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An Evaluation Of A Sixth Grade Intensive Mathematics Program And Impacts On Student Achievement

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AN EVALUATION OF A SIXTH GRADE INTENSIVE MATHEMATICS PROGRAM AND IMPACTS ON STUDENT ACHIEVEMENT

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A DISSERTATION:

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For the dissertation requirement, doctoral candidates are required to plan, research, and implement a major project within their school or district that relates to professional practice. The three foci of the project are:

- Program Evaluation
- Change Leadership
- Policy Advocacy

For the **Program Evaluation** focus, candidates are required to identify and evaluate a program or practice within their school or district. The "program" can be a current initiative; a grant project; a common practice; or a movement. Focused on utilization, the evaluation can be formative, summative, or developmental (Patton, 2008). The candidate must demonstrate how the evaluation directly relates to student learning.

In the **Change Leadership** focus, candidates develop a plan that considers organizational possibilities for renewal. The plan for organizational change may be at the building or district level. It must be related to an area in need of improvement and have a clear target in mind. The candidate must be able to identify noticeable and feasible differences that should exist as a result of the change plan (Wagner et al., 2006).

In the **Policy Advocacy** focus, candidates develop and advocate for a policy at the local, state or national level using reflective practice and research as a means for supporting and promoting reforms in education. Policy advocacy dissertations use critical theory to address moral and ethical issues of policy formation and administrative decision making (i.e., what ought to be). The purpose is to develop reflective, humane and social critics, moral leaders, and competent professionals, guided by a critical practical rational model (Browder, 1995).

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ABSTRACT

The purpose of this evaluation is to analyze an Intensive Math program's quality and design, as well as, address the impact of the program to determine whether the intensive mathematics class, and the use of computer-based support, impacts student achievement. The program design incorporates a two-prong model of teacher-directed and computer-based intervention. The relationship of the intensive mathematics curriculum implemented with struggling learners and closing the mathematics achievement gap are evaluated through the analyses of student data, the quality of implementation and program usability and teacher and teacher leader perspectives. The findings indicate that small groups and individualized attention for students is vital to student success and the misalignment of content with the core mathematics course should be addressed.

PREFACE

My 28-year career in education began in a middle school mathematics classroom where my love of teaching mathematics developed. I taught middle and high school level mathematics over a period of 10 years in both low and high socio-economic schools. Following my years in the classroom, I expanded my impact through serving as a district wide resource teacher in mathematics and leading as a supervisor in mathematics for a large school district. The context of my program evaluation developed from my intentional focus on ensuring all students have an equal opportunity to learn mathematics especially for students who need intensive support by the time they reach middle school. In my roles in district level positions, I have seen the impacts of curriculum, implementation and assessment on struggling learners. Seeing their challenges inspired me to begin a journey to ensure that there is equal access and opportunity to learn mathematics, so they can begin a road to success.

My topic is relevant to all stakeholders including parents, teachers, schools, and university personnel in that having mathematics content and thinking skills impacts student's personal and professional trajectory. The focus on low level performing math students in this research is to look at avenues to support their needs and look for paths to break the cycle of students who continue in low level courses year after year. The need to support their learning is vital to changing the education landscape for the students. By having students who develop confidence in mathematics, they then have a greater opportunity to approach mathematics with open eyes as they progress through school and transition to college and the work force.

The main leadership lessons learned through this process focused primarily on the impacts of research has for analysis. By understanding the importance of using multiple layers of research methods for analysis, I gained a richer understanding of the factors that can influence issues around mathematics education. Additionally, by gaining input from teachers and teacher leaders through the program evaluation, I learned the value of practitioner input and in the process of a research evaluation.

Through this experience, I gained insight into my own leadership. From beginning to end, the process taught me the value of a broader perspective of an evaluation. The multiple layers of impact on a study was a key learning lesson by knowing that a suggested policy change can have impacts not only for education but also political, social, economic, moral and legal impacts so arise and this was a step that helped me understand the greater impact. My passion lies in high quality mathematics programs and ensuring that all students have access to equitable opportunities in mathematics education. This evaluation project allowed me to learn more about ways to impact the change to ensure high level programs are developed but also anticipate possible barriers to change.

