are more likely to receive satisfaction from their jobs if they feel supported by their organizations (Edinger & Edinger 2018).

Implications, Applications, and Directions for Future Research

A professional development was my project for this study. The project is intended to help educators increase their preparation to implement the CCSS-M by using the WIDA English Language Development Standards Framework, increase knowledge of

strategies/interventions for effective vocabulary instruction for ELLs, and provide effective instructional strategies and interventions for word problems that not only promote mathematics proficiency, but also linguistic skills. The project has the potential to help educators in other grade levels within the school district and can be applied to other schools within the school district and other districts. I developed the project to offer information about the WIDA English Language Development Standards Framework, research-based mathematics instructional strategies/interventions and time for educators to collaborate with colleagues. Additionally, since it is meant to be presented in a virtual platform, it does not require any funding or specific space and is ready to be implemented. Future research could include other schools in the district and participants who teach ELLs in elementary grades K-5 using the CCSS-M.

As an ESOL educator for almost a decade, I am not only an educator, but have become an advocate for my ELL students and any ELL student in my school who needs someone to advocate for them. I have worked with many newcomers to the United States, and I can only imagine how hard it is to arrive at a school to learn a language and find out that instructors do not have the necessary experience and skills to support my needs. As an ESOL educator, I strive to make sure that every one of my ELL student has the opportunity to learn and become a productive citizen. I would like to be able to support mathematics classroom educators with best practices, strategies, and interventions that will help ELL students become more successful. This effort may result in an increase in English language proficiency, academic achievement, and mathematics proficiency for

ELLs, which may in turn open many doors for these students to do great things in life and promote positive social change.

Conclusion

Classroom practices are not adequately preparing ELLs for academic success in the area of mathematics and since the implementation of the CCSS-M there has been a lack of progress in mathematics proficiency for ELLs. The purpose of this basic qualitative study was to explore elementary educators' perceptions of implementation of the CCSS-M and the impact on math proficiency for ELLs at a Title I elementary school bordering a large urban area. The influx of ELLs into public schools and their challenge with the state-mandated assessments necessitated a serious examination of ELLs' struggle to pass the mathematics assessment.

The results of this study revealed the perceptions of the mathematics achievement of ELLs in regard to the CCSS-M as being more of hindrance than a help to students. The educators' lack of training to implement the CCSS-M for ELLs made them feel unprepared and affected the math proficiency of their students. The overall themes of this study were difficulty to implement CCSS-M, inadequate preparation to implement CCSS-M to ELLs, mathematical barriers of CCSS-M for ELLs, use of mathematical instructional strategies, and perceptions of the mathematics achievement of ELLs.

The findings of the study indicated that educators perceived they were unprepared to implement the CCSS-M for ELLs due to lack of training in mathematics instructional strategies and interventions. Therefore, when considering the themes, I developed a 3-day virtual professional development to assist classroom educators and specialists in helping

ELLs enhance their mathematics proficiency and become capable of success on the state-mandated tests. Furthermore, as a result of the project, educators may be better prepared to deliver mathematics instruction and better equipped to use research-based instructional strategies in the classroom. The process of putting this project together helped me become a better leader, scholar, practitioner, and project facilitator.

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Appendix A: The Project

The developed professional development will be facilitated virtually in the form of a 3-day training for K-5 classroom educators and specialists who teach mathematics using the CCSS-M for ELLs. The COVID-19 pandemic has forced all meetings and professional developments at the local site to be done virtually. The enhanced focus on online teacher professional development (oTPD) can be seen in conjunction with the economy, is more accessible and flexible, and provides new opportunities for distance collaboration (Lay et al., 2020). This project will be facilitated over the course of three PD days already built into the school calendar or at the beginning of the school year to prepare teachers to implement the CCSS-M for ELLs in order to effectively meet the needs of these culturally and linguistically diverse students in mathematics. There is a detailed description of how the project will work. The purpose of this mathematics PD to help educators increase their preparation to implement the CCSS-M by using the WIDA English Language Development Standards Framework, increase knowledge of strategies/interventions for effective vocabulary instruction for ELLs, and provide effective instructional strategies and interventions for word problems that not only promote mathematics proficiency, but also linguistic skills. Educators will learn how to use the WIDA framework in conjunction with the CCSS-M to plan engaging activities and develop lesson plans that promote mathematics content knowledge that meets the instructional and linguistic needs of ELLs in order to increase mathematics proficiency. This mathematics PD has been developed from the findings of the doctoral project study in section 2. In this mathematics PD, participants will learn a) about the WIDA English

Language Development Standards Framework, b) strategies and interventions for effective vocabulary instruction, and c) the implementation of effective instructional strategies and interventions for word problems that will support the mathematics needs of ELL students. One of the main goals of this mathematics PD is help prepare K-5 educators to implement the CCSS-M by learning how to develop meaningful lesson plans and activities that promote mathematics proficiency as well as meet the linguistic needs of ELLs.

