HOW CAN PARENTAL INVOLVEMENT IN FORMATIVE ASSESSMENT IMPACT MATH ACHIEVEMENT IN 4TH GRADE?

by

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ABSTRACT

With the changes in the Tennessee standards, the testing format has become more rigorous. Teachers who usually made high achievement scores in math, now struggle to adapt to teaching the new TNReady standards and prepare for the TNReady assessment (high stakes assessment). The school selected for this study was a Level 1 (on a 1-5 scale, 1 being the lowest score) in math on the TNReady assessment last school year; scores have been getting lower over the past three years. This study investigated how parental involvement in formative assessment impacts math achievement in 4th grade. By involving parents more in their child's education, the hope was that math achievement scores would improve. Strategies such as having parents/teachers watch a Parental Involvement in Formative Assessment video and use formative feedback with their child/student were implemented along with other forms of parent/teacher communication such as email, text, phone calls, and notes sent home to parents.

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CHAPTER ONE: INTRODUCTION

Overview

In 2010, the United States adopted the Common Core State Standards Initiative. This change was made to assure that students in grades K-12 would know English, reading, writing, spelling, and math at the end of each grade. Furthermore, when students finished their K-12 education, this initiative would better prepare students to enter college or the workforce. The goal was for students in the United States to keep up with students from around the world in regards to education and employment opportunities.

Tennessee was also impacted by these national trends in math standards when the state standards were changed. Because of these changes, the testing format has become more rigorous; especially beginning in 2016. Resnick (2009) warns that the old way of testing was a problem, because what you test is what you get; the old test was not conducive for students preparing for jobs that, nowadays, require critical thinking. However, teachers who usually made high achievement scores in math now struggle to adapt to teaching the new TNReady standards and prepare for the TNReady assessment (high stakes assessment).

Background

4th grade teachers at a rural elementary school have been working on making changes to prepare students to be successful in learning new standards, which has been a challenge given that the school was a Level 1 for math (on a scale of 1-5, 1 being the lowest score) for the previous school year (2018-2019). Moreover, math scores have gotten worse over the past three years. The math teachers, principal, and assistant principal met to brainstorm to find strategies to correct the problem last school year

(2018-2019). This school year (2019-2020), two educational consultants were brought in to help the school. Several new strategies have been implemented already to the math classes in order to address these issues. For example, one change was made by the administrators to use Eureka math in 3rd grade because 4th and 5th grade teachers use Eureka math at this school. The hope is that if all math teachers use the same math materials, that scores will improve because students are seeing the same format. If all goes well, 2nd grade will switch to Eureka next school year. Also, Eureka includes critical thinking in every lesson as well as being a program that is the most aligned to the TNReady standards. Additionally, the 3rd grade teachers have implemented a daily math review that consists of 4-5 higher order type questions. Students complete them, then the teacher has them correct the problems that they have gotten incorrect. This fast feedback is beneficial. Ainsworth (2007) states that by using formative assessment, that over time, one will truly see improvement in student achievement and teaching. Teachers also progress monitor using the benchmark assessment. It is taken in the fall, winter, and spring, as well as right before parent/teacher conferences in the fall and spring. Popham (2011) deduced that progress monitoring enables students to make adjustments in the ways that they are learning in order to be more successful. If students see how they are doing, it motivates them to try harder next time. Wiliam (2018) agrees by asserting that when teachers progress monitor with graphs the effect was three times as great as when they didn't.

Statement of the Problem

Due to the change in Tennessee math standards, some elementary schools are struggling to improve their math achievement scores. The selected school had a school

wide math achievement score of a Level 1 on a scale of 1-5 (1 being low and 5 being high) on the TNReady test (high stakes assessment). This school's math scores have been decreasing over the past three years. Teachers at this school were, on average, Levels 3-5 before the math standards changed. The teachers and administrators have brainstormed ideas of how to correct the problem. One example of changes that were made is that 3rd grade began using a common formative assessment last school year (2018-2019). However, that was dropped this school year (2019-2020), when two educational consultants came in to help. One or both of them attended data and Professional Learning Community (PLC) meetings throughout the school year. They had 3rd grade switch to teaching math using the program called "Eureka" because all of the teachers were pulling materials from different places which was encouraged in the past. In other words, the teacher would look at the standard first, then find the materials to align with it instead of going straight through a program or book. Their thought was that 3rd grade needed to be using the same instructional material not only throughout the 3rd grade, but also consistent with 4th and 5th grades at this school. The program has the reputation of being the most aligned to the TNReady standards, however the tests do not have a format that resembles the TNReady assessment type questions.

In the past, this school has utilized the STAR benchmark test to predict how the students are going to perform on the TNReady test. This is not a good predictor from what I have observed. The STAR test is a skills test, and the TNReady test is a test where students must apply those skills in order to solve problems. The school used to use Think Link which was an accurate predictor for the previous math standards.

The problem that will be of specific focus for this study is that formative assessment isn't being used to its full potential at this school. For students to get better at math, they have to receive formative feedback, not just a grade, before the teacher moves on to the next lesson. Students need to understand what they are doing incorrectly and learn how to do it correctly. In order for teachers to make this shift toward more formative feedback, it will take time for them to understand that not everything needs to be graded. Additionally, teachers need to involve parents more in the students' education. It is important that teachers keep in mind that parents are reluctant to approach teachers (Davies, 1991). If teachers reach out first, parents may be more likely to be involved in the child's education. Then, they could train parents how to help their child at home by using formative assessment. Formative assessment use in this study means that the parent will help their child correct his/her work and tests at home. Parents will commit to staying in contact with the teacher through e-mail, text, phone calls, or notes. Furthermore, the participating teachers will allow students to correct all assignments and unit tests for full credit. This could possibly be another strategy to assist students and teachers in getting math achievement to improve at this school.

Purpose of the Study

Tennessee math standards have recently changed to add more rigor to the students' education. With these changes, teachers at the selected school are struggling to find strategies to improve their school wide math TNReady (high stakes assessment) score of a Level 1 on a 1-5 scale, (1 being low and 5 being high). The purpose of this study is to explore how parental involvement in formative assessment impacts math achievement in 4th grade.

Research Questions

This study used the concurrent mixed methods design (Creswell et al., 2007) to identify if parental involvement in formative assessment impacted math achievement in 4th grade. MAP data (fall and winter) along with parents' and teachers' interviews were analyzed to determine the impact. The following research questions were considered:

(1.) How can parental involvement in formative assessment impact math achievement in 4th grade?

(2.) What are parents' perceptions of the implementation of parental involvement in the formative assessment process in school?

(3.) What are the participating teachers' perception of the implementation of parental involvement in the formative assessment process in school?

Significance of the Study

The purpose of this mixed methods study was to identify if parental involvement in formative assessment had an impact on 4th grade math achievement. This study is significant because some teachers are finding it difficult to raise student math achievement due to the new TNReady standards; the standards are more rigorous than they used to be. These teachers, at the school being studied, traditionally had scores of 3-5. In the past, this school was a Level 5 (on a 1-5 scale, 5 being the highest score) in math and had many teachers that were Level 5 teachers. In 2018-2019, these teachers tried making their lessons more rigorous, and the students struggled even more. The hope of this study was that with involving parents and using formative assessment, in class and at home, that students will begin to improve with the extra support.

Additionally, this research study sought to identify if parents and the cooperating teachers believe that parental involvement in formative assessment is conducive to their child's/students' education experience. It is imperative to gain this feedback from the teachers and parents in order to see how they perceived the process of involving the parent in math by using formative assessment and formative feedback.

This study was also important for future learning. The findings should be shared with faculty at the school through a professional development. It is essential that all teachers understand how parental involvement in formative assessment impacts math achievement.

Research Design

This study was conducted to research how parental involvement in formative assessment impacts math achievement in 4th grade. Hopefully, this can be another strategy to help students progress in math. 4th grade math teachers were asked to volunteer because math scores are declining at this school in their grade as well as in 3rd and 5th grades. All four teachers and their two classes were asked to participate in order to have stronger quantitative data. Two teachers taught their classes as usual. The other teachers in the study used formative assessment liberally.

The parental involvement was added by having parents complete a survey to identify who was interested in participating; all parents were welcomed. The parents watched a video about parental involvement in formative assessment before making a decision to volunteer for the study. Additionally, parents helped by using formative assessment with their child. The teachers also communicated with parents by email, text, phone calls, and notes.

Theoretical Framework

This research study aimed to identify if parental involvement in formative assessment had an impact on 4th grade math achievement. Gulevska (2018) asserts that parental involvement not only improves attendance and student behavior, but also increases student achievement. Additionally, Ainsworth (2007) states that by using formative assessment, that over time, one will truly see improvement in student achievement and teaching. By combining parental involvement and formative assessment the hope was that student math achievement would improve. The independent variable of this study is parental involvement in formative assessment, and the dependent variable is student achievement growth on the MAP assessment. Additionally, the constants of this study were that students in the control group and focus group were in the same grade; heterogeneous classes were mixed similarly with high, medium, and low students; the same subject (math) was used; the teachers, in both groups, taught the same lessons using the same materials at the same time; math classes were allotted the same amount of time; and the same tests were utilized. Based on all of these aspects, an independent Sample t-test was utilized in order to analyze the MAP assessment results (fall 2020 and winter 2020). "This test is used when you want to compare two means that come from conditions consisting of different entities (this is sometimes called the independent-measures or independent-means t-test)" (Field, 2018, p.331). This will be quantitative data. Also, the researcher conducted interviews with parents and teachers in the focus group for additional support to the Sample t-test results (December 2020), and this was qualitative data. Due to using both quantitative and

qualitative data that was analyzed at the same time, a concurrent mixed methods approach was the method used for this study. Creswell (2009) explains that:

> Concurrent mixed methods procedures are those in which the researcher converges or merges quantitative and qualitative data in order to provide a comprehensive analysis of the research problem. In this design the investigator collects both forms of data at the same time and then integrates the information in the interpretation of the overall results. Also, in this design, the researcher may embed one smaller form of data within another larger data collection in order to analyze different types of questions (the qualitative addresses the process while the quantitative, the outcomes) (p. 31).

Creswell and his colleagues (2007) state in regards to mixed methods that, "Its central premise is that the use of quantitative and qualitative approaches in combination provides a better understanding of research problems than either approach alone" (p. 5). By using both, it adds to the depth and scope of the findings.

Definition of Terms

Fast Feedback: is information a teacher or another speaker, including another learner, gives to learners, immediately, on how well they are doing, either to help the learner improve specific points, or to help plan their learning.

Formative Assessment: "An assessment functions formatively to the extent that evidence about student achievement is elicited, interpreted, and used by teachers, learners, or their peers to make decisions about the next steps in instruction that are likely to be better, or better founded, than the decisions they would have made in the absence of that evidence" (Wiliam, 2018, p. 48).

Parental Involvement: Refers to the amount of participation a parent has when it comes to schooling and their child's life.

Limitations, Delimitations, and Assumptions

The limitations of this study were that the research will begin after the summer break which is approximately two months long. Not only that, this past school year (2019-2020), schools closed on March 30th through May 21st due to COVID-19. Students continued to work during the school closure, however it was mandatory to give only review work during this time frame; teachers were not permitted to teach new skills. Additionally, teachers were only allowed to give 30 minutes of math per day. Math class is usually 60-90 minutes. Also, students were not penalized if they chose not to complete the assignments which could possibly have resulted in some of the students not turning in their work. In light of this, students sometimes lose some of their learning over the summer months. That coupled with the COVID-19 issues could mean that some students are even further behind than when they return from summer break.

This study is restricted in that it was only conducted with elementary students in math. Also, this study was used with students in inclusion classes. That means they may have contained students that are included from the special education classes, are classified in the group of English Language Learners (ELL), or Comprehensive Development Classroom (CDC). Additionally, the classes may have contained gifted students.

It was assumed that parents used formative assessment at their home with their child in this study. Additionally, it was assumed that parents understand what formative assessment means based on watching the Parental Involvement in Formative Assessment

video. Also, it is with good faith that the cooperating teachers used formative assessment in the classroom. During the interviews that were conducted with the teachers and parents it was assumed that they were honest with their answers. Additionally, it was an assumption that the students tried their best on the fall and winter assessments. All participants were believed to have participated without any motivation other than the desire to contribute to the study of parental involvement in formative assessment and its impact on math achievement in 4th grade.

Summary

Some schools were finding it difficult to identify what exactly needed to be incorporated into math classes in order to be successful in regards to the most recent Tennessee education standards. They are rigorous and so is the TNReady assessment that students take at the close of the school year. Some schools are Level 5's and others are Level 1's. Above, I have outlined my research study by giving my purpose of the study, research questions, theoretical framework, and significance for learning more about the impact of parental involvement in formative assessment in 4th grade math achievement. The next chapter will explore key research and perspectives that undergird and ground this study.

CHAPTER TWO: REVIEW OF LITERATURE

Introduction

"Education is too important to be left up solely to educators" (Keppel, F. as cited in Gulevska, V., 2018, p. 134). Colgan (2018) echoes that students only spend 14% of their hours through grades K-12, therefore schools cannot be held completely responsible for the end result of a child's academic growth. Parental involvement has been important to schools since the beginning of parental involvement research. Involving parents in their child's education is beneficial for several reasons, two of which are that parental involvement can aid in academic success and positive relationships between teachers and parents. How can this be achieved? To achieve efficient parental involvement there are six factors to consider: parenting, communicating, volunteering, learning at home, decision making, and collaborating. Also, utilizing formative assessment is an effective way to involve parents. The following will discuss the history of formative assessment, pros and cons of formative assessment, and how formative assessment plays a role in math. Additionally, parental involvement will be addressed, as well as parental involvement pros and cons, and how parental involvement and math have been researched in the past.

History of Formative Assessment

What is formative assessment? "An assessment functions formatively to the extent that evidence about student achievement is elicited, interpreted, and used by teachers, learners, or their peers to make decisions about the next steps in instruction that are likely to be better, or better founded, than the decisions they would have made in the absence of that evidence" (Wiliam, 2018, p. 48). Formative assessment has been around

a relatively long time. In 1967 the term "formative evaluation" was conceived by Michael Sciven. He differentiated formative assessment from summative assessment in that formative assessment is used to help students in the learning process by the teacher identifying what the student is having trouble with, then make an adjustment in the instruction, and summative assessment is used to test how the student did at the end of a unit or the school year, for example, on a "high stakes assessment." In other words, "When we are in summative mode, the purpose of success criteria is to determine the extent to which students have been successful. When we are in formative mode, the purpose of success criteria is to bring about that success" (Wiliam, 2018, p. 70).

Formative assessment doesn't have to be graded. Popham (2011) found that ". . . descriptive feedback is preferred to grades" (p. 147). Bloom (1969 as cited in Wiliam, 2018) concurs that formative assessment separated from the grading process is more beneficial, and when evaluation is directly related to the lesson as it progresses, all involved are more successful. That means that the students learn more, and that the teachers teach better. "The best examples of focused and timely feedback can be found in athletics, band, art, and theater classes. These teachers intervene when students make a mistake, stop them and show the students where they made a mistake, and importantly, explain how to correct the mistake. They do not allow students to continually practice incorrectly" (Eaker & Keating, 2015, p. 113). Lezotte & Snyder (2011) concur that real time feedback is beneficial, for example, when a tutor helps someone, or when athletes or musicians have coaches. Lang (2016) warns that predicting answers without timely feedback could reinforce incorrect learning. Fast feedback allows the learner to understand immediately what they need to correct instead of waiting until the next day.

Over the next 20 years the term formative assessment wasn't used as much, but instead the term "Cognitively Guided Instruction (CGI)" became popular. There was a CGI project involving 21 elementary teachers that participated for four years in workshops which involved watching videos of children's thinking while they were solving math problems. Then, the teachers were asked to adjust their instruction to help their students based on how the students thought about their work (Fennema et al., 1996). Students taught by CGI teachers had improvement in not only their confidence but also did better in several areas of math such as problem solving, number fact knowledge, and understanding (Carpenter et al., 2001).

In 1991, the study of measurement and planning systems (MAPS) was introduced. It involved 29 teachers, an assistant for each teacher, and a site manager. They assessed 428 kindergartners on their readiness in reading and math for entering school in the fall, then retested in the spring. Teachers used the test results to incorporate research-based materials that were on each of the student's tested levels. The results of this study showed that there was significant growth in math, reading, and science in the MAPS group of students (Bergan et al., 1991).

In the 1980's, Lynn Fuchs and Douglas Fuchs (1986) studied using formative assessment with students in special education, and found that using assessments two to five times per week and reteaching it was beneficial to their achievement. They found that progress monitoring with graphs was almost three times as great as when they didn't track progress.

Gary Natriello (1987) and Terence Crooks (1988) found that formative assessment can improve learning, but it can also have a negative effect because of the

assigning of a grade for the assignment or assessment. It was discovered that too much time is being spent on grading instead of focusing on helping students in the learning process (Natriello, 1997). Crooks (1988) concurs that grading is getting in the way. Instead of grading everything and moving on, teachers should take the time to identify what the students need help with and teach them how to do it.

In 1998, Paul Black and Dylan Wiliam continued the formative assessment research finding that teachers didn't have to choose between doing well on standardized assessments or using formative assessment because formative assessments help with student achievement on high stakes tests. They found that externally scored standardized tests of students that had teachers who taught utilizing formative assessment could possibly make twice as much progress in one year than students who were taught without formative assessment (William et al., 2004).

Formative assessment has a long history in education, and the popularity of formative assessment and formative strategies has only grown. In 2011, James Popham introduced the "Popham 5," which are 5 potential applications for formative assessment: (1) To make an immediate instructional adjustment, (2) To make near-future instructional adjustment, (3) To make a last-chance instructional adjustment, (4) To make a learning tactic adjustment, and (5) To promote a classroom climate shift. These are the 5 reasons that a teacher might deploy the use of formative assessment. Likewise, over the past ten years, Hattie (2017) has also researched and disseminated the proven power of formative assessment in the learning process. Most recently, Wiliam (2018) has led the conversation with the notion of "embedded formative assessment." Formative assessment is still relevant today.

Pro/Con of Formative Assessment

There are several benefits to gain from using formative assessment. Achievement scores may improve, students may become more motivated in regards to their school work, and/or formative assessment can be used to reflect on how the student is progressing. The following explains more about these benefits.

Formative Assessment and Achievement. One benefit of using formative assessment is the attainment of higher student achievement. Many schools are still on their way to harnessing the power of formative assessment. Energy is often put into training teachers on how to execute strategies that may not be conducive to learning. Every teacher needs appropriate professional developments (PDs) in order to sharpen their skills. Wiliam (2018) believes that no teacher is so good or bad that they can't benefit from learning. Furthermore, firing a bad teacher is not a beneficial option. If a principal fires a teacher, they are likely to replace them with one that is worse (Wiliam, 2018). It is important to give teachers support such as effective PDs.