As a leader in mathematics education, I feel this process prepared me to take the steps to have even a bigger impact on change in mathematics curriculum. The experience gave me insight into data analysis as a springboard for change, communication skills and a more holistic view of educational change. Knowing that change, even when in best interest of students comes with challenges, I have learned that at a system level, change must be grounded in research and stakeholder input. By leading with thoughtful, data-

driven decision making, I believe that changes in mathematics education can take place to create a pathway for all students to succeed.

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DEDICATION

I dedicate this work to those who had to share in the sacrifices that were made to make this research and doctorate a reality for me.

First, my husband Brian who learned very early on in the process that he would have to fill time during my doctorate journey. He used the time well and began work on his own dream. Together we sacrificed, encouraged each other and loved each other through it.

To my son Jacob, may this work be an inspiration to you. Your work ethic and determination are and always will be inspiring. You will forever be an example to everyone who has ever said or ever will say, you can't as you are proof that you can!

To my son Caleb, your spirit is contagious. Some of our best moments in life have been when it is just me and you. We have laugh so hard together! When you saw my books everywhere and watched me write for hours, you said, "nope, not doing that." Know that someday you just might! Dream big and lead with your spirit.

To my mom, for being there for me every time I need it. Your support has helped me through many challenges and journeys!

My final dedication is to my dad who left this world way too young. I am where I am today because of the foundation he built in my life. He taught me the value and rewards of hard work. This dissertation became a reality because of those deep-rooted values instilled in me so long ago. Dad, thank you and I did it!

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SECTION ONE: INTRODUCTION

Struggling students in mathematics in Gilbert School District (pseudonym) a large diverse urban district in Florida are often enrolled in two mathematics courses. In middle school, students are enrolled in a traditional mathematics course for each grade level, grade 6, grade 7 and pre-algebra for grade 8. Each course contains the standards for the grade level as defined by the Mathematics Florida Standards (MAFS). Near the end of each school year, the students take the Florida Standards Assessment (FSA) which evaluates their level of proficiency on the grade level specific MAFS. Students scoring at a level 3 are considered to be satisfactory, proficient at a level 4 or mastery when scoring a level 5. When a student scores a level 1 on the FSA for mathematics, the student's performance is identified as inadequate. A student scoring at a level 1 is described, based on the Florida Standards Assessment achievement level chart, as a student "highly likely to need substantial support for the next grade/course" (FLDOE, 2016, p. 3). In the school district, when a student scores a level 1, they are scheduled to take an additional mathematics class, Intensive Mathematics, alongside their traditional mathematics grade level class. This Intensive Mathematics course is designed to address the need for the substantial support for the next grade level. Approximately 3,500 students across the school district are impacted by this dual course process for intensive mathematics.

The Intensive Math course is one method of supporting the students in need. The support is in an effort to help close the gap of student's continually scoring low in mathematics throughout middle school. The data statewide shows that 26% of students in 2015 scored a level 1 in mathematics on the FSA which indicates these students will need additional support (FLDOE, 2106). Additionally, the results from the 2016 FSA

administration show the student data remained stagnant with 26% of grade 6 students still scoring a level 1 on the FSA (FLDOE, 2016). In Gilbert School District, the results mirror the state results in that the results remain the same year to year. Gilbert County had 28% of the students score a level 1 on the Spring 2016 and 2017 FSA. Additionally, in Gilbert County School District from school year 2015 to 2016, out of the 3,143 students who were a level 1 on the FSA, 24.4% of them gained enough points to move to a level 2. Thus, the results from the FSA is one factor to prompt a need for the Intensive Mathematics class specifically designed to support student gaps in their mathematics learning from prior grades.

Intensive Mathematics is a second mathematics class that the students take in addition to their traditional mathematics class and occurs during the school day, thus impacting the other courses students can take. The issue surrounding this is that the students who take the additional Intensive Mathematics class are removed from either physical education or an elective class. The concern this brings about is that the students are then prevented from having an opportunity to get the much-needed exercise for an adolescent, or an opportunity to explore electives such as art, band, orchestra or technology.

In addition to students losing much needed elective time for adolescent development, there is concern over the structure of the schedule, the curriculum, and the impact on student achievement over time in mathematics. The students in grade 6 take the Intensive Mathematics class for the entire school year while students in grade 7 and grade 8 take a semester course of Intensive Mathematics. The curriculum for the courses is designed to support the grade level standards currently taught in their traditional

mathematics class, but also to help fill any mathematics gaps in their learning from prior standards in previous grade levels. The impact on student achievement over time when a student takes Intensive Math is a focus of my evaluation of the Intensive Math program.