Title: Rigorous Mathematics Instruction for ELLs

Target Audience: K-5 Mathematics Educators

Time: 8:00-3:30

Method of Delivery: Virtual

Day 1: WIDA English Language Development Standards Framework

Learning Outcomes:

- Explore WIDA's English Language Development standards
- Identify key components of the WIDA standards
- Investigate the WIDA standards to match an expressive standard with a content standard
- Apply knowledge of the six key strategies to identify supports and activities that support the expressive mode
- Determine next steps based on today's learning

Day 1 Agenda **Check-In/Welcome** **Formative Evaluation** **Attendance**	8:00-8:15
Webinar: Introduction to the 2020 Edition | WIDA	8:15-9:15
Break	9:15-9:30
Presentation: WIDA Basics: WIDA ELD Standards Framework	9:30-10:30
PreK-12 Webinar: A Functional Approach to Language Development in WIDA 2020	10:30-11:30
Lunch	11:30-12:30
Presentation: Cultural Competency	11:45-12:45
Presentation: WIDA Standards: Expressive Mode	12:45-1:45
Collaboration with the WIDA ELD Standards Framework 5th Gr Mathematics Example1	1:45-2:15
Break	2:15-2:30
Grade Level Planning Group Activity: Deep Dive into WIDA's grade-level English Language Development (ELD) Standards Framework	2:30-3:25
Questions and Evaluation **Summative Evaluation Link**	3:25-3:30

Day 2: English Language Proficiency (ELP)/English Language Development (ELD) Levels

Learning Outcomes:

- Identify the different stages of language acquisition
- Distinguish between different proficiency levels
- Understand ESSA ELP Accountability
- Understand and Use the ELD Levels
- Understand How to Support the Needs of ELLs

Day 2 Agenda **Check-In/Welcome** **Attendance**	8:00-8:15
Anticipation Guide: Language Acquisition & ELLs **Presentation: English Language Learners: Stages of Language Acquisition**	8:15-9:15
Break	9:15-9:30
Video: Language Acquisition versus Language Learning **1. Explain briefly what is: acquisition, learning, language acquisition, language learning, first language acquisition, second language acquisition** **2. Write in detail about any one of the following topics right in detail about first language acquisition or second language acquisition**	9:30-10:15
Presentation: ESOL Levels of Proficiency	10:15-11:00
Presentation:Copy of A Guide to Understanding ESSA ELP Accountability	11:00-11:45
Lunch	11:45-12:45
Video: Understanding ELD Levels	12:45-1:30
Presentation: Understanding and Using ELD Levels	1:30-2:00:
Break	2:00-2:15
Presentation: Classroom Strategies to Support the Needs of Your ELLs	2:15-2:45
Independent Activity: Educators will use ELD Levels to group their ELL students	2:-45-3:25
Questions and Evaluation **Evaluation Link**	3:25-3:30

Day 3: Mathematics instructional strategies/interventions for English Language Learners (ELLs)

Learning Objectives:

- Investigate the six high impact instructional supports and their benefits.
- Apply knowledge of the six high impact instructional supports to plan activities.
- Determine next steps based on today's learning to collaborate and plan lessons.
- Be able to describe how graphic organizers support our students
- Explore the steps for creating a modified graphic organizer
- Develop a modified graphic organizer that aligns with a content and a language objective.
- Examine key characteristics of effective word walls
- Explore methods of making word walls interactive
- Apply learning to create a word wall for an upcoming topic or unit
- Discuss preparing for direct vocabulary instruction
- Discuss how to teach vocabulary
- Discuss how to engage students in vocabulary

Day 3 Agenda **Check-In/Welcome** **Attendance**	8:00-8:15
Video:Positioning Multilingual Learners to be Successful in Math by Dr. Jim Ewing	8:15-8:45
Presentation: :High Impact Instructional Supports for ELLs	8:45-9:30
Break	9:30-9:45
Video: How to Teach Math to ESL Learners **Presentation: Mathematics Instructional Strategies and Interventions**	9:45-10:45
Lunch	10:45-11:45
Presentation:Deep Dive: Modified Graphic Organizers	11:45-12:15
Presentation: :Deep Dive: Word Walls for ELLs	12:15-1:00
Presentation: Direct Vocab Instruction for ELLs	1:00-1:45
Break	1:45-2:00
Putting it all Together Work Session: Participants may work as grade levels to use the resource, strategies, techniques, and interventions to plan math lessons in order to support their ELLs	2:-00-3:25
Questions and Evaluation **Evaluation Link**	3:25-3:30

Appendix B: Interview Protocol

Interview Questions (Classroom educators/Specialists who teach mathematics)

1. How do you feel about the Common Core Math Standards in regards to ELLs for your grade level or level of expertise? (RQ1)
2. How prepared do you believe you feel to teach your ELLs using the Common Core Standards? (RQ1)
3. How do you believe you help ELLs understand the math material based on the Common Core Math Standards? (RQ1)
4. What barriers or challenges do you face as your ELLs understand math material based on the Common Core Math Standards? (RQ2)
5. What facilitators or strengths do you notice as you help your ELLs understand math material based on the Common Core Math Standards? (RQ2)
6. Using the Common Core Math Standards, how do you believe you adapt your instruction so that even ELLs with limited English proficiency can understand the math material? (RQ2)
7. Do you modify your Common Core math assignments for ELLs? If so, how do you modify them? (RQ2)
8. What is your perception of the mathematics achievement of your ELLs using the Common Core Math Standards? (RQ1)
9. What is your perception of whether the Common Core Math Standards help or hinder the progress of ELLs? Why? (RQ1)
10. What is your perception of your responsibility to bring your ELLs up to the same level mathematically as the other students? Do you think the Common Core Standards help you do that? (RQ1)