Some popular PD trainings include technology integration, Response to Intervention (RTI), and differentiating instruction. However, Fullan (2010) asserts that these do not have research to back them up as being effective strategies to improve achievement. These are the types of trainings that teachers are attending when they should be focusing on something such as the basic lesson plan components like formative assessment. According to Schmoker (2011) schools should go back to the basics such as using the basic lesson plan template. He believes that using formative assessment during your lesson is beneficial. Black and Wiliam (1998) agree and found that the gains in achievement from formative assessment are beneficial, stating they are ". . . amongst the

largest ever reported for educational interventions" (p.61). Also, formative assessment helps the lowest achievers and students in special education the most (Black & Wiliam, 1998). Low achieving students can benefit from feedback and improve which means that the learning gap, for this group, could get smaller.

Formative Assessment and Motivating Students. Formative assessment can be used to motivate students intrinsically instead of giving students extrinsic rewards such as candy or toys. Pink (2009) warns that extrinsic rewards can extinguish intrinsic motivation, diminish performance, hurt creativity, encourage cheating, or even become addictive. However, Eaker and Keating (2012) do encourage celebrating when students do achieve a goal, because when we celebrate what is important to us we send the message of what is important. ". . . feedback also involves appropriate, timely, focused, and meaningful praise" (Eaker & Keating, 2015, p. 113). Celebrating after the fact is an appropriate way to motivate students.

Also, when using formative assessment coupled with the idea of having a growth mindset, students can see how they are progressing and feel a sense of fulfillment. A growth mindset is believing that even if you aren't good at something, you can learn through hard work as opposed to a fixed mindset which is basically believing you are either smart or not (Dweck, 2006). Popham (2011) asserts that the benefits of students taking a role in their progress monitoring can be "remarkable—namely, [for] students who are actively reviewing their own classroom assessment data, connecting these outcomes to their own inputs, and making changes so that their efforts will yield more satisfactory results" (p.19). That means that students will be more involved in their education. It is important for students to have a growth mindset. "It is virtually

impossible to become proficient at any mental task without extended practice" (Willingham, 2010, p. 81). In other words, to learn something one must practice. Willingham (2010) also stresses that students do differ in intelligence, but if they work hard they can change their intellectual abilities. To grow, practice is a requirement and formative assessment practice and strategies give students just that opportunity.

Formative Assessment and Reflecting. Nuthall (2007) found that students already know 40-50% of what we are going to teach them. This means that if teachers aren't careful they will be wasting the students' time and boring them in the process. Formative assessment coupled with progress monitoring can be beneficial reflection tools to use with students to find where they are and keep them progressing. "Through reflection, people make connections among ideas, develop a deeper understanding of which strategies are the most productive, and become better prepared to transfer what they've learned to new situations in the future. Immersion without reflection can be satisfying, but not fulfilling" (Resnick, 2017, p. 71).

When reflecting and brainstorming why scores may be low, always look at the data before predicting what went wrong. Never just go by your gut in regards to making decisions for students' academic success. Lipton and Wellman (2012) stress that problems worth solving are messy, and you should never go for a quick fix. If it is too easy, then it is probably not the right solution. Data, progress monitoring, and goal setting are important when considering formative assessment. Hattie and Timperley (2007) explain that the formative assessment process is made up of three questions: (1) Where am I going? (2) How am I going now? And (3) Where do I go next? Feedback is more than just pointing out what someone is doing wrong. "The secret of effective

feedback is that saying what's wrong isn't enough; to be effective, feedback must provide a *recipe for future action"* (William, 2018, p. 141). It is imperative to give some advice on how to improve. First, one should look at their data before making any decisions. Progress monitoring reassures students and teachers that they are on the right track, and goal setting will enable students to keep their focus on what they are working toward. Progress Monitoring was once referred to as Curriculum Based Measurement (CBM). According to research, Curriculum Based Measurement/Progress Monitoring were created by Stan Deno and his colleagues, in the 1970s, at the University of Minnesota (Deno, 1985, 1992 as cited in Patton, Reschly, & Appleton, 2014). Although this discovery was many years ago for Deno, it is still very much relevant today. Progress monitoring has many uses. For example, it may be used to screen at risk students, plan instruction, make referral decisions, and place students back into their regular education classroom (Hosp & Hosp, 2003). CBM has many uses, even though originally it was designed to help special education students (Deno, 2003). CBM can help anyone. There is a plethora of learning strategies that students utilize to learn. There isn't a one size fits all strategy that works well for every student (Whinnery & Stecker, 1992). CBM identifies the weaknesses to help teachers find strategies that will be most beneficial to students. When students see each week how they are doing, they are informed, and because of that they usually do better on the next test. In more recent research, it was found that CBM is an effective means to formatively monitor students' progress (Fore et al., 2007).

Also, it is beneficial to share the scores with students to allow them to be part of the progress monitoring process. Lang (2016) says to share the "Play Book." Tell the

students why you are sharing their scores and making goals and how this is beneficial. How can you meet a goal if you don't set it? Locke found that when students set goals, it improves student achievement (Locke et al., 1981). Marzano (2007) concurs, "Clear goals establish an initial target. Feedback provides students with information regarding their progress toward that target. Goal setting and feedback used in tandem are probably more powerful than either one in isolation. In fact, without clear goals it might be difficult to provide effective feedback" (p. 12). It is important to involve the student in the learning process. Brown (2014) asserts, "Remember that the most successful students are those who take charge of their own learning" (p. 201). Most students want to please the teacher by doing their best; however they can't do this if they aren't aware of how they are doing. Many organizations use data to determine their next move to gain success. Progress monitoring and goal setting are tools that can be utilized to share data with students. Tools that, when used with formative assessment, are beneficial to not only the student but also the teacher.

Formative Assessment and Negative Consequences. There can be some negative consequences if formative assessment isn't used appropriately. When using formative assessment, it is imperative that one gives timely feedback. Stiggins (2007) cautions, ". . . work is wasted if procedures are not also in place to deliver the assessment results into the user's hands in a timely and understandable form" (p.68). For example, if one waits too long to give feedback, then the student may have forgotten what they did on the assignment. Although Brown (2014) found that learning will "stick" better when taking a break in between learning sessions by spacing out the work and even letting it consolidate in your mind while you sleep. Through this process, the learner can get the

information into their long-term memory, and that will free up short term memory space. "Finding a fact in long-term memory and putting it into working memory places almost no demands on working memory" (Willingham, 2009, p. 85). This is important because you have a limited amount of space in your working memory (Willingham, 2009). Freeing up working memory space leaves more room to solve problems. Lang (2016) warns that waiting too long to give feedback is not wise because it could lead to strengthening of incorrect knowledge. Popham (2011) concurs, "Using formative assessment to make an immediate instructional adjustment means the teacher gathers data, analyzes it, and decides whether or not to change instruction right then, in that class session, in that moment" (p. 15). However, Brown (2014) advises that making mistakes is okay, and actually a good learning strategy, as long as the mistakes are corrected quickly. Lang (2016) agrees that it is okay to get the wrong answer as long as corrective feedback is given soon after. Trying something, getting it incorrect, then being corrected immediately is a beneficial teaching strategy.

Can feedback be given too quickly? Wiliam (2018) found that the timing of feedback is imperative, and if it is given too early learning is less likely to occur. The learner needs to struggle with retrieving the answer, and the teacher needs to create "desirable difficulties" such as these to cultivate learning (Bjork, 1994, p. 193). Furthermore, "If your students are going home at the end of the day less tired than you are, the division of labor in your classroom requires some attention" (Wiliam, 2018, p. 55). If you are exhausted after school each day, the students aren't doing enough of the thinking and working. Because timing of feedback must be perfect, teachers must find the "Goldilocks" timing in order for feedback to be beneficial.

Another difficulty with formative assessment is the task of convincing educators shift from traditional grading to giving feedback. Elmore (2016) asserts, "It is unlikely that successful practices will spontaneously reproduce themselves just because they are successful, in the absence of structures and processes based on explicit theories about how reproduction occurs" (p. 25). It is important to keep in mind, "When we are asking teachers and school leaders to do things they don't (yet) know how to do, we are asking them to 'implement' something, we are asking them to learn, think, and form their identities in different ways. We are, in short, asking them to be different people" (Elmore, 2016, p. 531). It is very difficult to change an individual much less a school and pass the change on to a school district unless you have a research-based plan to help you. TED (2009) found that "starting with why" is helpful when persuading people to change. Tell them why it is important that the change takes place. Deutschman (2007) warns that people cannot be changed with what he calls the 3 F's (Fear, Facts, and Force). "Fear" is when you try to frighten someone into changing, "Force" is when you try to force someone to change, and "Facts" are the listing of facts to try to persuade someone to change. Even though these seem to work at first, they don't for very long. That is why his book is called *Change or Die.* Deutschman believes that telling someone that they must change or they are going to die or have something bad happen to them will not convince them to change for the long run. His book gives examples of prisoners being released from jail then turning around and ending up right back in prison shortly after being released; the problem is that they are not being supported with the 3 R's. In his book Deutschman also discusses what it takes to truly make change happen in one's life, "The 3 R's" (Relate, Repeat, and Reframe). First, one must "Relate" to the person in

need of help. Second, "Repeat" the steps in order to form a habit, and lastly, "Reframe" by having the person picture the desired outcome throughout the entire process.

How does one do this with formative assessment? Use of the professional learning community (PLC) is one way to show this kind of support. What is a PLC? "The official definition of a professional learning community ". . . is an ongoing process in which educators work collaboratively in recurring cycles of collective inquiry and action research to achieve better results for the students they serve" (DeFour et al., 2016, p.10). Ideally, teachers meet weekly, at designated times, in their PLC's. One benefit of having this meeting is that teachers share ideas. For example, if a teacher shares the idea of using formative assessment in the classroom, he/she could use the 3 R's more easily in this type of meeting. The teacher that shares her experience and success stories with the others would be an example of "Relating." The teachers could use formative assessment and discuss how things are going each week at the meeting ("Repeat"), and keeping the goal in mind of how it will look at the end of the school year (higher scores) would be an example of "Reframing." Teachers benefit from these PLC meeting. ". . .teachers improve at greater rates when they work in schools with better collaboration quality" (Ronfeldt et al., 2015, p.475).

In conclusion, formative assessment has been around for a while. Also, there are many benefits to using formative assessment as long as it is used appropriately.

Formative Assessment and Elementary Math

Using formative assessment in math can be beneficial. Klute et al. (2017) found that formative assessment use for math had greater effects than when used during other

subjects like reading and writing. That can be helpful information for schools that are struggling to teach the new TNReady math standards.

Also, the teacher is not the only agent that can give students formative feedback. Student, teacher, or computer directed formative assessment were found to be effective for math (Klute et al., 2017). That means that teachers don't have to overwhelm themselves with the formative assessment process.

How should formative assessment be implemented into the math classroom? First, identify the "Power Standards." It would be impossible to teach all of the standards that teachers are asked to teach. Teachers should be focusing on the "Power Standards" according to Reeves et al. (2007). Jakicic (2008) avers, "Whether we call them power standards, grade-level expectations, performance descriptors, or essential learning, the desired product of this process is a very clear list of students' learning outcomes for a given grade-level or content area" (p. 83). Teachers must then curriculum map in order to budget their time so that every "Power Standard" is taught.

Next, teachers need to map out the entire school year; this is similar to budgeting money only you are budgeting time. Then, with your PLC group make a common formative assessment with questions related to the standard that you wish to teach. Teachers will use the "Backwards" design to make the test first, then teach the lessons, then *finally* give the assessment. "Knowing, in advance, what the students will need to know and be able to do on the summative assessment will most definitely impact instruction" (Reeves et al., 2007, p. 83). Furthermore, research says that tests designed after the lessons have been taught will have little impact on what the teacher teaches

(Popham, 2014). After students take the test, the teachers should meet in the PLC to analyze data and identify what needs to be retaught.

Additionally, students need to be part of the process. A progress monitoring sheet could be used to involve the students. They need to see how they are progressing and keep their goal in mind (Hattie et al., 2017). When students participate, they will perform better.

Also, when teaching math and giving formative feedback, one must take into account short term and long-term memory (Hattie et al., 2017). Students sometimes think they have learned their multiplication tables for example, but in reality, they have only stored them in their short-term memory. Brown (2014) asserts that for learning to "stick," one must space out learning, interleave the learning, and retrieve knowledge. He goes on to say that cramming knowledge the night before an exam might look successful, but in the long term it is harmful because the knowledge is not retained. Lang (2016) concurs that retrieving and interleaving are beneficial for long term learning.

Working memory must be considered when thinking in terms of teaching math and giving formative feedback. Working memory has a limited amount of space (Willingham, 2009). Sweller (1998) agrees that it does have limited space. However, "Once information is stored in long-term memory, the capacity and duration limits of working memory disappear transforming our ability to function."

There are a couple of things that can be done to help with the limited working memory issue. First, one can "chunk" information. This is where you treat several separate things as a single unit. Second, is to make things that you have learned automatic. For example, when one learns to tie his/her shoes it takes their full attention.

Then, after a while it becomes more automatic and requires less of their working memory. Willingham (2009) asserts, "Mental processes can become automatized. Automatic processes require little or no working memory capacity" (p. 84). This is why it is so important that students memorize their multiplication tables. When a student doesn't have them memorized it over loads their working memory, and they have great difficulty solving problems such as word problems or long division.

Even though working memory has been thought to have limited amount of space, Sweller (1998) explains that working memory can actually be increased when using visual and auditory working memory at the same time. That means that when teaching a lesson, for example, one could use a PowerPoint presentation with pictures coupled with talking/teaching to enhance working memory.

Furthermore, it is imperative to keep in mind that problem solving should be taught to lower and average math students with examples first (which is called the "Worked Example Effect") instead of allowing students to struggle through the problem solving on their own (Sweller, 2016). This is something that has been over looked by teachers when teaching higher order thinking/problem solving. Sweller (2016) even stresses that it was a bad time to be publishing a paper that included "Worked Example Effect," at the time, because, "Most of the field leapt enthusiastically on the problem-solving bandwagon." Additionally, when working with higher students one should allow them to try the problem on their own to avoid the "expertise reversal effect" which Sweller teaches can be detrimental to these students because their memory will not be overloaded when working the problem, therefore it would be redundant to them to see an example that isn't needed.

History of Parental Involvement

What is parental involvement in regards to education? One way to demonstrate parental involvement is by following a framework consisting of six factors. Sheldon and Epstein (2002) created these steps to guide teachers in involving parents (parenting, communicating, volunteering, learning at home, decision making, and collaborating). Parenting was described as including all of the activities that parents participate in to have well rounded children who become good students. For example, this could include parent education programs, other courses or trainings for parents, etc. Volunteering would be helping in school activities such as school parties, Parent/Teacher Organization (PTO) meetings, etc. Learning at home consists of sending information home to educate parents in ways to help their child with homework and curricular-related decisions and activities. Decision making refers to parental involvement in school decisions. Collaborating with the community includes finding help from the community to support schools, students, and their families. Examples would include summer programs and health programs. These are some basic ideas of how to involve parents. Others may include e-mailing, calling, texting, and notes home.

Prior to the 1980's there was not much research in parental involvement; however, it formerly consisted of basic things such as report cards and parent/teacher conferences. In the 70's and 80's women returned to the workforce which caused a decline in parental involvement. Then, as the years progressed, diverse difficulties in communication began to appear, both culturally and linguistically. English Language Learners (ELL) needed assistance in involving their parents in regards to translating notes that were being sent home. It soon became mandatory, by No Child Left Behind

(NCLB), that in addition to sending translated notes home, schools were allocated funds for improving parental involvement. In 1994, the School-Parent Compact was introduced in order to aid parents in their child's education. This is a form that teachers, parents, and students sign to signify that everyone understands what their responsibilities are (Lezotte & Snyder, 2011). In other words, it is a strategy to encourage teachers to involve parents and parents to become involved with their child's education.

Today, parents have many ways to engage in parental involvement. They can use grade portals to see their child's grades, text, email, Remind, all calls that go out to the parents' phones, or Zoom. However, even though parents have these opportunities to be engaged with their child's learning, it is still difficult for parents and teachers to make this process happen.

Pro/Con of Parental Involvement

Are most parents willing to help their child succeed with their education? Regardless of race, ethnicity, or socioeconomic status parents want their children to do well in school and are willing to help them (Mapp, 2003). However, white middle class families tend to be more involved in their children's education (Webstat and Policy Studies Associates, 2001). When parents become involved in the child's education, relationships between parents and teachers begin to form. "When teachers have positive relationships with students' parents, understanding of and support for classroom curriculum and activities rise. Collaboration often leads to improved ideas, enriched resources (e.g. volunteers, donations), expanded trust, and increased teacher willingness to try new things. All of these, in turn, lead to improved teacher confidence, job satisfaction and self-esteem. In general, the teachers who have strong positive

relationships with parents appear to have more energy and less stress. They brought home into the discussion and made the school an extension of the child's life with his or her family" (Olender et al., 2010, p.4). Bonding between parents and teachers happens when the teacher includes the parents in what is going on at school.

Parental involvement in their child's education can cultivate more than just better relationships between parents and teachers. Henderson and Mapp (2002) found the following positive results from parental involvement: higher grades and achievement scores on high stakes assessments; enrollment in classes that were more challenging; attendance improvement; better adaptation to school; better social skills; better behavior; and more classes passed. Furthermore, race/ethnicity, economic, and educational backgrounds didn't negatively affect these positive results.

Not all involvement is equal in effectiveness. Ferlazzo and Hammond, as cited in Gulevska (2018), state that many believe that parents attending informative meetings or school events is not beneficial in regards to parental involvement. For example, just because a parent attends ball games and the Parent-Teacher Organization meeting doesn't mean that this is beneficial parental involvement in regards to student achievement.

Gulevska (2018) encourages home visits as an excellent way to involve parents. However, some teachers may not be comfortable with this kind of parent-teacher involvement. There are several ways to involve parents that are interested in being involved (phone calls, text, notes, etc.) and teachers can choose what they are most comfortable with trying.

Parental involvement can sometimes be difficult for the parents. Davies (1991) found that many parents are not confident when approaching teachers. They may have

had trouble in school and feel that they cannot be of assistance to their child. Some parents may have had bad experiences and view school through a negative lens. Parents may not know the academic vocabulary or may not teach things in the same manner as the teacher. Ascher (1988) reported, ". . . low-income parents can and want to help with their children's schooling—both at home and at school" (p. 2). However, sometimes teachers assume that either they do not want to be involved, or they aren't able to be involved for one reason or another (Ma. et al., 2016).