Purpose of the Evaluation

The program I will be evaluating is the Intensive Mathematics program specifically used in grade 6 Mathematics in a large urban district. The program is used as a full year curriculum for students enrolled in Intensive Mathematics which is the secondary mathematics class for students who score a Level 1 on the Florida Standards Assessment. The students engage in a curriculum that is a blended model program of teacher directed and computer-based learning. The teacher directed portion of the program allows the teacher to teach approximately half of the students in a small group while the other group of students work on the computer-based portion of the curriculum. The teacher directed portion is the same for all students and the computer-based portion is differentiated for each student based on diagnostic testing at the beginning of the school year to determine what level the students begin for initial placement in the program. The program is designed as a two-prong model that allows for half of the class time per week to be teacher directed and the other half to be computer- directed instruction. The students typically spend 20 minutes per day with the teacher and 20 minutes using the computer-directed instruction time.

I first became aware of the Intensive Math program when it was used as a pilot for select schools in the Gilbert School District. Following the pilot year of implementation, was the state of Florida's adoption for instructional materials for mathematics. The program, Math 180, was on the state textbook adoption list in 2013 during the state of

Florida's adoption for new mathematics textbooks and programs. Gilbert School District chose to adopt the Intensive Math program, Math 180, for the 2014-2015 school year to be used in grade 6 Intensive Mathematics. The use of the program stemmed from the ability to adopt resources for the course while in the past the curriculum was developed by the district. As implementation of the program became more wide scale in the district's 48 middle schools, I was able to observe the new blended model of instruction, as well as, observe teachers and students using the program through my role as a mathematics supervisor.

The Intensive Math program directly relates to student learning as it is designed to help fill gaps and misconceptions in student's mathematical prior learning. The students who are enrolled in the grade 6 Intensive Math class that use Math 180 are often referred to as struggling mathematics learners. Struggling learners will at times have temporary struggles or have ongoing persistent conceptual understanding challenges that can cause the learning of mathematics to be difficult (Tapper, 2012, p.4). The program is designed to address the temporary struggles through the teacher small group time, and then during the adaptive computer-based portion of the class, the students are remediated to address any conceptual understanding misconceptions from prior learning. For some students, this remediation through the online portion may go back to third grade mathematics content. Other students who have more foundational skills and fewer gaps may be moved to higher level material thus meeting the needs of each learner individually.

The purpose of my evaluation is to analyze the Intensive Math program's quality and design, as well as, address the impact of the program to determine whether the intensive mathematics class and the use of Math 180 impacts student mathematics

achievement. In the Gilbert School District, some schools have been looking for options other than the Intensive Mathematics class to meet student needs for additional support in mathematics. The students in some cases truly have a need for additional support through a structured course such as Intensive Mathematics. There are also some students whose school leaders have voiced they may not need the defined structure of a class but some additional time on certain skills may prove to meet the student's needs. Additionally, some schools may find that they could offer other scheduling options such as a thirty-minute lunch and learn time that could meet the needs of the students in mathematics without losing physical education or an elective course. My review of the district and school policies to evaluate systemic programs that are targeted at a particular group of students should be reviewed through an analysis of tracking, how students are placed, the opportunities they have for remediation and to look at student outcomes (NCTM, 2014, p.69). Through my review of Intensive Mathematics as a program and looking at student outcomes, the results may impact systemic practices in the school district.

Rationale

I chose to select the Intensive Math program used in grade 6, Math 180, to evaluate in order to analyze what the impact of taking an additional mathematics class has on student achievement. As a supervisor specializing in mathematics instruction, my rationale for selecting this program to evaluate is to ensure students have access to high quality programs that impact student learning and overall achievement. An additional reason is to analyze the results in order to determine if systemic changes should be made to the program itself, the scheduling procedures and to determine the impact of the support systems in place for struggling learners. Students who are identified as a

struggling learner in middle school often lose elective time such as music, art or technology due to the added mathematics course in their daily course schedule. This analysis is important to help determine if the program adds value to our student's development and academic achievement.