Parental Involvement in the Assessment Process in Elementary Math

Wiliam (2018) defines formative assessment in the following way, "An assessment functions formatively to the extent that evidence about student achievement is elicited, interpreted, and used by teachers, learners, or their peers to make decisions about the next steps in instruction that are likely to be better, or better founded, than the decisions they would have made in the absence of that evidence" (p. 48). Parents should be added to this definition as well. They play an integral part in the formative assessment process.

Student achievement will increase when parents are involved. Lam (2004) made a great effort to involve all parents in the education of the students in his class (which were primarily poor Hispanic students); only three students the previous year passed New York's state English Language Arts (ELA) and math tests. By involving the parents in test prep workshops and building relationships with them, he had 57% pass the ELA test and 74% pass the math test. Furthermore, in 2003, he had over 90% of his students pass both tests. There are great benefits when teachers make an effort to involve parents.

Another example of parental involvement helping students with low achievement comes from Westat and Policy Studies Associates (2001). They did a study for the U.S. Department of Education finding that low-performing 3rd grade math students made greater gains when the teachers involved the students' parents. Additionally, math scores grew at a 40% higher rate in grades 3rd through 5th due to parental involvement when compared to classes that had low parental involvement. Gulevska (2018) concurs that parental involvement not only improves attendance and student behavior, but also increases student achievement.

There are some strategies that can be used to help parents be more involved in their child's education. When parents meet with the teacher in person, receive materials from teachers, keep in touch about their child's progress, and attend workshops training them on helping with math at home, math achievement scores are higher (Webstat and Policy Studies Associates, 2001). Parents and teachers can choose what they think is beneficial from this list or implement a few or all of the listed strategies.

However, there are some down sides to parental involvement. Moroni et al. (2015) warns that when homework is done in an intrusive and controlling manner by parents, the outcome is negative. So, it is imperative for parents to be supportive to their child in order to have a positive outcome.

Another problem that can arise in parental involvement is that it is defined in different ways. For example, Soto's (1988) defines parental involvement as the parents' aspirations for their child; Crystal et al. (1994) believes that the involvement of parents includes expectations for the child's success; and Eagle (1989) says parental involvement is parental assistance with homework. "The use of idiosyncratic definitions and

measurement of parental involvement makes it difficult to assess cumulative knowledge in the field" (Baker & Soden, 1997 p.13).

Summary

In conclusion, parental involvement coupled with formative assessment is conducive for learning and has many benefits. Formative assessment has been around for a while and has been researched and proven to help in the classroom. When adding parental involvement to appropriate formative assessment practices, students become more successful because of the immediate feedback and the extra support from the teacher and the parents. Parental involvement has changed over the years due to changes in our world such as women working and the language barriers faced by ELL students. However, positive results still occur when involving parents in their child's education.

CHAPTER THREE: METHODOLOGY

Introduction

This chapter outlines, rationalizes, and justifies the concurrent mixed methods design that was utilized in this study. Reasoning for the use of this design is explained as well as the details of instruments used to collect the data and how it was collected. Additionally, an explanation of how the quantitative and qualitative data were analyzed is summarized. Also, a description of the population and sample participants are given.

Restatement of the Problem

Due to the change in Tennessee math standards, some elementary schools are struggling to improve their math achievement scores. The selected school had a school wide math achievement score of a Level 1 on a scale of 1-5 (1 being low and 5 being high) on the TNReady test (high stakes assessment).

This study used the concurrent mixed methods design to identify if parental involvement in formative assessment impacts math achievement in 4th grade. MAP assessment data (fall and winter) along with parents' and teachers' interviews were analyzed to determine the impact. The following research questions were considered:

(1.) How can parental involvement in formative assessment impact math achievement in 4th grade?

(2.) What are parents' perceptions of the implementation of parental involvement in the formative assessment process in school?

(3.) What are the participating teachers' perception of the implementation of parental involvement in the formative assessment process in school?

Research Design and Procedures

Mixed Methods Design. This study used a mixed methods design. "Mixed methods strategies are less well known than either the quantitative or qualitative approaches" (Creswell, 2009, p.30). However, by using the mixed methods design it applies both quantitative and qualitative data in order to make a more accurate judgement of the results. Creswell and his colleagues (2007) defined mixed methods in the following way:

> Mixed methods research is a research design with philosophical assumptions as well as methods of inquiry. As a methodology, it involves philosophical assumptions that guide the direction of the collection and analysis of data and the mixture of qualitative and quantitative approaches in many phases in the research process. As a method, it focuses on collecting, analyzing, and mixing both quantitative and qualitative data in a single study or series of studies. Its central premise is that the use of quantitative and qualitative approaches in combination provides a better understanding of research problems than either approach alone (p. 5).

Greene, Benjamin, and Goodyear (2001) assert that mixed methods can give the researcher a better understanding by (1) enhancing validity and credibility of inferences, (2) giving greater comprehensiveness of findings, (3) giving more insightful understandings, and (4) increasing value, consciousness, and diversity. There are several benefits to using mixed methods.

More specifically, concurrent mixed methods were utilized to carry out the research procedures for this study. This is when quantitative and qualitative data are

analyzed at the same time with the intent to validate each other. Creswell (2009) explains:

> Concurrent mixed methods procedures are those in which the researcher converges or merges quantitative and qualitative data in order to provide a comprehensive analysis of the research problem. In this design the investigator collects both forms of data at the same time and then integrates the information in the interpretation of the overall results. Also, in this design, the researcher may embed one smaller form of data within another larger data collection in order to analyze different types of questions (the qualitative addresses the process while the quantitative, the outcomes) (p. 31).

There is one issue to consider when using this method; the sample size was smaller for the qualitative data than the quantitative data. However, when used at the same time they can validate each other, therefore making the judgments of the overall data more accurate. When analyzing these results, the researcher's goal was to identify similarities and differences in the data before coming to a conclusion. Also, the participants in this study were purposefully selected in order to have the qualitative data weigh more in the analysis.

The following table lists characteristics of mixed methods research (Creswell, 2009, p. 34):

Table 1

Characteristics of Mixed Methods Research (Creswell, 2009, p. 34)

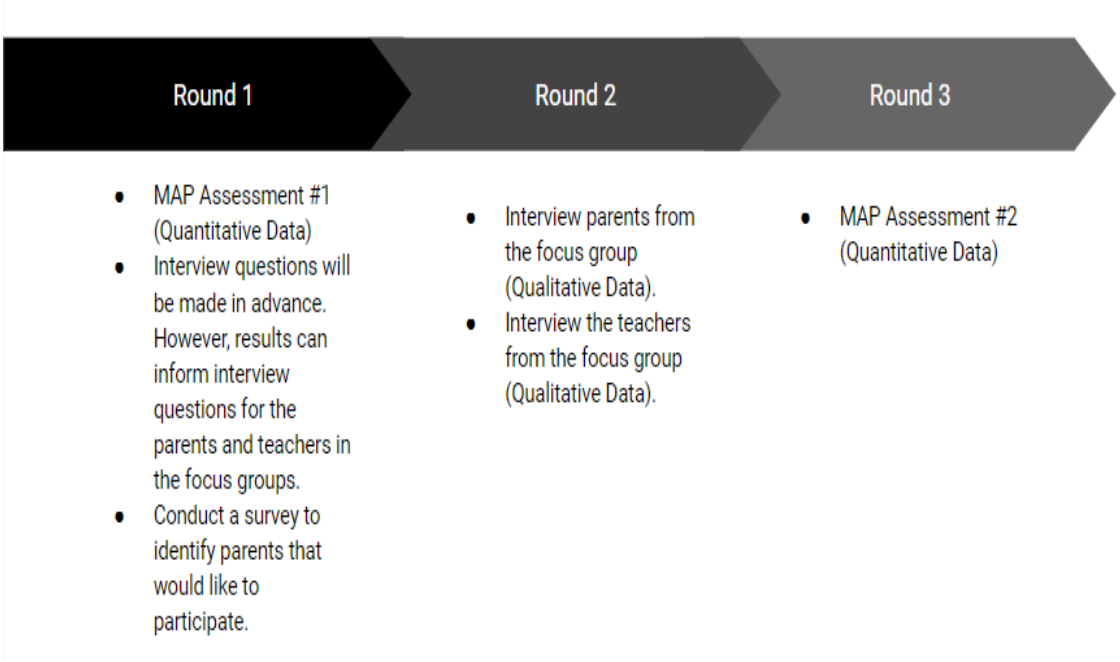
Tend to or typically. . .	**Mixed Methods Approaches**	**Used in this Study**
● Use these philosophical assumptions	● Pragmatic knowledge claims	● Pragmatic knowledge claims
● Employ these strategies of inquiry	● Sequential, concurrent, and transformative	● Concurrent
● Employ these methods	● Both open- and closed-ended questions, both emerging and predetermined approaches, and both quantitative and qualitative data and analysis	● Both open- and closed-ended questions ● Both quantitative and qualitative data and analysis
● Use these practices of research as the researcher	● Collects both quantitative and qualitative data ● Develops a rationale for mixing ● Integrates the data at different stages of inquiry ● Presents visual pictures of the procedures in the study ● Employs the practices of both qualitative and quantitative research	● Collects both quantitative and qualitative data ● Develops a rationale for mixing ● Employs the practices of both qualitative and quantitative research

Quantitative Design and Qualitative Design

Table 2 explains the trajectory of administering the quantitative and qualitative aspects of the study.

Table 2

Trajectory of Administering the Quantitative and Qualitative Aspects of the Study



Students in the focus and control group took the MAP Assessment # 1 in August 2020. This was considered quantitative data. The researcher did not analyze the data until the end of the study in January 2021. Interview questions were made in advance, however results from the assessment could have informed the interview questions for the parents and teachers in the focus group, which was qualitative data. The interviews were conducted at the end of the study. At the same time, the students took a second MAP Assessment in order to compare the results to the first test that was taken. The test scores from the winter were analyzed for the students in the control group and the focus group in order to identify if there was significance.

Population and Sample

For this study the target population was 4th grade elementary math students. This group was chosen because math teachers at this school are seeing a decline in their scores. Table 3 lists the scores for 3rd through 5th grades, at this school, for 2017-2019.

Table 3

Scores for 3rd-5th Grades, at this School, for 2017-2019

Grade	Year	Level (1-5, 1 =low)	Growth Measure
3	2017	Level 1	-10.3
3	2018	Level 1	-11.8
3	2019	Scores were lost?	Scores were lost?
4	2017	No scores	No scores
4	2018	Level 2	-1.1
4	2019	Level 1	-2.6
5	2017	Level 1	-6.0
5	2018	Level 3	-1.0
5	2019	Level 1	-2.8

The researcher was a 3rd grade teacher at this school, and she has seen the struggle that these teachers, including herself, have had the past few years to adapt to the new TNReady math standards. Scores have gotten worse each year for the past three years. The math teachers at the school are experienced and were consistently evaluated well by

their administrators, so it is important to identify strategies that can help these teachers. Some schools are Level 5's, so it can be done.

The rural elementary school used in this study was a 2nd through 5th grade school that has approximately 600 students each year and 16 regular education math teachers. The sample included two 4th grade math teachers and their math classes. Each teacher taught two math classes. Each class was heterogeneously mixed and contained regular education students as well inclusion students. 4th grade classes usually have approximately 18-25 students. CDC students were invited to participate. However, the focus group only contained one CDC student, and he was unable to participate, due to the fact that he spent most of the day outside of the regular education classroom and was usually included into the classroom only to work on social skills. Furthermore, the MAP assessment wasn't an appropriate assessment for this student to participate in. Qualitative data was weighed more heavily in this study meaning that the focus was on the parents' and teachers' interviews. The parents and teachers were purposefully chosen.

For round one of the study, students took the MAP assessment in the fall (August 2020). Then, the teacher and the parents used formative assessment to help their child/students with math from August 2020 until December 2020. For the second round of the research, parents and teachers participated separately in an interview with the researcher at the conclusion of the study (December 2020). Questions were asked in order to gain their perspective on parental involvement in formative assessment and the impact that it had on 4th grade math achievement. Additionally, in round three, in the winter (January 2021), the students took a second MAP assessment, and the results were

compared to the fall test to identify the impact of parental involvement in formative assessment in regards to math achievement.

Instrumentation

MAP. One instrument used for this research study was the MAP assessment. The administrators state that it is most aligned to the TNReady standards, and it was also recommended by the educational consultants that worked with this school in the 2018-2019 school year. MAP was used to analyze the quantitative data. This was used to compare the fall and winter data of the students.

SPSS. SPSS was used to analyze data using the independent Sample t-test. It used the MAP math winter data from the students in the control group and compared it to the students in the focus group in order to determine if there was significance.

Temi. Another instrument that was utilized was Temi, which was used to record and transcribe the interviews with the teachers and parents that were conducted by the researcher. Temi was used in place of the researcher taking notes, to ensure that nothing was missed from the interviews. Creswell (2009) states that when using a software like Temi, ". . . the informant will be informed of all data collection devices and activities," and verbatim transcriptions and written interpretations and reports will be made available to the informant . . ." (p.183).

Video. A video was used to train parents and teachers on what formative assessment is (see Appendix A). The parents and teachers watched the video before deciding if they would be willing to volunteer for the study. The video explained how the students would be allowed to correct all assignments and unit tests for full credit (with the exception of MAP benchmark tests and high stakes assessments used for

research analyses). Also, the video outlined what was expected of the participating parents and teachers. For example, parents would be asked to help their child correct their work and tests in a positive manner, give formative feedback, and stay in contact with the teacher. The participating teachers would allow students to correct their work and tests for full credit, give formative feedback, and stay in contact with parents.

Data Collection Procedures

Concurrent mixed methods were used to analyze the data for this study. The fall and winter quantitative data and the qualitative data was collected and analyzed in the winter. The researcher collected the scores from the students' fall and winter MAP assessments and the recorded interviews from parents and teachers. This data was stored in a professor's locked office on the MTSU campus. Test results and interviews were kept anonymous by using pseudonyms. A third party (the researcher's assistant) blinded the quantitative data for the researcher.

Quantitative Data Collection Procedures

For the collection of the quantitative data, first the parents and teachers watched a video on parental involvement in formative assessment. In Appendix A an outline of that video is provided. The students took a MAP assessment in the fall (August 2020). Next, the parents and teachers began to help their child/students by using formative assessment. Then, in the winter (January 2021) the students took another MAP assessment; the results were compared to the fall MAP assessment. The assessment was given, then a make-up day was scheduled for the students that were absent. Additionally, the school had a scheduled day for remote learners to come to school to take the assessment. The assistant principal printed the MAP math data for the researcher to analyze.

Qualitative Data Collection Procedures

In December 2020, the researcher collected qualitative data by conducting interviews with parents and teachers separately (see Appendix B and C for Interview Protocol). The questions asked were open-ended questions. There were prompts listed to gain more information if the researcher felt the need for clarification or just the need for the participant to elaborate.

Interviews were conducted by telephone; except for one that was sent by text to a parent that spoke Spanish and needed the interview translated. A school translator translated the interview questions to Spanish, and then translated the answers to English for the researcher. The researcher downloaded Temi on her cell phone for the interviews. She called the parent, switched the cell phone to speaker phone, and then opened Temi to start recording the interview. Temi had technical difficulty for one parent interview, and the researcher took notes in place of recording.

The researcher used Temi to retrieve a transcription of each interview; with the exception of the translated text and the notes taken from the one interview where Temi wouldn't record. The interviews were sent from Temi to her email. Next, the interview transcriptions were copied and pasted to a word document. The researcher played each of the Temi interview recordings and edited the transcription. The two interviews that weren't recorded by Temi were typed into a word document by the researcher.

Data Analysis Procedures

This study used the concurrent mixed methods design to include both quantitative and qualitative data to analyze the findings of this research project. The quantitative data for the first MAP test and the data from the second MAP test, as well as the parents' and

teachers' interviews were gathered December 2020-January 2021. The data was analyzed December 2020-January 2021.

Quantitative analysis occurred by comparing the fall and winter MAP assessments. Also, the control group was compared to the focus group using winter data. The data was analyzed using an independent Sample t-tests using SPSS. The hypothesis was tested to identify if there was a significant difference in the classes that incorporated parental involvement in formative assessment.

The qualitative data was analyzed by looking for similarities in the interviews, then coding to identify findings that are conducive to the research.

Research Hypotheses

The following hypotheses will be tested in this research study for the quantitative data:

Null Hypothesis (H0): Parental involvement in formative assessment will impact 4th grade elementary math achievement in a positive way.

Alternate Hypothesis (H1): Parental involvement in formative assessment will not impact 4th grade elementary math achievement in a positive way.

Summary

This chapter discussed information about the concurrent mixed methods design that was used to conduct this study. It explained why this design was the appropriate one to use, as well as what instruments were used to collect data and how data was collected. The chapter also summarized how the quantitative and qualitative data were analyzed. A description of the population and sample participants were given.

CHAPTER FOUR: PRESENTATION AND ANALYSIS OF DATA

This chapter contains an analysis of data collected from parental involvement in formative assessment in 4th grade math. 142 students participated in two MAP Math Assessments (fall and winter assessments), and data was analyzed in January 2021. The quantitative portion of this study consisted of 66 students in the focus group and 76 students in the control group. The two MAP Math Assessments' data were compared to assess the null hypothesis of the study using an independent Sample t-test. Additionally, interview data was collected in a ten-day period in the month of December 2020 from six parents and two teachers. Moreover, the interviews coupled with the MAP Math Assessments give a more accurate picture of the research findings. The research questions considered for this study were:

(1.) How can parental involvement in formative assessment impact math achievement in 4th grade?

The null hypothesis is as follows: Null Hypothesis (H0): Parental involvement in formative assessment will impact 4th grade elementary math achievement in a positive way.

(2.) What are parents' perceptions of the implementation of parental involvement in the formative assessment process in school?

(3.) What are the participating teachers' perception of the implementation of parental involvement in the formative assessment process in school?

Analysis of Quantitative Findings

An independent Sample t-test was conducted to determine if there was significance between the focus and control groups' MAP Math Assessments.

Table 4 describes the descriptive statistics for parental involvement in formative assessment in 4th grade math. 142 students took the MAP Math Assessment 1 and MAP Math Assessment 2. The focus group consisted of 66 students, and 76 students made up the control group. There was a mean of 192.75 on the first assessment and a mean of 197.53 on the second assessment; this reflects a raw increase of approximately five points between the two assessments.

Table 4

Descriptive Statistics

Descriptive Statistics

	N	Minimum	Maximum	Mean	Std. Deviation
Assessment1	142	154	233	192.75	12.579
Assessment2	142	160	235	197.53	13.115
Valid N (listwise)	142				

Table 5 shows that there was an increase between the fall MAP assessment and the winter MAP assessment for the focus and the control groups.