Throughout my career as a teacher, I often took the opportunity to tutor students in mathematics outside of the school day. This time of tutoring one-one-one provided insight into the struggling student's thinking and, at times, understanding their dislike of mathematics. During tutoring sessions, instead of working on current mathematics, typically the students and I worked on past skills that were gaps in learning. On one occasion a student seemed frustrated and not sure why she would continually not score well on tests even when she studied. Once I determined her frustration was impacting her mindset and desire to do math either in school or outside of school, I then knew where to begin. We began to look at the gaps in learning and find success in the content that was confusing for her and through understanding the mathematics conceptually and not just rote procedures, she began to gain confidence. Through this experience, the need to go beyond teaching only the content and build mathematical confidence and mindset became clear to me that it is vital to student success long term. These two, mathematical confidence and mindset, are the foundation for making change in student learning and in programs that support struggling learners, thus creating my personal interest in the impact of Intensive Mathematics as an additional course for students.

The critical issues related to the Intensive Mathematics program are twofold. The first critical issue is related to the mindsets of students who are tracked into low level courses. The tracking of students has been shown to reduce achievement due to the fixed

versus growth mindset that develops due to the grouping of students (Boaler, 2016, p. 113). The Math 180 program has embedded growth mindset development within the program, yet the critical issue to explore is whether these embedded pieces counteract the tracking impact. An additional critical issue related to the program is the long-term impact of Intensive Mathematics. Once completing the program in grade 6, it is important to determine if the students have sufficient gains in mathematics achievement to no longer need an additional mathematics class. These critical issues are focused on determining if the program is helping students reach the untapped potential they may have and close the mathematics gap with the struggling students. A student's untapped potential is often due to student's not having the opportunity to develop their mathematical knowledge to their fullest potential (Seeley, 2009, p.8).

This evaluation is important to school districts in that it impacts student and teacher scheduling, curriculum budgets and the results in students' mathematics achievement. Through my experience as a mathematics supervisor, I often evaluate the impact of programs on student achievement, as well as financial impacts of purchased curriculum. When a curricular program is not showing a positive impact on student achievement, it is often eliminated for use with students or evaluated to propose possible changes in implementation. The evaluation of this program is important to the community at large as it will assist other schools and districts in determining the impact of Intensive Mathematics on student achievement and what impact the program Math 180 has on student performance over time. The parent stakeholder group often voices concern when students are taking a second Intensive Mathematics class. The parents desire to know that there is a positive impact on their child's overall mathematics performance if

they indeed participate in the Intensive Math program. I often receive phone calls from parents when their child is placed in an Intensive Mathematics course to help them understand the purpose of the placement and to discuss possible support options. To that end, this evaluation is valuable to address the parent concerns of their child's placement and mathematics performance.

Goals of the Program Evaluation

The goals of my program evaluation are to examine the use of the Intensive Math program to determine the impact of the two-prong design on student engagement, what implementation challenges teachers face and what can be improved in the program to determine the impact on student achievement. In addition, by design the Intensive Math program creates tracking of low performing students. Through the focus on evaluating what is working and what the challenges are for the program, there may be a possible impact of the tracking of students. Students who are tracked are limited in their achievement and teachers report that these students in low level classes are capable of work at a higher-level (Boaler, 2016, pp.113-115).

The program evaluation goals are directly related to student performance and learning as the focus of the evaluation is on low performing, struggling mathematics students. When students are enrolled in a class to support their learning, there are two factors that may play a role in their performance: first, the program used with the students and second, the role of the teacher in implementation and support. The program evaluation focus is on Math 180 as a program and its impact on student learning. A supporting focus is on the impact the teacher has on the implementation of the program which may in turn impact student learning.

Exploratory Questions

The primary research question to drive the evaluation of the Intensive Mathematics program used in grade 6 is: What impact does the Intensive Math program implemented in grade 6 mathematics classrooms have on struggling learners' mathematics achievement?

From this overarching question, the supporting questions to the main primary question include: (1) What do teachers report is working well in the Intensive Mathematics program? (2) What do teachers report is not working well in the Intensive Mathematics program? (3) What do school level leaders and teachers report as the greatest challenges with the Intensive Mathematics program? (4) What do the school level leaders and teachers report as ways to improve the Intensive Math program?

The additional secondary research questions related to the evaluation are: (1) , When comparing students who have intensive math to those who do not take it along-side their core math class, do teachers see evidence of increased confidence in mathematics? (2) In the Math 180 program, the students use the computer portion of the program, as well as, the small group teaching component; does the amount of time on the computer based differentiated portion impact student achievement in Math 180?