Table 5

Group Statistics

Group Statistics

	focus_control	N	Mean	Std. Deviation	Std. Error Mean
Assessment1	1	66	191.94	11.806	1.453
	2	76	193.45	13.251	1.520
Assessment2	1	66	196.86	12.671	1.560
	2	76	198.11	13.546	1.554

However, Table 6 shows that the independent Sample t-test found that this difference was not statistically significant. This means that we have no basis to claim that the parental involvement in formative assessment in 4th grade math made an impact on student learning, as measured by this MAP Math Assessment.

The researcher compared the focus group to the control group on their math achievement assessed by the MAP math assessment. In order to analyze this, an independent Sample t-test was completed. The results of this study did not find a statistically significant difference between the focus and control groups on their math achievement, $t(140) = -.56$, $p = .05$, so we reject the null hypothesis that parental involvement in formative assessment impacted 4th grade elementary math achievement in a positive way. Additionally, the focus group (196.86) has a lower mean math score than the control group (198.11).

A Leven's test was run. It was used to test the assumption that both groups are equal. In a Leven's test, if the sig. value is below .05, the column labeled "Equal

variances not assumed" is used, and if the sig. value is above .05 the column labeled "Equal variances assumed" is used.

Table 6

Independent Samples Test

								95% Confidence Interval of the Difference	
	F	Sig.	t	Df	Sig. (2-tailed)	Mean Diff.	Std. Error Diff.	Lower	Upper
Assessment2 Equal variances assumed	.100	.752	-.561	140	.575	-1.242	2.212	-5.615	3.132
Equal variances not assumed			-.564	139.208	.574	-1.242	2.202	-5.594	3.111

According to the analysis above, parental involvement in formative assessment didn't have a positive effect on the 4th grade math achievement. The control and focus groups performed similarly on the math MAP assessment. Therefore, the MAP math data can't be used to support parental involvement in formative assessment.

When looking at the MAP data results, some factors to consider are that the focus group had 675 absences and the control group had 426 absences; the focus group had 249 more absences than the control group. Also, this school is using the Eureka curriculum to teach math. Administrators encourage teachers to teach from the script, which could be

interfering with using formative assessment to its full potential. Additionally, COVID-19 has led to more use of technology. Teachers are having a difficult time managing student behavior, such as students playing computer games during classtime, coming to the Google Meets late and leaving early. This could be overloading the teachers' working memory causing formative assessment use to be minimal. Lastly, parent communication may have been utilized more for logistic issues than for formative assessment and formative feedback due to COVID-19. For example, parents texted/called because of bus changes, to ask if they could send cupcakes due to COVID-19 restrictions, and to inform teachers that their child was sick.

One of the teachers interviewed was MC. He has been a teacher for 14 years, and has spent the entirety of those 14 years at the selected school. He was self-contained for eight of those years and taught math, science, social studies, and ELA (English Language Arts). The other seven years he taught various subjects with a co-teacher(s). For example, he taught social studies and science at one time. Presently, he teaches math and science. MC's teacher interview was on December 8, 2020 at 2:30 PM. His interview was conducted at his school in person.

One of the parents interviewed was KWBB. KWBB's interview was on December 16, 2020 at 2:20 PM. KWBB is white, female, and 36 years of age. The interview was conducted by telephone.

This teacher and parent both mentioned, in interviews, that COVID-19 was a concern. MC said that he wished that this study had been conducted during a typical school year. KWBB explained, "This year, it was just kind of hard to really, I guess, to

see how well it works because of the remote learning. That's the only thing that . . . I don't know if it would have been different had they been in person 100% of the time."

Personally, as the researcher and a teacher myself during the COVID-19 pandemic, I have found it very difficult to educate students as well as I am able to during a typical school year. It is difficult to get all students on the computer for the full amount of time that they are supposed to be on. Then, once the students are in the digital classroom, I can sometimes see on Go Guardian that they are playing computer games. Even though students know that teachers can see what they are doing, and teachers send them a message and/or contact the parent, some students repeatedly get on games, YouTube, etc. Some students don't show up for class at all during remote learning even if they have internet access at home.

Also, I predict that some students are taking advantage of their ability to stay home because they "may have COVID-19." I have four students that have missed between 17-34 days of school. Three of their parents/guardians have stopped answering the telephone/text message when I try to contact them to repeatedly ask for one student to log on and for the other two to come to school. The other parent communicates well with me, but her child is chronically absent. Three of the four students are below average in math, and it is concerning that they are missing so much material being covered. When talking with one of these students about her MAP Math Assessment score and how she was falling behind, she told me that she could get on Zearn.org at home to improve. I was surprised when I asked her about her internet access, and she told me that she has internet. I asked her why she hadn't been getting on Google Meets when we switched to

remote learning, and she said that her mom just doesn't get her up and put her on; it's just a day off in their opinion.

I believe that if this study had been conducted in a school with more teacher autonomy in teaching the Eureka curriculum and during a typical school year, that there would have been significance in the comparison of the focus and control groups' MAP scores.

Analysis of Qualitative Findings

Parents and teachers completed an interview with the private investigator at the conclusion of the study. Interview questions can be found in Appendix B for parents and Appendix C for teachers. There were 10 interview questions regarding the parents' and teachers' perceptions of parental involvement in formative assessment in 4th grade math. Question 2 was removed by the private investigator because of time constraints to include a weekly progress monitoring sheet. All parent interviews can be found in Appendix D, and the teacher interviews can be found in Appendix E. The following gives a summary of each participants' individual interview and gives the combined parents' perceptions and combined teachers' perceptions of parental involvement in formative assessment.

The following summary of individual parents' interviews were categorized by using the interview questions; each question was made into a category. The parent interview questions can be found in Appendix B.

Summary of Individual Parents' Interviews

Interview with DHBH. DHBH was interviewed December 8, 2020 at 2:20 PM by telephone. DHBH is white, female, and 26 years of age. Also, she is the step-mother of BH; his mother passed away a couple of years ago. When asked to define formative

assessment she had trouble doing so. She did say that she believed that her child has a more positive outlook on school because of being involved in the formative assessment process. She explained, ". . .B_____ had been having trouble with some of his math and some of the tests . . . that had to be taken . . . Mr. C_____ made me aware of the situation, and he would . . . let me know that he was able to redo his test too, for a higher grade that way. And he was able to explain it more to him." Also, she said that the training video was helpful, and it wasn't inconvenient to be involved in the formative assessment process. In regards to the interview question asking if she felt that her child improved by her being involved in the formative assessment process she stated, "I do . . . I feel like it gives him a second chance to understand some of his work and being able to give him a second chance on some of his homework and test." DHBH did say that she thought the teacher/parent relationships improved by being involved in the formative assessment process. When asked what she liked she said, "I like being involved in my child's education . . . knowing where B_____ was having trouble really helped out. That way we could help him at home and know what's going on in school, also." She said that there wasn't anything that she didn't like about the process.

Interview with TDKD. TDKD was interviewed December 10, 2020 at 2:31 PM. The interview was conducted by telephone. TDKD is white, female, and 39 years of age. When she was asked what she thought formative assessment was, she said, "Helping and assisting my child." TDKD did say that she believed that her child had a more positive outlook on school because of her being involved in the formative assessment process. She explained that, despite COVID, her child's grades are still good. Also, she said that the training video was helpful and that it wasn't inconvenient to be involved in the

formative assessment process. Additionally, TDKD felt that her child improved by being involved in the formative assessment process. She said, "I'm a firm believer in anything that is beneficial to the students' education." The teacher/parent relationships improved by being involved in the formative assessment process according to TDKD. She stated the following example of improved relationships between herself and the teacher, "Mrs. P____ sent emails and ran out to see me in the car line." When asked what she liked about the process, she answered, "Communication made it easier because of COVID." Additionally, she said that there wasn't anything that she disliked about participating.

Interview with BFLF. BFLF was interviewed by telephone on December 13, 2020 at 2:00 PM. BFLF is white, female, and 41 years of age. She is married and hasn't been divorced. LF is her biological daughter. When asked to define formative assessment, she did so appropriately. She defined it in the following manner, " . . . it's where they look at what the child is good at or what they need help with and they try to assess that and go from there." When asked if she felt that her child has a more positive outlook on school because of her being involved in the formative assessment process, she said that she thought so. She gave the following example, ". . . We got on the Zoom chat, last week, and went over some of the things that L_____ had been missing and . . . that she needed to work on because . . . her computer had glitched out a couple of days, and she didn't stay on the Google Meet the whole time, so we went over what she needed to do." BFLF said that the training video was helpful, and she stated that parental involvement in formative assessment wasn't inconvenient.

Also, when asked if she felt that her child improved by being involved in formative assessment, she said that she did but didn't elaborate when prompted. She did

say that teacher/parent relationships improved by being involved in the formative assessment process. She explained, “I think it gives us more . . . communication as far as what my particular child needs and needs to improve on and what she’s good at. And I think that helps the teacher to identify it as well as me as a parent, and we try to work on that together.” Also, when asked what she liked about parental involvement in formative assessment she said, “I feel like I have a closer relationship with the teacher, as far as what is best for my child, and we can work on things together because we have better communication.” There were no dislikes.

Interview with MCEC. MCEC was interviewed on December 15, 2020 at 2:30 PM by telephone. This particular interview could not be recorded by Temi due to technical difficulties. MCEC is white, female, and 30 years old. The researcher took notes during the interview. When MCEC was asked to define formative assessment, she said that it was to review work and help her child with the work. When asked if she felt like her child has a more positive outlook on school because of her being involved in the formative assessment process she said, “Yes, it made him want to do it correctly because I was looking at it.” She said that the training video was helpful, and that it wasn’t inconvenient being involved in the formative assessment process. She said that she believed that her child improved by being involved in the formative assessment process. She explained that parents should be involved anyway and that she was aware of some parents that are not. MCEC wasn’t sure if the teacher/parent relationship improved, because she said that she hasn’t worked with these teachers before this year. She said that she liked being able to see what’s going on and being able to correct things early, and that there wasn’t anything that she disliked.

Interview with CMDS. CMDS is Hispanic, female, and 39 years of age. She was interviewed on December 15, 2020 at 8:33 PM by texting her the questions translated from English to Spanish. The interview questions were translated to Spanish, then answered in Spanish by the parent. Then, the interview answers were translated to English. This interview was not recorded with Temi due to the language barrier.

When asked what formative assessment is, CMDS answered, "It is to be more involved; teachers, parents, and students." She did feel that her child had a more positive outlook on school because of her being involved in the formative assessment process. Also, CMDS found the training video helpful and said that it wasn't inconvenient being involved in the formative assessment process. She said that she thought that her child improved by being involved in the formative assessment process, because, ". . . they learned to develop better." Additionally, CMDS stated that teacher/parent relationships improved by participating, ". . . despite the difficult situation we are going through." (I believe that she is referencing COVID and the transitioning to and from remote learning to in person learning.) When asked what she really liked about parental involvement in formative assessment she explained, "Confidence in communication between students, parents, teachers." Nothing was mentioned as a dislike. She also added that she was thankful for the attention that she and her daughter received.

Interview with KWBB. KWBB's interview was on December 16, 2020 at 2:20 PM. The interview was conducted by telephone. KWBB is white, female, and 36 years old. When asked to define formative assessment she said that she was confused about it but did some research. She explained, "I think it's just where pretty much the parent and the teacher work more one-on-one with the kids and are a little bit more involved."

When she was asked if she felt that her child has a more positive outlook on school because of her being involved in the formative assessment process she explained, "Oh, absolutely. Yes. B_____ always loved school, but this year . . . I really think this probably has an effect on it. Um, she's really done so much better, and she's been more on top of things, and she comes to me a lot more with questions about her school work and all of that, so, yeah, absolutely." KWBB said that the training video was helpful, and it wasn't inconvenient being involved in parental involvement in formative assessment. She explained, "Not for me because I'm pretty involved anyways with my kids' school work . . . it wasn't an inconvenience at all, especially this year now that they've been home with us more . . . So, absolutely not." When asked if she felt that her child improved by being involved in the formative assessment process, she stated, ". . . I don't know if I would say she improved because B_____ has always had straight A's, and she has still had straight A's . . . But . . . her attitude towards school is much better this year." She said that she believes that the teacher/parent relationships improved by being involved in the formative assessment process. She elaborated by saying, "…her teachers and I have a very good relationship, and I speak with them at least once a week . . ." Additionally, when asked what was something that she really liked about parental involvement in formative assessment she said, ". . . I know more about what they're doing in school, and I'm able to reach out to her teachers. We've just been communicating a lot more. I've learned more of her teacher's teaching styles and also how B_____ responds to them when she's in person and in the classroom." When asked to name a dislike, KWBB explained that she didn't think there were any dislikes, but went on to say, "This year, it was just kind of hard to really, I guess, see how well it

works because of the remote learning. That's the only thing that . . . I don't know if it would have been different had they been in person 100% of the time."

Parents' Perceptions

Formative Assessment Definition. One of the questions asked in the interview was for the parent to define formative assessment. A few of the parents struggled to answer this question. However, most gave answers that coincided with the definition from the formative assessment in parental involvement training video that the parents viewed in the fall at the beginning of the study. Five parents defined formative assessment in an appropriate manner or somewhat appropriate manner. One of them answered that they didn't know the definition. One parent defined formative assessment as, "Helping and assisting my child." Another parent said that it is when you review work and help the child. Parents were on the right track. A third parent said, ". . . it's where they look at what the child is good at or what they need help with and they try to assess that and go from there."

Do you feel that your child has a more positive outlook on school because of you being involved in the formative assessment process? All six parents said that they felt their child has a more positive outlook on school because of them being involved in formative assessment. Table 7 shares how the parents elaborated on this question.

Table 7

Parents Answers to Their Child Having a More Positive Outlook on School

DHBH	"Yes . . . B_____ had been having trouble with some of his math and some of the tests . . . Mr. C_____ made me aware of the situation and let me know that he was able to redo his test too, for a higher grade . . . And he was able to explain it more to him."
TDKD	"Yes, despite COVID, her grades are still up."
BFLF	"I think so . . . We got on the Zoom chat last week and went over some of the things that L_____ had been missing and . . . that she needed to work on because . . . her computer had glitched out a couple of days, and she didn't stay on the Google Meet the whole time, so we went over what she needed to do."
MCEC	"Yes, it made him want to do it correctly, because I was looking at it."
CMDS	"Yes."
KWBB	"Oh, absolutely. Yes. B_____ always loved school, but this year . . . probably has an effect on it . . . she's really done so much better, and she's been more on top of things, and she comes to me a lot more with questions about her school work and all of that, so, yeah, absolutely."

Training Video. All six parents contended that the parental involvement in formative assessment video was helpful in training them on what they were expected to do in order to participate. One parent said that it had been a while since she had watched the video, however she still agreed that it was helpful.

Convenience. All six parents said that parental involvement in formative assessment was not inconvenient. When KWBB was asked if she thought parental involvement in formative assessment was inconvenient, she replied, ". . . not at all. Not for me because I'm pretty involved anyways with my kid's school work." KWBB also stated, ". . . it wasn't an inconvenience at all, especially this year now that they've been home with us more."

Student Improvement. All six parents agreed that students did show improvement by being involved in parental involvement in formative assessment. Table 8 shows what the parents had to share in regards to student improvement.

Table 8

Parents' Comments about Student Improvement

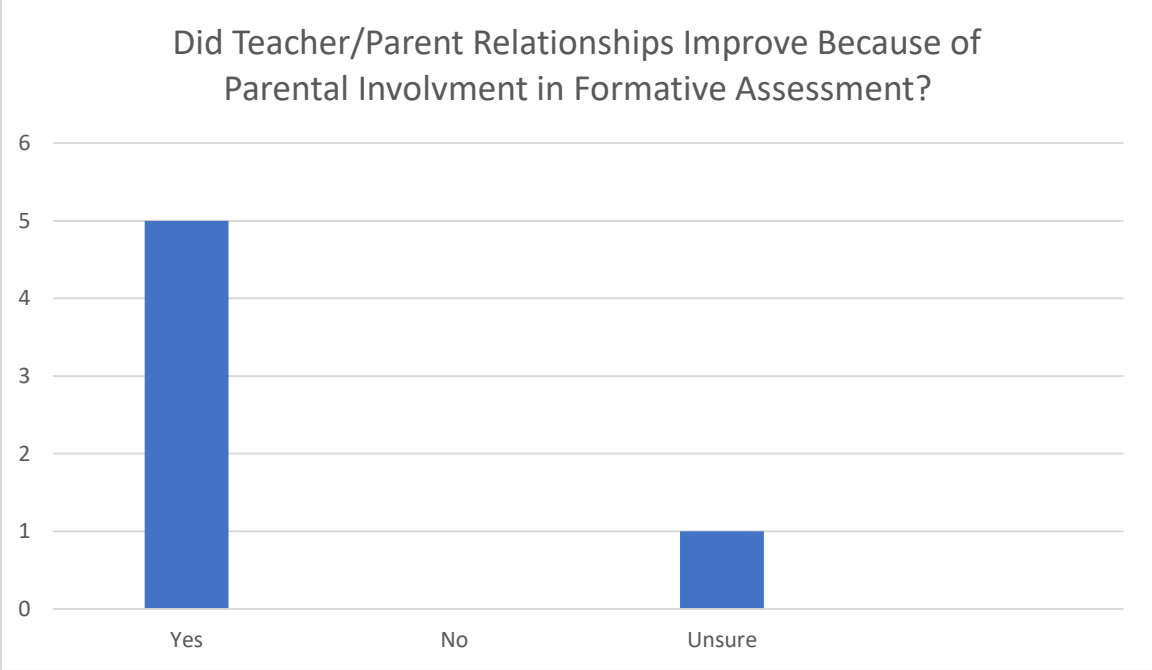
DHBH	". . . I feel like it gives him a second chance to understand some of his work and being able give him a second chance on some of his homework and tests."
TDKD	". . . I'm a firm believer in anything that is beneficial to the students' education."
BFLF	N/A
MCEC	". . . You should be involved anyway. I know some parents are not."
CMDS	". . . because they learned to develop better."
KWBB	". . . I don't know if I would say she improved because B_____ has always had straight A's, and she has still had straight A's. . . But . . . her attitude towards school is much better this year."

Teacher/Parent Relationships. Positive comments were made in the parent interviews in regards to how parental involvement in formative assessment affected teacher/parent relationships. Five parents said that the teacher/parent relationship improved. One parent said that she was unsure because she had not worked with these teachers the school year before. When BFLF was asked if she felt that teacher/parent relationships improved by being involved in the formative assessment process and to name an example, she responded, "Yes," and stated, "I think it gives us more of a

communication as far as what my particular child needs and needs to improve on and what she's good at. And I think that helps the teacher to identify it as well as me as a parent. And we try to work on that together." Table 9 displays the findings to the question of did teacher/parent relationships improve because of parental involvement in formative assessment.

Table 9

Did Teacher/Parent Relationships Improve?



What Did You Like About Parental Involvement in Formative Assessment?

Table 10 has parents' responses to the question, "What did you like about parental involvement in formative assessment?"

Table 10

What Parents Liked About Parental Involvement in Formative Assessment

DHBH	". . . I like being involved in my child's education . . . knowing where B_____ was having trouble . . . really helped out that way we could help him at home and know what's going on in school, also."
TDKD	"Communication made it easier because of COVID."
BFLF	"I feel like I have a closer relationship with the teacher, as far as what is best for my child, and we can work on things together because we have better communication."
MCEC	"Being able to see what's going on and being able to correct things early."
CMDS	"Confidence in communication between students, parents, teachers."
KWBB	". . . I know more about what they're doing in school, and I'm able to reach out to her teachers. We've just been communicating a lot more. I've learned more of her teacher's teaching styles and also how B_____ responds to them . . . when she's in person and in the classroom."

What Did You Dislike About Parental Involvement in Formative Assessment? All six parents said that there wasn't anything that they disliked about parental involvement in formative assessment. However, KWBB explained, "This year, it was just kind of hard to really, I guess, see how well it works because of the remote learning. That's the only thing that . . . I don't know if it would have been different had they been in person 100% of the time." This school year has been inconsistent by transitioning back and forth from in person learning to remote learning, as well as giving students the option to move to and from remote when school is open for in person learning.

Additional Information Shared by Parents. Out of the six parents interviewed only one parent shared additional information. CMDS, a Hispanic parent, expressed that

she was thankful for the additional attention that she received. Also, I noted that all of the parents interviewed were extremely friendly and seemed appreciative to be involved.

The following summary of individual teachers' interviews were categorized by using the interview questions; each question was made into a category. The teacher interview questions can be found in Appendix C.

Summary of Individual Teachers' Interviews

Interview for DP. DP has taught 14 years. She has taught at this school for seven years in 4th grade (math and science). At a different school, in the same county, she taught kindergarten (math, science, social studies, and English Language Arts) for six years and 6th grade (math and science) for one year. Last school year, she was awarded "Teacher of the Year" for the 2019-2020 school year. DP's teacher interview was on December 7, 2020 at 2:15 PM. Her interview was conducted at her school in person.

Over all DP had positive comments in regards to parental involvement in formative assessment. She was able to define formative assessment as, ". . . ongoing feedback of students' strengths and weaknesses, so I can better help them and prepare the lessons." She stated that she felt that students do have a more positive outlook on school because of their parents being involved in the formative assessment process. She gave the following example, ". . . the students will come back the next day and share with me how their parents showed them how to solve a problem. So, they're excited because of that parent bonding time. I mean, it actually gives them more time with that parent. So they're excited to see that parents are showing them strategies, and I think more so that they're just happy to have that time with the parents. She did find the training video

helpful and said that being involved in the formative assessment process with parents was not at all inconvenient.

When asked if she felt like her students improved by their parent being involve in the formative assessment process, she explained, “Absolutely. Again, I think they just wanted the parents to see what they’re doing well, and then if they needed some strengthening, their parents kind of shared another view or another strategy. So I think it was very helpful.”

Additionally, she believed that the teacher/parent relationship improved through them participating. She stated, “I think that the parents really appreciated you taking extra time to give their student another shot at the learning objective and that they were able to offer that assistance.” She liked the positive relationships that developed between all of the participants, and she said that she didn’t dislike anything really, but that in one instance she had a parent want a very long period of time for the child to complete an assignment and that made it a little tricky for her to go back and find. She did add that it was still a really good experience. DP seemed to enjoy participating in parental involvement in formative assessment.

Interview for MC. MC has taught 14 years, and he has taught the entire 14 years at the selected school. He was self-contained eight of those years and taught math, science, social studies, and ELA (English Language Arts). The other seven years he taught various subjects with a co-teacher(s). For example, he taught social studies and science at one time. Presently, he teaches math and science. MC’s teacher interview was on December 8, 2020 at 2:30 PM. His interview was conducted at his school in person.

MC was able to define formative assessment appropriately for this study. He said that formative assessment was, ". . . trying to grasp what the strengths and weaknesses are of a child and focusing on those ones so they can have confidence in what they're doing, but too letting them know and knowing that they haven't attained anything yet and working on that area; self-realization of shortfalls."

When asked if he felt that his students have a more positive outlook on school because of their parents being involved in the formative assessment process he explained, "I think that the kids love their parents. They love being involved no matter what it is; formative assessment, playing Tic-Tac-Toe, as long as their parents are there. They love that. So, yes, I think that they have a . . . great positive outlook on school when their parents are right there helping them. I have a couple of children that the parents are right there. And in fact, I saw one today where the dad was there guiding his daughter. And it seemed to help. They liked that." Additionally, he said that the video was helpful especially when he didn't know what to do, and it gave him guidance as well.

When MC was asked if being involved in parental involvement in formative assessment was inconvenient he said, "I don't think inconvenient is the word to put especially when we have the distance learning like we do. It's not inconvenient. It's just difficult, difficult because . . . everyone has their own thing going on sometimes . . . as far as meeting, you set up a 'Meet' and one of the parties aren't there, it . . . was difficult."

When he was asked if he felt his students improved by their parents being involved in the formative assessment process, MC answered, "Yes. They improved . . . they just had a more positive outlook . . . anytime a parent can be involved, as long as they're not angry about being involved is a plus." Also, he said that he believes that

teacher/parent relationships improved by being involved in the formative assessment process.

When asked what he liked about parental involvement in formative assessment he said, ". . . just the fact that parents are involved is an asset to the student, to the teacher, and I even believe to the parent. I think they learn each other better while they're interacting." When asked what he didn't like he said that he wasn't sure if there was anything. Then, when asked if he would like to share anything else he explained, "I wish you could be asking these questions where the children were face-to-face with us instead of distance learning; that makes it difficult for us. And I know it's probably difficult for you doing this paper."

Teachers' Perceptions

Formative Assessment Definition. Both 4th grade math teachers were able to define formative assessment in an appropriate manner. DP defined formative assessment as follows, "Ongoing feedback of students' strengths and weaknesses, so I can better help them and prepare the lessons." MC gave the following definition, ". . . trying to grasp what the strengths and weaknesses are of a child and focusing on those ones so they can have confidence in what they are doing, but too letting them know and knowing that they haven't attained anything yet and working on that area; self-realization of shortfalls." The two math teachers interviewed understood the meaning of formative assessment as it pertains to this study.

Do you feel that your students have a more positive outlook on school because of their parents being involved in the formative assessment process? When asked this question MC answered, "I think that the kids love their parents. They love

been involved no matter what it is. Formative assessment, playing Tic-Tac-Toe, as long as their parents are there. They love that. So, yes, I think that they have a great positive outlook on school when their parents are right there helping them. I have a couple of children that the parents are right there. And in fact, I saw one today where the dad was there guiding his daughter, and it seemed to help. They liked that." DP agreed that she felt that her students had a more positive outlook on school because of their parents being involved in the formative assessment process.

Training Video. Both participating teachers agreed that the parental involvement in formative assessment video was helpful in training them on what they were expected to do in order to participate. When MC was asked if the training video was helpful, he replied, "Sure. Especially when I didn't know what to do, and it gave me some guidance."

Convenience. Both teachers said that parental involvement in formative assessment was not inconvenient. When MC was asked if he thought parental involvement in formative assessment was inconvenient, he explained, "I don't think inconvenient is the word to put especially when we have the distance learning like we do. It's not inconvenient. It's just difficult . . ." He explained that it was difficult because everyone has their own thing going on. For example, in regards to the Google Meets where the teachers teach their students lessons, he expressed that it was difficult to get everyone there when they were supposed to be.

Student Improvement. Both teachers agreed that students did show improvement by participating in parental involvement in formative assessment. Table 11 shows what the teachers had to share in regards to student improvement.

Table 11

Teachers' Comments about Student Improvement

DP	"I think they just wanted the parents to see what they're doing well, and then if they needed some strengthening, their parents kind of shared another view or another strategy. So I think it was very helpful."
MC	"They improved . . . they just had a more positive outlook. . . Anytime a parent can be involved, as long as they're not angry about being involved is a plus."

Teacher/Parent Relationships. Positive comments were made in the teacher interviews in regards to how parental involvement in formative assessment affected teacher/parent relationships. Both teachers agreed that parent/teacher relationships improved from participating in involving parents in the formative assessment process. When DP was asked if she felt that teacher/parent relationships improved by being involved in the formative assessment process, she explained, "Yes, because I think that the parent really appreciated you taking the time to give their student another shot at the learning objective and that they were able to offer that assistance."

What Did You Like About Parental Involvement in Formative Assessment? When the teachers were asked to name something that they really liked about parental involvement in formative assessment, DP explained, "I think just the positive relationships that are developed between the child and the parent and the teacher and the parent, and then the teacher and the child, because of the parent." MC said, ". . . just the fact that parents are involved is an asset to the student, to the teacher, and I even believe to the parent. I think they learn each other better while they're interacting."

What Did You Dislike About Parental Involvement in Formative Assessment? One teacher couldn't think of anything that he disliked about parental involvement in formative assessment. However, DP had trouble thinking of something she disliked but did add, ". . . there was one situation where a parent wanted to have a very long expanse of time and that just made it a little tricky for me to go back and find, but it was a really good experience." So, the longer time frame allowed, the more difficult it may be for teachers to find the assignment, allow the student to redo the assignment, grade it, and change the grade.

Additional Information Shared by Teachers. Out of the two teachers interviewed, one shared additional information. When MC was asked if he would like to share anything else, in the interview, he stated, ". . . I wish you could be asking these questions where the children were face-to-face with us instead of distance learning; that makes it difficult for us. And I know it's probably difficult for you doing this paper." This teacher believes that if this was a regular school year with only in person learning, it would make a difference in the results of this study. This school started school two weeks late, then began in person learning with the option for students to learn remotely if needed. Then, the school was all remote for approximately two weeks, then back in person with the option of remote. Following that, the school was remote again right before Christmas break for two weeks. This was a very inconsistent first half of the school year.

Parent/Teacher Definitions of Formative Assessment

Table 12 displays parents' and teachers' definitions of formative assessment. Parents seemed to have more of a struggle to define the term. DHBH was unable to give

a definition. Some of the parent definitions were more acceptable than others. For example, BFLF said, ". . . it's where they look at what the child is good at or what they need help with and they try to assess that and go from there." However, CMDS said, "It is to be more involved; teachers, parents, and students." This definition is vague.

The teacher definitions of formative assessment were more aligned to this research study. DP's definition was, ". . . ongoing feedback of students' strengths and weaknesses, so I can better help them and prepare the lessons." Teachers use this term in their profession, so it may have been easier for them to define the term.

Table 12

Parent and Teacher Definitions of Formative Assessment

Parent	Teacher
• DHBH - She didn't give a definition. • TDKD - "Helping and assisting my child." • BFLF - ". . . it's where they look at what the child is good at or what they need help with and they try to assess that and go from there." • MCEC - She said that it was to review work and help her child with the work. • CMDS - "It is to be more involved; teachers, parents and students." • KWBB - "I think it's just where pretty much the parent and the teacher work more one-on-one with the kids and are a little bit more involved."	• DP - "…ongoing feedback of students' strengths and weaknesses, so I can better help them and prepare the lessons." • MC - ". . . trying to grasp what the strengths and weaknesses are of a child and focusing on those ones so they can have confidence in what they're doing, but too letting them know and knowing that they haven't attained anything yet and working on that area; self-realization of shortfalls."

Summary of Trends

Communication, relationship building, confidence, and success in school were trends identified in the parent and teacher interviews as being positive outcomes of parental involvement in formative assessment.

Communication included things such as Remind, text, and phone calls. Parents had positive comments in regards to communication. For example, DHBH said, "I like being involved in my child's education. . . knowing where B____ was having trouble

really helped out, that way we could help him at home and know what's going on in school, also." Another parent, TDKD, explained that Mrs. P___ sent emails and ran out to the car line. She said, "Communication made it easier because of COVID." BFLF mentioned that it let her know what her child needed to improve on and what she's good at. Also, it helped the teacher to identify it as well, then they could work on it together. MCEC said that she liked being able to see what's going on and being able to correct things early. CMDS explained that she liked the "Confidence in communication between students, parents, and teachers." Additionally, KWBB said that she knows more about what they're doing in school, she's able to reach out to her teachers, they are communicating a lot more, and she learned more of her teacher's teaching styles and how her child responds to them.

Relationship building was mentioned several times during the parent and teacher interviews, not only parent teacher relationships, but also relationships between parents and students. A parent, BFLF, said, "I feel like I have a closer relationship with the teacher, as far as what is best for my child, and we can work together because we have better communication." Another parent, CMDS, explained that relationships improved, ". . . despite the difficult situation we are going through." CMDS said that she was thankful for the attention that she and her daughter received. KWBB stated, ". . . her teachers and I have a very good relationship, and I speak with them at least once a week."

Teachers, DP and MC, shared that student/parent relationships improved as well as teacher/parent relationships. DP said that students share how their parents showed them how to solve problems, they're excited about the bonding time, it gives them more time with parents, and they are happy to have time with their parents. She added that she

really liked the positive relationships that developed between all of the participants. MC stated, “I think the students love their parents. They love being involved no matter what it is; formative assessment, playing Tic-Tac-Toe, as long as their parents are there. They love that. Additionally, when asked what he liked about parental involvement in formative assessment he explained, “. . . just the fact that parents are involved is an asset to the student, to the teacher, and I believe to the parent. I think they learn each other better while they are interacting.

Confidence resulting in positive attitudes was another trend that was evident from the parent and teacher interviews. When MCED was asked if she felt like her child has a more positive outlook on school because of her being involved in the formative assessment process she said, “Yes, it made him want to do it (the work) because I was looking at it.” KWBB explained that this year her daughter’s attitude is much better towards school, parental involvement in formative assessment has had an effect she believes. She said that she’s done so much better, been more on top of things, and comes to her with a lot more questions about her work.

A teacher, MC, said that he thinks that students have a great positive outlook on school when their parents are right there helping them. He named an example of seeing a dad help his daughter, and noted that it looked to be a positive experience.

Success in school because of second chances was another trend from the parent and teacher interviews. A parent, DHBH, said that her child was having trouble with his math and test. Mr. C made her aware of the situation, and he said that her child could redo his test for a higher grade. Also, Mr. C said that he could explain it more for him. She said, “I feel like it gives him a second chance to understand some of his work . .

." BFLF said that she got on the Google Meet to see what her daughter was missing, because her computer had glitched out a couple of days during her online class, and the teacher let her know what she needed to do.

One of the teachers, DP, explained that students improved because of parental involvement in the formative assessment process. She said if students needed strengthening, parents helped them at home. Also, she mentioned that parents really appreciated her taking the extra time to give their child another shot at the learning objective.

Diagram 1 is a summary of trends found in the parent and teacher interviews.

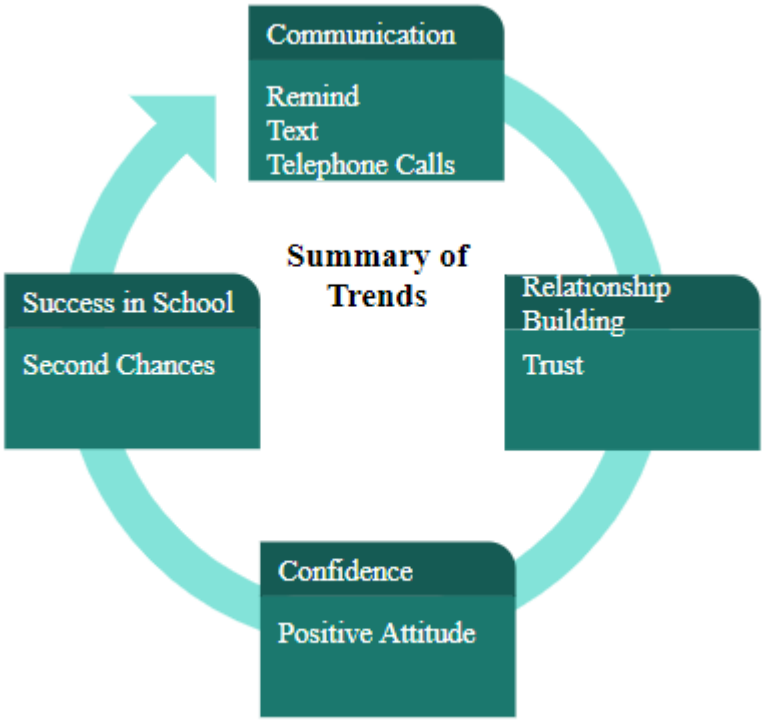


Diagram 1

Summary of Trends

Quantitative and Qualitative Data Comparison

In regards to the research Question 1, "How can parental involvement in formative assessment impact math achievement in 4th grade?" an independent Sample t-test did not find any statistical significance. Although student performance increased from assessment one to assessment two, the difference is not sufficient to warrant a claim of this intervention as having led to the increase. The quantitative findings of no significance between the focus and control groups conflict with the qualitative data, from the interviews, with many positive comments from teachers and parents about parental involvement in formative assessment in regards to creating more communication, better relationships, confidence, and success in school.

Qualitative data confirms that parents think that their child performs better because of parental involvement in formative assessment. When DHBH was asked if her child improved through this process, she explained, ". . . I feel like it gives him a second chance to understand some of his work and being able to give him a second chance on some of his homework and test." When KWBB was asked if she felt that her child has a more positive outlook on school because of her being involved in the formative assessment process she explained, "Oh, absolutely. Yes. B_____ always loved school, but this year . . . I really think this probably has an effect on it. Um, she's really done so much better, and she's been more on top of things, and she comes to me a lot more with questions about her school work and all of that, so, yeah, absolutely."

Additionally, the teachers' qualitative data reveals positive results of parental involvement in formative assessment. DP and MC both agreed that the students enjoyed working with and getting attention from their parents. DP mentioned that some students

would return to school with a new strategy to solve a problem and show her. When DP was asked if her she thought her students improved because of parental involvement in the formative assessment process she said, "Absolutely. Again, I think they just wanted the parents to see what they're doing well, and then if they needed some strengthening, their parents kind of shared another view or another strategy. So I think it was very helpful." MC noted that anytime a student can work with their parent is beneficial. He gave an example of seeing a student work with their parent during remote learning; it was a positive experience.

Also, the data reveals that being involved in the formative assessment process and parental involvement was not troublesome. The parents and teachers interviewed all stated that participating was not inconvenient, and they all expressed that there were no dislikes about parental involvement in formative assessment. So, parents and teachers can participate in an improvement strategy that requires little effort but has great results.

Summary

This chapter outlines the quantitative and qualitative data results for the research in parental involvement in formative assessment for 4^{th} grade math. It informed the reader of how the data from the independent Sample t-test showed no significance in the focus group and the control groups' MAP scores even though there was some improvement in the focus group from Test 1 to Test 2. Additionally, it gave a summary of each participants' individual interview and gave the combined parents' perceptions and combined teachers' perceptions.

CHAPTER FIVE: DISCUSSION AND CONCLUSIONS

Introduction

This study on parental involvement in formative assessment was conducted in a school that was struggling to improve its math achievement scores on the TNReady assessment. The hope was that by training teachers and parents in parental involvement in formative assessment that scores would improve. The teachers and parents watched a video to train them on how to implement formative assessment, they began using formative assessment with the students, and the parents and teachers communicated by phone, Remind, text, and email. The math MAP data didn't show significance when the focus group was compared to the control group. However, the parent/teacher interviews had positive results in regards to communication, relationship building, confidence, and school success.

The math MAP data didn't show significance when the focus group and the control group were compared with one another. Factors that may have influenced this were that the focus group had more absences than the control group, the new utilization of the Eureka math program may be impeding the freedom of teachers to use formative assessment, and COVID-19 may have forced schools to rely heavily on technology, resulting in less time to implement formative assessment because of classroom management issues. Additionally, parental involvement may have increased, but it may have been more about logistic issues than academic ones.

Parents and teachers communicating by phone, Remind, text, and email had a positive effect. Trends that presented themselves often, from the interviews, were communication, relationship building, confidence, and success in schools. I believe that

these positive results developed because of the teachers' accessibility from sharing their phone numbers with the parents and from the transparency that the teachers displayed by informing parents that their child could redo the assignments and the assessments in their classes.

In the following paragraphs, I will discuss the findings, share the implications for future practice, share the limitations and delimitations, and end with my conclusions for this research study.

Discussion of Findings

Research Question 1

How can parental involvement in formative assessment impact math achievement in 4th grade? This question was answered by the students participating in the MAP Math Benchmark Assessment. Students tested in the fall and winter, and the scores were analyzed. No significance was found when the focus group was compared to the control group. Factors to consider are that the focus group had more absences than the control group, the Eureka math program may be hindering the use of formative assessment, COVID-19 may have forced schools to use technology more, resulting in less time to implement formative assessment because of classroom management issues, and parental involvement may have been used more for logistics than academics.

Attendance is a factor to consider when analyzing the MAP math data. When giving my back up assessment, I noted that approximately 30 students had not taken the second test. When I questioned teachers about this, they expressed that some students weren't participating remotely like they should. When analyzing the attendance data for

the school, I noted that the control group had 426 absences, and the focus group had 675 absences. The focus group had 249 more absences than the control group.

In my experience, in my classroom, I had noticed a similar problem. I would message parents to ask them to have their child get on the computer. If I did get the student to get on, I could send them messages. I would have to repeatedly ask students to get off games and get on their assignment, or I would have some students leave before the class was over. Also, students would have their screen off during class; how does the teacher know that they are even there or not watching television or asleep? These are problems that I tried to address with the following rules that were made with both of my classes input (see Table 13). Also, all teachers were encouraged to do this. I read these rules every day at the beginning of class.

Table 13

Rules for Using Google Meets

1. Mic button - Keep muted unless you talk. 2. Have paper and pencil ready. 3. Keep your screen on during the lesson. 4. Pick a spot with no distractions. 5. Be still. Stay seated in a chair. 6. Stay on the computer, on math, the entire time (1st period 8:45-10:40 and 2nd period 12:40-2:15).

The use of the Eureka math program may be hindering formative assessment use. The administrators at this school have asked faculty to basically follow the script when teaching this curriculum. It is compiled of five parts: an application word problem,

fluency, the lesson, practice, and an exit ticket. When I was evaluated, I used all five parts, but I didn't follow the script. In my post conference, the assistant principal asked me to start following the script, because she said that the students will use Eureka for the next two years and that this would get them accustom to the format. I believe that it has hindered teachers from being able to formatively assess effectively. For example, there is no daily math review for teachers to formatively use to keep the math from being forgotten. In the book *Make it Stick,* Brown (2014) asserts that to learn new material, people have to keep going back to it by retrieving what they have already learned. Also, the teacher needs to interleave skills with the students' other learning throughout the school year. Eureka teaches a new skill, then moves right on to the next new skill without reviewing.

COVID-19 may also be a factor to consider when looking at the MAP Math Assessment data. This school year has been an anomaly compared to other school years. Students have been educated using Chromebooks in all classes, and they also learned in person and remotely. Teachers have struggled to teach in person and remotely, while trying to manage what students are viewing on their computers (computer games). Teachers have had to repeatedly ask students to get back on their math assignment, then walk away to find seconds later that the student or students are back on games. At the same time, the teacher must use GoGuardian (a tool to observe what students have on their computer screens) to view what the remote learners are on; they may be on games, may have left class early, or may have come to class late. It is a lot on the teachers' mental load or working memory. Sweller (1998) asserts that when working memory is overloaded, it creates blind spots in what is being perceived. Willingham (2009) concurs

saying, ". . . teaching is quite demanding of working memory." If teaching is demanding on working memory, I believe that teaching during a pandemic and managing students' behavior would be even more demanding of working memory. I believe management issues got in the way of the participating teachers use of formative assessment to its full potential.

In my experience, this school year I have communicated with parents more than I ever have in the past. However the communication has been about things like: what bus the student will ride home (our school had a lot of bus changes due to COVID-19); if a child is sick; can parents send birthday cupcakes because of COVID-19 restrictions, etc. I have sent messages to parents about their child missing work, but not like I have in the past. Therefore, I believe that communication may not have been used to its full potential for formative assessment; I believe this is a factor to consider in regards to the MAP data.

The results of the MAP math benchmark may have had a different outcome if students in the focus group hadn't missed so many days of school, if administrators had given more flexibility for implementing the Eureka program, and if it was a typical school year where technology wasn't so heavily relied on and where teachers could communicate more about academic issues instead of COVID-19 related conundrums. These are things to consider when looking at the quantitative data for this research study.

Research Question 2

What are parents' perceptions of the implementation of parental involvement in the formative assessment process in school? Parents had mostly positive statements when interviewed. Parents said that their child had a more positive outlook on school and performed better, that parental involvement was convenient, and that the training video

was helpful. Additionally, parents liked the better communication, relationships that were built, and the improved confidence of students. The common trends were: communication, relationship building, confidence, and success in school. One parent did express that she wondered how the research would have gone if it was a regular school year.

Qualitative data confirms that parents think that their child performs better because of parental involvement in the formative assessment process. When DHBH was asked if her child improved through this process, she explained, ". . . I feel like it gives him a second chance to understand some of his work and being able to give him a second chance on some of his homework and test." When KWBB was asked if she felt that her child has a more positive outlook on school because of her being involved in the formative assessment process she explained, "Oh, absolutely. Yes. B_____ always loved school, but this year. . . I really think this probably has an effect on it. Um, she's really done so much better, and she's been more on top of things, and she comes to me a lot more with questions about her school work and all of that, so, yeah, absolutely."

Also, the data revealed that being involved in formative assessment and parental involvement was not troublesome. The parents interviewed all stated that participating was not inconvenient, and they all expressed that there were no dislikes about parental involvement in the formative assessment process. So, parents can participate in an improvement strategy that requires little effort but has great results.

I believe that the common trends of communication, relationship building, confidence, and success in school improved because of two reasons: teacher accessibility and teacher transparency. Teachers gave parents their phone numbers at the beginning of

the school year. Parents were encouraged to communicate with them. Davies (1991) warns that parents are reluctant to approach teachers. If the teachers reach out first, it could encourage parent communication. Additionally, teachers were very transparent in informing parents that their child could redo assignments and tests. I believe that these two things were the foundation that led to these results. The following table shows the summary of trends that resulted from the parent and teacher interviews.

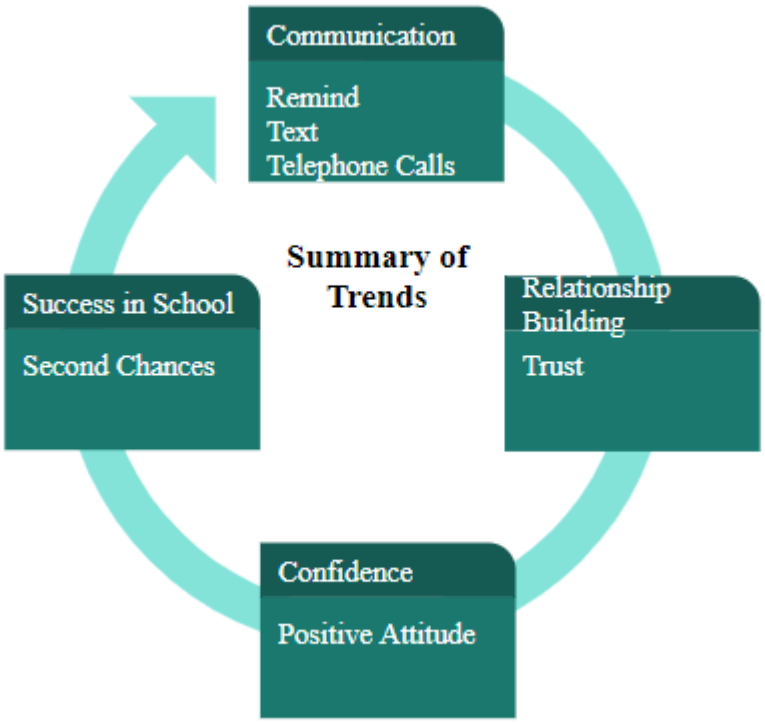


Diagram 2

Summary of Trends

Research Question 3

What are the participating teachers' perception of the implementation of parental involvement in the formative assessment process in school? A common trend in the teacher interviews were communication, relationship building, confidence, and success in schools.

In regards to communication, two parents, TDKD and BFLF, noted that Mrs. P_____ would email, come out to the car line, and use Zoom to communicate. Both teachers had positive statements in regard to parental involvement in the formative assessment process. When the teachers were asked to name something that they really liked about parental involvement in the formative assessment process, DP explained, "I think just the positive relationships that are developed between the child and the parent and the teacher and the parent, and then the teacher and the child, because of the parent." MC said, ". . . just the fact that parents are involved is an asset to the student, to the teacher, and I even believe to the parent. I think they learn each other better while they're interacting."

MC did say that he wished that we weren't doing this study during COVID-19, meaning that he thought the research study would have gone better under normal circumstances.

Additionally, the teachers' qualitative data revealed that DP and MC both agreed that the students enjoyed working with and getting attention from their parents. DP mentioned that some students would return to school with a new strategy to solve a problem and show her. When DP was asked if she thought her students improved because of parental involvement in the formative assessment process she said,

"Absolutely. Again, I think they just wanted the parents to see what they're doing well, and then if they needed some strengthening, their parents kind of shared another view or another strategy. So I think it was very helpful." MC noted that anytime that a student can work with their parent, it is beneficial. Also, he said that he thinks that students have a great positive outlook on school when their parents are right there helping them. He named an example of seeing a dad help his daughter, and noted that it looked to be a positive experience.

Also, the data revealed that being involved in formative assessment and parental involvement was not troublesome. The teachers interviewed all stated that participating was not inconvenient, and they both expressed that there were no dislikes about parental involvement in formative assessment. So, teachers can participate in an improvement strategy that requires little effort but has great results.

Communication, relationship building, confidence, and success in schools were the trends that developed from the interviews. I believe that this resulted from accessibility of parents being able to contact the teachers because they shared their phone numbers at the beginning of the school year, and the transparency of teachers with parents that students could redo assignments and test for full credit with no consequence.

The following diagram is a summary of trends that were evident from the interviews.

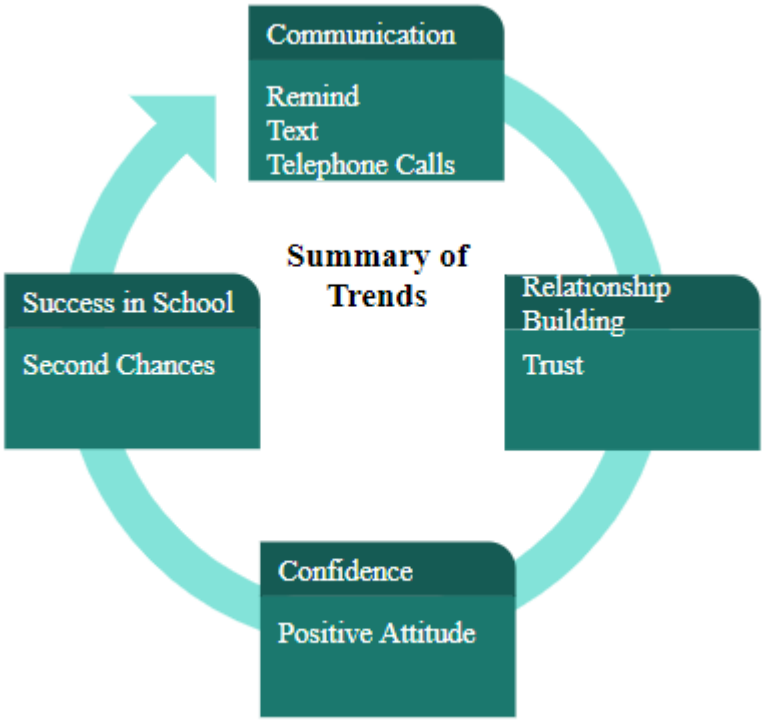


Diagram 3

Summary of Trends

Implications for Practice in Context

Parental involvement in formative assessment has beneficial outcomes that can be achieved with little training, such as using the parental involvement in formative assessment training video, and are convenient for the parents and the teachers to implement. Also, by communicating, relationships grow stronger, and it is imperative to have a good relationship with the people you are working with.

Many teacher PD trainings are conducted and soon forgotten because they are not implemented throughout the school year. They are what some call "one and done." Deutschman (2007) teaches that it requires the 3 R's to bring about change: Relate, Repeat, and Reframe. Relate means to relate to the person needing to change, Repeat means to get into the habit of doing what needs to be done, and Reframe is to keep your eye on the goal. Repeating is important in order to form a habit, typical PD's are lacking in this area. Brown (2014) avers that repetition is key when learning a new skill.

The parental involvement in formative assessment training was conducted by the parents and teachers watching a brief, approximately 10-minute video at their convenience. Also, they had the video to refer back to if needed. The parents and teachers used what they learned to repeatedly implement it with their child/student. When one uses something repeatedly they are likely to remember it, unlike the "one and done" PD trainings. There is very little investment of time and effort put in for the gains that come from the implementation of parental involvement in the formative assessment process.

To implement a training on parental involvement in the formative assessment process I would recommend utilizing the video. However, I would add Deutschman's (2007) 3 R's to reinforce that change happens. The 3 R's are Relate, Repeat, and Reframe. I would share the video with parents and teachers during a training at the beginning of the school year. I would be "relating" with them because I have used this in my classroom the past couple of years. Teachers would meet weekly in their PLC's to discuss math as usual, but they would also spend 15 minutes of their meeting discussing parental involvement in the formative assessment process. Teachers could share their

successes and struggles with the implementation. This would be "repeating" the process to form a habit. "Reframe" is keeping your eye on the goal. The goal at this school for example is to improve math achievement scores.

It is easier to work with someone that you have a good relationship with. Brafman and Brafman (2011) assert that there are certain strategies that help us make better connections with others and are conducive to building trust. Table 14 lists five trust generators, their definitions, and what they look like.

Table 14

Trust Generators

Trust Generator	Definition	What it Looks Like
Selective Vulnerability	People respect and connect with others who share their own vulnerable moments. It means showing your human side that is not perfect.	Sharing with a student a challenge you had as a young person or as a learner. Sharing new skills you are learning and what is hard about it. The information shared is selective and appropriate.
Familiarity	People develop a sense of familiarity with someone who they see often in a particular setting such as at a bus stop every day or in the café on a regular basis.	Crossing paths with a student during recess or lunch. Bumping into students and their families at a community farmer's market or at a local park. Attending community events that you know the student may have attended.
Similarity of Interest	People create a bond with others who share similar likes, dislikes, hobbies, and so forth. This common affinity allows a point of connection beyond any obvious racial, class, or linguistic differences. This plants the seed of connection in the relationship.	Sharing hobbies, sports, or other things you like that are similar to a particular student's interests. Also sharing social causes that you are passionate about, such as saving the environment or caring for animals.
Concern	People connect when another shows concern for those issues and events important to another, such as births, illnesses, or other life transitions. This plants the seed of personal regard.	Remembering details from a student's life. Demonstrated by asking follow-up questions about recent events.
Competence	People tend to trust others who demonstrate they have the skill and knowledge, as well as the will, to help and support them. This plants the seed of confidence in others.	Students trust the teacher when the teacher demonstrates the ability to teach effectively or make learning less confusing, more exciting, and more successful.

Parental involvement in formative assessment helps parents, teachers, and students build stronger relationships with one another. Trust generators used in this study were familiarity, concern, and competence. Teachers and students experienced familiarity by seeing each other in class or online each day. Concern was expressed by teachers when they noticed that a student made a bad grade, then allowed them to redo the assignment or test without a consequence. Additionally, competence was displayed by the teacher/parent being able to show students a different way to solve a problem when they were struggling with the first way it was taught; the teacher/parent used formative assessment and formative feedback.

When one continually works on their relationship, when a dilemma arises that normally would cause discourse in a mere acquaintance type relationship, it resolves much quicker or isn't even an issue at all. For example, I have been in communication with all of my parents this school year; they all have my phone number and I have theirs and we text/call as needed. One of my students developed a rash from accidentally eating gluten; he has celiac disease. This parent could have gotten very upset. However, she did not, and I believe that this is because she knows how many times I've texted to ask questions of what her child could have. I have sent pictures of labels to check to see if chips were okay at a party, I have gluten free snacks for times that parents send in something for the students but might have forgotten to include these types of snacks. Come to find out, the child had eaten some Valentine candy that another student had given him. By communicating throughout the school year, she knew that I work very hard to keep her child safe, and she trusted me; I had been using the concern trust

generator. This led to her being patient with me, and together we investigated to find out what happened.

Teacher and student and parent and student relationships are important as well as the teacher and parent relationships. For a student to learn in the classroom, they must feel safe. Hammond (2015) says, "Simple gestures, a smile, simple nod of the head, a pat on the back, or touch of the arm from another person stimulates the release of oxytocin in the recipient" (p.74). Oxytocin is a bonding chemical. When teachers and parents are giving formative feedback, this not only shows the student/child that the teacher/parent cares, but it is also a great opportunity to give a smile or pat on the back for example. If a child doesn't feel safe, a part of the brain called the amygdala can be hijacked causing a release of the hormone cortisol. This is harmful because the child's brain will shut down learning for about 20 minutes (Hammond, 2015).

The video on parental involvement in the formative assessment process is an efficient way to train teachers. Additionally, communication leads to relationship building, and it is important to have a good relationship with someone, especially when you are working with them daily.

Recommendation for Future Research

Further researchers should consider having a larger sample population when conducting their study. This study did not have a relatively large sample size and that may be a factor leading to the lack of significance because of a lack of power. Future studies might want to increase their sample population size because this study did detect some increase, it was just not a statistically significant increase. This may mean that it is an issue of power, not of lack of impact.

Further researchers should consider check points with the participating teachers to give recommendations. The teachers and parents did view a parental involvement in formative assessment training video at the beginning of the research study. However, when interviewed they had a difficult time remembering it. The researcher did give a few helpful recommendations throughout the study, such as sharing with the teachers that if they save the students' names with parents' names in parenthesis in their phone it was much easier to communicate instead of having to look up the parents' numbers when needed.

A final recommendation would be to use your grade level for your study if possible in order to be closer to the study and to know more of what is going on. Although I felt that participating teachers did what I asked them to do, I think I would have felt better having my grade level teachers participate if they had been willing. I know that it is not allowed to use your own classroom, but I have been using parental involvement in the formative assessment process in my classroom and would be curious how my MAP math scores compared to the other 3rd grade teachers' scores.

Limitations and Delimitations

The limitations of this study are that the research began after the summer break which is approximately two months long. Not only that, this past school year (2019-2020), schools closed on March 30th through May 21st due to COVID-19. Students continued to work during the school closure, however it was mandatory to give only review work during this time frame; teachers were not permitted to teach new skills. Additionally, teachers were only allowed to give 30 minutes of math per day. Math class is usually 60-90 minutes. Also, students were not penalized if they chose not to complete

the assignments which could possibly have resulted in some of the students not turning in their work. In light of this, students sometimes lose some of their learning over the summer months. That coupled with the COVID-19 issues could mean that some students are even further behind than when they return from summer break.

Absences may have been a limitation to this study. The focus group had 675 absences, and the control group had 426 absences. The focus group had 249 more absences that the control group. Because of COVID-19, this school gave parents the choice for their child to learn in person or remotely. Also, if a parent believed that their child had COVID-19 symptoms they could switch to remote learning. I believe that some parents/students took advantage of this and have missed more days than they would during a typical school year.

The use of the scripted program, Eureka, may have hindered teachers from utilizing formative assessment to its full potential. When following a script, it is difficult to formatively assess when the script is telling the teacher what to say. Also, Eureka doesn't include a daily math review which is imperative for retaining new skills that were previously learned, and conducive for formatively assessing/formative feedback.

COVID-19 brought about the new increased use of technology which improved computer skills, however possibly overwhelmed the teachers' working memory due to classroom management issues that developed, such as repeatedly having to ask students to get off computer games, and to get back on their assignments. Moreover, teachers had to teach remotely and in person simultaneously, which again may have overloaded their working memory which may have led to less time for formative assessment.

Parent/teacher communication may have been affected by COVID-19 as well. I found myself communicating about logistic issues much more than academics. For example, parents would text to inform me that their child would be riding a different bus because their bus driver was sick, to ask if they could send cupcakes because of COVID-19 restrictions, or to notify me that someone in their family was quarantined and their child would be transitioning to remote learning.

This study was restricted in that it was only conducted with elementary students in math. Also, this study was used with students in inclusion classes. That means they may contain students that are included from the special education classes, are classified in the group of English Language Learners (ELL), or Comprehensive Development Classroom (CDC). Additionally, the classes may contain gifted students.

Conclusions

In conclusion, parental involvement in formative assessment did not prove to have significance when comparing the focus and control groups. However, there are some factors to consider when looking at the MAP math data: absences were greater in the focus group, implementation of the scripted Eureka program may have impeded the full potential of formative assessment, technology use may have overloaded teachers' working memory hindering the full potential use of formative assessment, and communication may have been more about logistics than academics due to COVID-19 issues.

Parents and teachers have many positive things to say about parental involvement in formative assessment such as they think their child is doing better and has a more positive outlook because of it, relationships between parents and teachers are better, and

parental involvement is convenient. Additionally, the parents and the teachers seemed to enjoy being involved in the process. Common trends found in the interviews were communication, relationship building, confidence, and success in school. A concern was that the research was conducted during the COVID-19 pandemic. This concern was voiced by a parent and a teacher.

REFERENCES

Ainsworth, L., Almeida, L., Davies, A., DuFour, R., Gregg, L., Guskey, T., Marzano, R., O'Connor, K., Reeves, D., Stiggins, R., White, S., & Wiliam, D. (2007). *Ahead of the curve: The power of assessment to transform teaching and learning.* Bloomington, IN: Solution Tree Press.

Ascher, C. (1988). Improving the school-home connection for poor and minority urban students. *The Urban Review, 20(2),* 109–123. https://doiorg.ezproxy.mtsu.edu/10.1007/BF01112512

Baker, A. J. L., & Soden, L. M. (1997). Parental involvement in children's education: A critical assessment of the knowledge base. Paper presented at the Annual Meeting of the American Educational Research Association, Chicago, IL. ED407127.

Bergn, J. R., Sladeczek, I. E., Schwarz, R. D., & Smith, A. N. (1991). Effects of a measurement and planning system on kindergartners' cognitive development and educational programming. *American Educational Research Journal, 28(3),* 683-714.

Bjork, R. A. (1994). Memory and metamemory considerations in the training of human beings. In J. Metcalfe & A. P. Shimamura (Eds.), *Metacognition: Knowing about knowing* (pp. 188-205). Cambridge, MA: MIT Press.

Black, P.J., & Wiliam, D. (1998a). Assessment and classroom learning. *Assessment in Education: Principles, Policy and Practice, 5(1),* 7-73.

Black, P.J., & Wiliam, D. (1998b). Inside the black box: Raising standards through classroom assessment. *The Phi Delta Kappan, 80(2),* 139-148.

Brafman, O., & Brafman, R. (2011). *Click: The magic of instant connections.* New York: Crown Publishers.

Brown, P. C., Roediger, H. L., & McDaniel, M. A. (2014). *Make it stick: The science of successful learning.* Cambridge, MA: Harvard University Press.

Colgan, L. (2018). Hey, it's elementary: Share-worthy parent engagement materials for math. . . no fake news! *Ontario Mathematics Gazette, 56(4),* 37-40.

Creswell, J.W. (2009). *Research design: Qualitative, quantitative, and mixed methods approaches.* Thousand Oaks, CA: Sage.

Creswell, J.W. & Plano-Clark, V. L. (2007). *Designing and conducting mixed methods research.* Thousand Oaks, CA: Sage.

Crooks, T. J. (1988). The impact of classroom evaluation practices on students. *Review of Educational Research, 58,* 438–481. https://doi-org.ezproxy.mtsu.edu/10.3102/00346543058004438

Crystal, D., Chen, C., Fuligni, A. & Stevenson, H. (1994). Psychological maladjustment and academic achievement: A cross-cultural study of Japanese, Chinese, and American high school students. *Child Development, 65,* 738-753.

Davies, D. (1991). Schools reaching out: Family, school, and community partnerships for student success. *The Phi Delta Kappan, 72(5),* 376.

Deno, S. L. (2003). Developments in curriculum-based measurement. *Journal of Special Education, 37(3),* 184-192.

Deutschman, A. (2007). *Change or die: Could you change when change matters most?* New York, NY: HarperCollins Publishers.

DuFour, R. [Richard], DuFour R. [Rebecca], Eaker, R., Many, T.W., Mattos, M. (2016). *Learning by doing: A handbook for professional learning communities at work* (3rd ed.). Bloomington, IN: Solution Tree Press.

Đurišic, M., & Bunijevac, M. (2017). Parental involvement as an important factor for successful education. *Center for Educational Policy Studies Journal, 7(3),* 137-153.

Dweck, C. (2006). *Mindset: The new psychology of success.* New York: Random House.

Eagle, E. (1989). *Socio-economic status, family structure, and parental involvement: The correlates of achievement.* Paper presented at the annual meeting of American Educational Research Association, San Francisco, CA.

Eaker, R., & Keating, J. (2012). *Every school, every team, every classroom: District leadership for professional learning communities at work.* Bloomington, IN: Solution Tree Press.

Eaker, R., & Keating, J. (2015). *Kid by kid, skill by skill: Teaching in a professional learning community at work*. Bloomington, IN: Solution Tree Press.

Elmore, R. (2016). Getting to scale with good educational practice. *Harvard Educational Review*: 66, 1-27.

Fennema, E., Carpenter, T.P., Franke, M.L., Levi, L., Jacobs, V.R., & Empson, S.B. (1996). A longitudinal study of learning to use children's thinking in mathematics instruction. *Journal for Research in Mathematics Education, 27(4),* 403–434.

Field, A. (2018). *Discovering statistics using ibm spss statistics*. Thousand Oaks, CA: Sage.

Fore, Cecil, I.,II, Boon, R. T., Lawson, C., Sr., & Martin, C. (2007). Using curriculum-based measurement for formative instructional decision-making in basic mathematics skills. *Education, 128(2),* 324-332.

Fuchs, L. S., & Fuchs, D. (1986). Effects of systematic formative evaluation: A meta-analysis. *Exceptional Children, 53 (3),* 199-208.

Fullan, M. (2010). *Motion leadership: The skinny on becoming change savvy*. Thousand Oaks, CA: Corwin.

Green, J. C., Benjamin, L., & Goodyear, L. (2001). The merits of mixing methods in evaluation. *Evaluation, 7,* 25-44.

Gulevska, V. (2018). *Teachers' perceptions of parental involvement in primary education. Teaching Innovations / Inovacije U Nastavi, 31*(1), 134-140. doi:10.5937/inovacije1801134G

Hammond, Z. (2015). *Culturally responsive teaching & the brain: Promoting authentic engagement and rigor among culturally and linguistically diverse students.* Thousand Oaks, CA: Corwin.

Hattie, J., Fisher, D., Frey, N., Gojak, L.M., Moore S.D., & Mellman W. (2017). *Visible learning for mathematics: What works best to optimize student learning.* Thousand Oaks, CA: Corwin.

Hattie, J. & Timperley, H. (2007). The power of feedback. *Review of Educational Research, 77,* 81-112.

Henderson, A. & Mapp, K. (2002). A new wave of evidence: The impact of school, family and community connections on student achievement. *National Center for Family & Community Connections with Schools, Southwest Educational Development Laboratory.* Retrieved from www.sedl.org/connections/resources/evidence.pdf.

Hosp, M. K., & Hosp, J. L. (2003). Curriculum-based measurement for reading, spelling, and math: How to do it and why. *Preventing School Failure, 48(1),* 10-17.

Jakicic, C. (2008). *The collaborative teacher.* Bloomington, IN: Solution Tree Press.

Klute, M., Apthorp, H., Harlacher, J., Reale, M., Regional Educational Laboratory Central (ED), National Center for Education Evaluation and Regional Assistance (ED), & Marzano Research Laboratory. (2017). Formative assessment and elementary school student academic achievement: A review of the evidence. REL 2017-259. In *Regional Educational Laboratory Central*. Regional Educational Laboratory Central.

Lang, J. (2016). *Small teaching: Everyday lessons from the science of learning*. SanFrancisco, CA. Jossey-Bass.

Lam, L. T. (2004). Test success, family style. *Educational Leadership, 61(8),* 44-47.

Lezotte, L.W. & Snyder, K.M. (2011). *What effective schools do: Re-envisioning the correlates.* Bloomington, IN: Solution Tree Press.

Lipton, L., & Wellman, B. (2012). *Got data? Now what?*. Bloomington, IN: Solution Tree Press.

Locke, E. A., Shaw, K. N., Saari, L. M., & Latham, G. P. (1981). Goal setting and task performance: 1969–1980. *Psychological Bulletin, 90(1),* 125–152. https://doi-org.ezproxy.mtsu.edu/10.1037/0033-2909.90.1.125

Ma, X., Shen, J., Krenn, H. Y., Hu, S., & Yuan, J. (2016). A meta-analysis of the relationship between learning outcomes and parental involvement during early childhood education and early elementary education. *Educational Psychology Review, 28(4),* 771-801.

Mapp, K. L. (2003). Having their say: Parents describe why and how they are engaged in their children's learning. *School Community Journal, 13(1).* 35-64.

Marzano, R. J., (2007). *The art and science of teaching.* Alexandria: ASCD.

Moroni, S., Dumont, H., Trautwein, U., Niggli, A., & Baeriswyl, F. (2015). The need to distinguish between quantity and quality in research on parental involvement: The example of parental help with homework. *Journal of Educational Research, 108(5),* 417–431.

Natriello, G. (1987). The impact of evaluation processes on students. *Educational Psychologist, 22(2),* 155. https://doi-org.ezproxy.mtsu.edu/10.1207/s15326985ep2202_4

Nutall, G. A. (2007*). The hidden lives of learners*. Wellington: New Zealand Council for Educational Research.

Olender, R. A., Elias, J., Mastroleo, R. D. (2010). *The school-home connection: forging positive relationships with parents*. Thousand Oaks, CA: Corwin.

Patton, K. L. S., Reschly, A. L., & Appleton, J. (2014). Curriculum-based measurement as a predictor of performance on a state assessment: Diagnostic efficiency of local norms. *Educational Assessment, 19(4),* 284–301.

https://doi-org.ezproxy.mtsu.edu/10.1080/10627197.2014.964117

Pink, D. (2009). *Drive: The surprising truth about what motivates us*. New York, NY: Riverhead Books.

Popham, W. J. (2011). *Transformative assessment in action.* Alexandria, VA: ASCD.

Popham, W. J. (2014). *Classroom assessment* (7. ed., Pearson new internat. ed. ed.). Harlow: Pearson.

Reeves, D. B. (2007). *Ahead of the curve: The power of assessment to transform teaching and learning.* Bloomington, IN: Solution Tree Press.

Resnick, M. (2017). *Lifelong kindergarten: Cultivating creativity through projects, passion, peers, and play*. Cambridge, MA: The MIT Press.

Schmoker, M. (2011). *Focus: Elevating the essentials to radically improve student learning.* Alexandria, VA: ASCD.

Sheldon, S., & Epstein, J. L. (2002). Improving student behavior and school discipline with family and community involvement. *Education and urban society, 35(1).*, 4-26.

Soto. L. D. (1988). The home environment of higher and lower achieving Puerto Rican children. *Hispanic Journal of Behavioral Sciences 10 (2),* 161-167.

Sweller, J. (2016, February 10). Story of a research program. Retrieved from https://edrev.asu.edu/edrev/index.php/ER/article/viewFile/2025/545

Sweller, J. Van Merrienboer, J., & Paas, F. (1998). Cognitive architecture and instructional design. *Educational psychology review 10:* 251-296.

TED. (2009, September). *Start with why: How great leaders inspire action.* [Video file]. Retrieved from: http://youtube.com/watch?v=u4ZoJKF_VuA

Webstat and Policy Studies Associates. (2001). *The longitudinal evaluation of school change and performance in Title 1 schools.* Washington DC: U.S. Department of Education. Office of the Deputy Secretary. Planning and Evaluation Service. http://www.ed.gov/offices/OUS/PES/esed/lescp_highlights.html

Wiliam, D., Lee, C., Harrison, C., & Black, P.J. (2004). Teachers developing assessment for learning: Impact on student achievement. *Assessment in Education: Principles, Policy and Practice, 11(1),* 49-65.

Wiliam, D. (2018). *Creating the schools our children need: Why what we're doing now won't help much (and what we can do instead).* West Palm Beach, FL: Learning Sciences International.

Wiliam, D. (2018). *Embedded formative assessment.* Bloomington, IN: Solution Tree Press.

Willingham, D. T. (2009). *Why don't students like school?: A cognitive scientist answers questions about how the mind works and what it means for the classroom*. San Francisco, CA: Jossey-Bass.

Willingham, D. T. (2012). *When can you trust the experts?: How to tell good science from bad in education*. San Francisco, CA: Jossey-Bass.

Whinnery, K. W., & Stecker, P. M. (1992). Individual progress monitoring to enhance instructional programs in mathematics. *Preventing School Failure, 36,* 26-29. doi:10.1080/1045988X.1992.9944266

APPENDICES

Appendix A

Video Outline on Parental Involvement in Formative Assessment

Slide 1: Formative Assessment and Parental Involvement – "Colgan (2018) found that students only spend 14% of their hours in grades K-12, therefore schools cannot be held completely responsible for the end result of a child's academic growth." Parents are important.

Slide 2: What is formative assessment? Formative assessment is when the teacher sees the student doing work incorrectly and corrects them. It is better to do it without giving a grade. However, teachers sometimes do give grades. Also, teachers use this in their lessons when teaching. When they see a misconception they may back up a little in their lesson or teach the problem in a different way.

Slides 3 – Slides 5: Think back to when you took your driver's test and the ACT/SAT. Did you have to take them more than once? What about the bridge in Murfreesboro? I heard that it didn't get completed in time. The workers were given more time to complete the job without a penalty. This is how I want you to think about your students getting more opportunities to complete their work.

Slide 6: What does research say about formative assessment (FA)?

- Ainsworth (2007) states that by using FA, that over time, one will truly see **improvement in student achievement and teaching.**
- Popham (2011) found that **". . . descriptive feedback is preferred to grades"** (p. 147).
- Wiliam et al. (2004) found that students that have been taught using FA can **make twice as much progress in one year.**

- Klute et al. (2017) found that **FA use for math had greater effects than when used during other subjects** like reading and writing.
- **Student, teacher, or computer** directed FA were found to be effective for math (Klute et al., 2017).

Slide 7: What does research say about FA (continued)?

- Black and Wiliam (1998) found that the gains in achievement from FA are, **". . . amongst the largest ever reported for educational interventions"** (p. 61).
- FA **helps the lowest achievers** and SPED the **most** (Black & Wiliam, 1998).

Slide 8: What does research say about parental involvement?

- Regardless of race, ethnicity, or socioeconomic status **parents want their children to do well** in school and are willing to help them (Mapp, 2003).
- Henderson and Mapp (2002) found the following positive results from parental involvement: **higher grades and achievement scores on high stakes assessments, enrollment in classes that were more challenging, improved attendance, better adaptation to school, better social skills, better behavior, and students passed more classes.**

Slide 9: What does research say about parental involvement (continued)?

- Lam (2004) had 3 students pass New York's high stakes assessment. He made a great effort to involve parents through test prep workshops and building relationships. Then, **57% passed the English Language Arts test and 74% passed the math test. In a subsequent year, he had over 90% of his students pass both tests.**

Slide 10: Describes the lengths to go to in order to get a student to correct their work.

Slide 11: What do I need teachers to do?

1. Give students fast feedback while they are working.

2. Never give them the answer without first having them tell you what they think. You may then give a hint if needed.
3. Allow students to correct their work for full credit.
4. Allow students to take work home to complete if needed.
5. Allow students to ask you what words mean on their tests, during their tests.
6. Allow students to correct their test for full credit.
7. Progress monitor each test.
8. Meet with each student about their test.
9. Have parents sign the progress monitoring sheet weekly.
10. Make contact, weekly, with the parents.

Slide 12: What do I need parents to do?

1. Help your child correct their work in a positive way.
2. Never give them the answer without first having them tell you what they think. You may then give a hint if needed.
3. Sign weekly progress monitoring sheet.
4. The teacher will make contact with you weekly by note, text, phone call, etc. Feel free to contact them in the same manner when needed.

Slides 13-14: References

Black, P. J., & Wiliam, D. (1998b). Inside the black box: Raising standards through classroom assessment. *The Phi Delta Kappan, 80(2),* 139-148.

Colgan, L. (2018). Hey, it's elementary: Share-worthy parent engagement materials for math. . .no fake news! *Ontario Mathematics Gazette, 56(4).* 37-40.

Klute, M., Apthorp, H., Harlacher, J., Reale, M., Regional Educational Laboratory Central (ED), & Marzano Research Laboratory. (2017). Formative assessment and elementary school student academic achievement: A review of the evidence. REL 2017-259. In *Regional Educational Laboratory Central.* Regional Educational Laboratory Central.

Lam, L. T. (2004). Test success, family style. *Educational Leadership, 61(8),* 44-47.

Mapp, K. L. (2003). Having their say: Parents describe why and how they are engaged in their children's learning. *School Community Journal, 13(1).* 35-64.

Popham, W. J. (2014). *Classroom assessment* (7. Ed., Pearson new internat. ed. ed.) Harolow: Pearson.

Appendix B

Interview Protocol

The following are the interview questions that were designated for parents to answer.

I will be using voice to text to capture this interview. Is that ok with you?

- I agree.
- I do not agree. (If participant does not agree then notes will be captured by the investigator during the interview.)

#1. What do you think formative assessment is?

#2. When the progress monitoring sheet came home was it easy to understand? If not, what questions did you have?

#3. Do you feel that your child has a more positive outlook on school because of you being involved in the formative assessment process?

#4. Was the training video helpful?

#5. Was it inconvenient to be involved in the formative assessment process?

#6. Do you feel that your child improved by you being involved in the formative assessment process? Why or why not?

#7. Do you feel that teacher/parent relationships improved by being involved in the formative assessment process? Why or why not?

#8. What is something that you really liked about parental involvement in formative assessment?

#9. What is something that you really did NOT like about parental involvement in formative assessment?

#10. Is there anything else that you would like to share?

Prompts

- What was that like for you?
- How would you describe…?
- How do you feel about…?
- Describe to me what I would have seen if…
- What is the meaning of….
- Could you share more about…?
- Share a story that exemplifies…

Appendix C

Interview Protocol

The following are the interview questions that were designated for the cooperating teachers.

I will be using voice to text to capture this interview. Is that okay with you?

- I agree.
- I do not agree. (If participant does not agree then notes will be captured by the investigator during the interview.)

#1. What do you think formative assessment is?

#2. Did parents seem to understand the progress monitoring sheet that was sent home? Did they have a lot of questions?

#3. Do you feel that your students have a more positive outlook on school because of their parents being involved in the formative assessment process?

#4. Was the training video helpful?

#5. Was it inconvenient to be involved in the formative assessment process with parents?

#6. Do you feel that your students improved by their parents being involved in the formative assessment process? Why or why not?

#7. Do you feel that teacher/parent relationships improved by being involved in the formative assessment process? Why or why not?

#8. What is something that you really liked about parental involvement in formative assessment?

#9. What is something that you really did NOT like about parental involvement in formative assessment?

#10. Is there anything else that you would like to share?

Prompts

- What was that like for you?
- How would you describe…?
- How do you feel about…?
- Describe to me what I would have seen if…
- What is the meaning of….
- Could you share more about…?
- Share a story that exemplifies…

Appendix D

Parent Interviews

DHBH Parent Interview (12/8/2020 2:20 PM)

Okay. Um, I will be using voice to text to capture this interview. Is that okay with you? (Yes ma'am.)

1. Okay. Question one. There are 10 questions, um, question one, what do you think formative assessment is? (Um, it is to um can you kinda clarify?) Yeah. Um, so formative assessment is like, I was telling you earlier about B_____, um, getting to correct his work for full credit. (Um, so to help the students that need more help in class or don't understand.)

2. Okay. All right. And we're going to skip question number two.

3. Um, question three. Do you feel that your child has a more positive outlook on school because of you being involved in the formative assessment process? (Yes.) Okay. Can you name any examples of when the teacher contacted you? (Um, yeah, so B_____ had been having trouble with, um, some of his math and some of the tests for some of the tests that he had to be taken. And, um, Mr. C_____, uh, made me aware of the situation and, um, he would, he let me know that he was able to redo his test too, for a higher grade that way. And he was able to explain it more to him.) Okay. Great.

4. Question four. Was the training video helpful? I know it's been a while since you've watched it. (A minute. Um, I feel like it was, uh, Miss Amanda once again, it was a minute ago since I've watched it.) Yeah.

5. Question five. Was it inconvenient to be involved in the formative assessment process? (No. Ma'am.) Okay.

6. Question six. Do you feel that your child improved by you being involved in the formative assessment process? (I do.) Okay. Um, can you tell me why? You may have answered that in that other question? (Um, I feel like it gives him a second chance to, um, understand, some of his work and being able to, um, give him a second chance on some of his homework and um, test.)

7. Okay. Question seven. Do you feel that the teacher/parent relationships improved by being involved in the formative assessment process? (I do.)

8. And question eight, what is something that you really liked about parental involvement in formative assessment? (Um, I like being involved in my child's education. Um, so knowing where B_____ was having trouble, um, really helped out that way we could help him at home and know what's going on in school, also.)

9. Good. And question nine, what is something that you really did not like about the parental involvement in formative assessment? (None. Nothing.)

10. Okay. And the last question, is there anything else that you would like to share? (No. Not that I'm aware of.)

Okay. Thank you very much. (You're welcome.)

TDKD Parent Interview (12/10/2020 2:31 PM)

I will be using voice to text to capture this interview. Is that okay with you? (Yes.)

1. Question one. What do you think formative assessment is? (Helping and assisting my child.)

2. Question two. We're going to skip question two.

3. Question three. Do you feel that your child has a more positive outlook on school because of you being involved in the formative assessment process? (Yes, despite COVID, her grades are still up.)

4. Question four. Was the training video helpful? (Yes.)

5. Question five. Was it inconvenient to be involved in the formative assessment process? (No.)

6. Question six. Do you feel that your child improved by being involved in the formative assessment process? (Yes. I'm a firm believer in anything that is beneficial to the students' education.)

7. Question 7. Do you feel that teacher/parent relationships improved by being involved in the formative assessment process? (Yes.) Why? (Mrs. P_____ sent emails and ran out to see me in the car line.)

8. Question eight. What is something that you really liked about parental involvement in formative assessment? (Communication made it easier because of COVID.)

9. Question nine. What is something that you really did not like about parental involvement in formative assessment? (Nothing.)

10. Is there anything else that you would like to share? (No.)

Thank you for your time.

BFLF Parent Interview (12/13/2020 2:00 PM)

Okay, can you hear me? (I can.) Okay. So, I will be using voice to text to capture this interview. Is that okay with you? (Yes.) Okay.

1. Question one. What do you think formative assessment is? (Um, it's where they look at what the child is good at or what they need help with and they try to assess that and go from there.)

2. Okay. We're going to skip question two.

3. Number three. Do you feel that your child has a more positive outlook on school because of you being involved in the formative assessment process? (I think so.) Okay. Um, can you name any examples of where the teacher has called to, um, talk to you about your child's work or emailed? (Yeah, the teacher had a….We got on the Zoom chat, um, last week and went over some of the things that L_____ had been missing and say that she needed to work on because, um, because her computer had glitched out a couple of days, and she didn't stay on the Google Meet the whole time, so we went over what she needed to do). Okay. And does L_____ have Mr. C_____ or Mrs. P_____ for math? (She has P_____.) Okay, so was Mrs. P_____ pretty good about letting her redo assignments, um…(Yes.) if needed or like for full credit? (Yes.) Okay.

4. Um, question four. Was the training video helpful, and I know that's been a while since you've watched that? (Um, yes, I think it was.)

5. Question five. Was it inconvenient to be involved in the formative assessment process? (No.)

6. Question six. Do you feel that your child improved by being involved in formative assessment in the formative assessment process? (I do.) Okay. And that question kind of goes with that other one, but, um, do you want to add anything to that? (No.) Okay.

7. Question seven. Do you feel that teacher, that the teacher/parent relationships improved by being involved in the formative assessment process? (Yes.) Okay. Can you name any examples of how that might have improved? Um. (I think it gives us more of a communication as far as what my particular child needs and needs to improve on and what she's good at. And I think that helps the teacher to identify it as well as me as a parent. And we try to work on that together.) Okay. Great.

8. Question eight. What is something that you really liked about the parental involvement in formative assessment? (Um, I feel like I have a closer relationship with the teacher, as far as what is best for my child and we can work on things together because we have better communication.)

9. Okay. And question nine. Is there anything that you really did not like about the parental involvement in formative assessment? (No, everything seemed okay.)

10. Okay and question….And last question. Is there anything else that you'd like to share? (No.) Okay. Thank you. I'm good.

MCEC Parent Interview (12/15/2020 2:30 PM)

Temi would not record, so the PI took notes of the interview.

1. Question one. What do you think formative assessment is? (Review work and help him with it.)

2. We're going to skip question two.

3. Number three. Do you feel that your child has a more positive outlook on school because of you being involved in the formative assessment process? (Yes, it made him want to do it correctly, because I was looking at it.)

4. Question four. Was the training video helpful, and I know that's been a while since you've watched that? (Yes.)

5. Question five. Was it inconvenient to be involved in the formative assessment process? (No.)

6. Question six. Do you feel that your child improved by being involved in the formative assessment process? (Yes, you should be involved anyway. I know some parents are not.).

7. Question seven. Do you feel that the teacher/parent relationships improved by being involved in the formative assessment process? (I don't know. I haven't worked with these teachers before this year.)

8. Question eight. What is something that you really liked about the parental involvement in formative assessment? (Being able to see what's going on and being able to correct things early.)

9. Question nine. Is there anything that you really did not like about the parental involvement in formative assessment? (Nothing.)

10. Last question. Is there anything else that you'd like to share? (No.) Okay. Thank you very much!

CMDS Parent Interview (12/15/2020 8:33 PM)

The interview questions were translated to Spanish, then answered in Spanish by the parent via text. Then, the interview answers were translated to English. This interview was not recorded with Temi due to the language barrier.

1. What do you think formative assessment is? (It is to be more involved; teachers, parents and students.)

2. We're going to skip question two.

3 .Do you feel that your child has a more positive outlook on school because of you being involved in the formative assessment process? (Yes.)

4 .Was the training video helpful? (Yes.)

5. Was it inconvenient to be involved in the formative assessment process? (No.)

6. Do you feel that your child improved by being involved in the formative assessment process? (Yes, because they learned to develop better.).

7. Do you feel that the teacher/parent relationships improved by being involved in the formative assessment process? (Yes to despite the difficult situation we are going through.)

8. What is something that you really liked about the parental involvement in formative assessment? (Confidence in communication between students, parents, teachers.)

9. Is there anything that you really did not like about the parental involvement in formative assessment? (For the moment nothing.)

10 Is there anything else that you'd like to share? (A thanking for the attention received.)

KWBB Parent Interview (12/16/2020 2:20 PM)

I will be using voice to text to capture this interview. Is that okay with you? (Yes it is.)

1. Okay. Question one. What do you think formative assessment is? (Um, I was very confused about it, but I did like you know did some research on it. I think it's just where pretty much the parent and the teacher, uh, work more one-on-one with the kids and are a little bit more involved.)

2. Okay. Good. Question two. When the progress…oh we're skipping question two.

3. Question three. Do you feel that your child has a more positive outlook on school because of you being involved in the formative assessment process? (Oh, absolutely. Yes. B_____ always loved school, but this year has been…and I really think

this probably has an effect on it. Um, she's really done so much better, and she's been more on top of things and, um, she comes to me a lot more with questions about her school work and all of that, so, yeah, absolutely.) Okay. Good.

4. Question four. Was the training video helpful? (Yes it was.)

5. Okay. Question five. Was it inconvenient to be involved in the formative assessment process? (Uh, not at all. Not for me because I'm pretty involved anyways with my kids' school work. Um, but it did, uh, it wasn't an inconvenience at all, especially this year now that they've been home with us more.) Okay. (So, absolutely not.) Okay.

6. Question six. Do you feel that your child improved by being involved in the formative assessment process? (Um, I mean, I don't know if I would say she improved because B_____ has always had straight A's and she has still had straight A's.) Okay. (But her attitude, her attitude towards school is much better this year.) Okay. And you think that's from being involved in the formative assessment process? (I think it could be, yes.) Okay.

7. Question seven. Do you feel that the teacher/parent relationships improved by being involved in the formative assessment process? (Uh, yes, I think so. Yeah, her teachers and I have a very good relationship and, uh, I speak with them at least once a week, so, yes.) Okay. Awesome.

8. Question eight. Why is something, um, what is something you really liked about parental involvement in formative assessment? (Um, just, I guess, being, knowing that I can, uh, I know more about what they're doing in school and I'm able to reach out to her teachers. We've just been communicating a lot more. I've learned more of her teacher's teaching styles and also how B_____ responds to them, uh, when she's in person and in the classroom.). Okay.

9. Question nine. What is something that you really did not like about parental involvement in formative assessment? (I don't think there's anything I didn't necessarily dislike about it. This year, it was just kind of hard to really, I guess, see how well it works because of the remote learning. That's the only thing that, you know, I don't, I don't know if it would have been different had they been in person 100% of the time.) Yeah. I know what you mean.

10. And question ten. Is there anything else that you would like to share? (I don't think so.) Okay. Thank you.

Appendix E

Teacher Interviews

DP Teacher Interview (12/7/2020 2:15 PM)

Okay. Testing, um, I'll be using voice to text, to capture the interview. Is that okay with you? (Yes ma'am.) Okay.

1. What do you think formative assessment is? (Um, ongoing feedback of students' strengths and weaknesses, so I can better help them and prepare the lessons.)

2. I'm going to skip the second one. (Okay.)

3. Do you feel that your students have a more positive outlook on school because of their parents being involved in the formative assessment process? (Yes ma'am.) Okay. Can you give me an example? (Well, like, um, the students will come back the next day and share with me how their parents showed them how to solve a problem. So, they're excited because of that parent bonding time. I mean, it actually gives them more time with that parent. So they're excited to see that parents are showing them strategies, and I think more so that they're just happy to have that time with the parents.)

4. Um, was the training video helpful? (Yes ma'am.) Okay. Is there anything specific from the video that, um, that resonated with you? (Not that I recall.) It's been a while.

5. Was it inconvenient to be involved in the formative assessment process with parents? (Not at all, not at all).

6. Do you feel that your students improved by their parent being involved in the formative assessment process? (Absolutely. Again, I think they just wanted the parents to see what they're doing well, and then if they needed some strengthening, their parents kind of shared another view or another strategy. So I think it was very helpful.)

7. Do you feel that teacher/parent relationships improved by being involved in the formative assessment process? (Yes, because I think that the parent really appreciated you taking extra time to give their student another shot at the learning objective and that they were able to offer that assistance.)

8. What is something that you really liked about parental involvement in formative assessment? (I think just the positive relationships that are developed between the child and the parent and the teacher and the parent, and then the teacher and the child, because of the parent.)

9. What is something that you really did not like about parental involvement and formative assessment? (I really can't think of it anything. Um, there was one situation where a parent wanted to have a very long expanse of time and that just made it a little tricky for me to go back and find, but it was a really good experience.)

10. Okay. Is there anything that you would like to share? (No.)

Okay. Thank you so much.

MC Teacher Interview (12/8/2020 2:30 PM)

Okay. I will be using voice to text to capture this interview. Is that okay with you? (Sure.)

1. Okay. Question one: What do you think formative assessment is? (Uh, trying to grasp what the strengths and weaknesses are of a child and focusing on those ones so they can have confidence in what they're doing, but too letting them know and knowing that they haven't attained anything yet and working on that area; self-realization of shortfalls.)

2. Okay, good. We're going to skip question two.

3. Question three. Do you feel that your students have a more positive outlook on school because of their parents being involved in the formative assessment process? (I think that the kids, uh, love their parents. They've been involved no matter what it is. Formative assessment, playing Tic-Tac-Toe, as long as their parents there. They love that. So, yes, I think that, uh, they, um, have a, a great positive outlook on school when their parents are right there helping them. I have a couple of children that the parents are right there. And in fact, I saw one today where the dad was there guiding his daughter. And, uh, it seemed to help. They liked that.)

4. Was the training video helpful? (Sure. Especially when I didn't know what to do, and it gave me some guidance.)

5. Okay. Was it inconvenient to be involved in the formative assessment process with the parents? (I don't think inconvenient is the word to put especially when we have the distance learning like we do. It's not inconvenient. It's just difficult, difficult because of the, uh, everyone has their own thing going on sometimes. Uh, as far as meeting you set up a 'Meet' and one of the parties aren't there, it was, uh, it was difficult.)

6. Question six. Do you feel that your students improved by their parents being involved in the formative assessment process? (Yes. They improved, again, going back to question three, that they just had a more positive outlook. Uh, anytime a parent can be involved, as long as they're not angry about being involved is a plus.)

7. Do you feel that teacher/parent relationships improved by being involved in the formative assessment process? (Yes.)

8. Question eight. What is something that you really liked about parental involvement in formative assessment? (I'm being repetitive because I just think parents just the fact that parents are involved is an asset to the student, to the teacher, and I even believe to the parent. I think they learn each other better while they're interacting.)

9. Question nine. What is something that you really did not like about parental involvement in formative assessment? (Not sure if there's anything that I didn't like about it.) Okay. (Just, I, I can't think of anything right off hand.)

10. Is there anything else that you would like to share? (No. No. I wish you could be asking these questions where the children were face-to-face with us instead of distance learning; that makes it difficult for us. And I know it's probably difficult for you doing this paper.) Yes. Thank you very much. (No problem.) Okay.