Conclusion

Through my role as a mathematics supervisor, I support the need to evaluate programs and teacher practice to ensure that high quality instruction is taking place in mathematics classrooms. This evaluation addresses the Intensive Mathematics program's quality through teacher and school leader input as well as the impact on student learning

and achievement. The support of struggling learners through high quality mathematics curriculum and instruction is vital to closing the mathematics achievement gap.

SECTION TWO: REVIEW OF LITERATURE

Introduction

Many people in society share that they have struggled in mathematics through their school years. In addition, many will share even though they struggled with the content themselves, they still feel mathematics should be taught exactly the way they were taught in school through memorizing facts and formulas, learning procedures and repeating them (Sam & Ernest, 2000, pp. 7-12). Learning mathematics without conceptual understanding creates gaps in a student's mathematics understanding. The base understanding that "conceptual understanding establishes the foundation, and is necessary, for developing procedural fluency" (NCTM, 2014, p. 7) is the building block of strong programs to support struggling math learners.

Students at times need additional mathematics support or intensive programs to fill the gaps in learning. In order to provide students with a program that will meet their needs, it is vital to understand the learner and what types of interventions provide academic solutions for success. To build on this understanding of meeting the needs of struggling learners through additional support, a review of literature that focuses on mathematical mindsets, interventions for instruction and studies for students with learning difficulties will provide opportunity for analysis of intensive math programs.

Mathematical Mindsets

Looking at research related to why teachers think students struggle in mathematics, Seeley (2014) shares reasons from teachers for the lack of success, which include more than just the student factor such as a lack or gap in their knowledge. Other factors that impact student's success include school related issues such as lack of content coverage and a lack of quality resources, as well as, community or family factors that

occur through low expectations or beliefs around mathematics that some people can do math and some cannot (p. 3) While many students face obstacles that may impact their success in mathematics, no one factor should be the sole factor for a student's lack of success. Many students with these factors that can impact of mathematics can be successful when appropriate support and interventions are in place.

The connection between how a student and the adults around them view intelligence may be one of the biggest factors in student's success in mathematics (Seeley, 2014, p. 4). All students have a mindset that they come with to a classroom that is a core belief that defines how they learn (Dweck, 2006). Dweck (2006) shares that the two types of mindset, fixed and growth, impact our learning behaviors which can impact learning outcomes for students. In a growth mindset, there is belief that "smartness increases with hard work, whereas those with a fixed mindset believe that you can learn things, but you can't change your basic level of intelligence" (Boaler, 2016, p. ix). Students will bring the ideas around mathematics from their environment into the classroom and when surrounded by a fixed or growth mindset about the learning of mathematics it can transcend into the classroom environment.

In a study of seventh-grade students by Blackwell, Trzesniewski, and Dweck (2007), the students asked to complete a survey designed to measure what would show insight into their mindset and then were followed for over two years in order to continue to monitor the student's mathematical achievement. The results were telling as they showed that the student achievement for those with a fixed mindset remained constant and those with a growth mindset increased (Blackwell et al., 2007). In addition, the study included a motivation intervention with the students in the experimental group. The

results showed with even a small intervention focused on a key belief, there is impact on motivation and achievement (Blackwell et al., 2007, p. 258).

Framing Student Learning

Further research shares, changing mindset may not be enough for all struggling students to experience success (Slossan, 2004, pp. 45 - 48). Teachers need to recognize that some students do have challenges with mathematics; and students know that just telling them work harder and they will improve isn't always true (Slossan, 2004, pp. 45-48). In addition, three main intersecting categories, environmental factors which include language, culture and socioeconomic status, cognitive challenges such as memory issues and attention deficits and the quality of instruction stemming from a mismatch between the student learner and instruction are the three factors that are related to math difficulty for students. (Tapper, 2012, pp. 5-7). The intersection of these three factors is are not the cause of the math difficulty but can be impactful and associated with student difficulties (Tapper, 2012, p. 5).

Through analysis of the frame of student learning to understand student thinking, a better understanding of the struggling learner will emerge. Tapper (2012) shares, "If we want to reach all our students, especially those who struggle, we need to first develop a deep and personal understanding of their learning." The learner frame serves as a platform for determining qualities of intervention programs for struggling learners.

The Learner Frame defined by Tapper (2012) addresses the student and their understanding of concepts. There are two types of learning, one being procedural which involves using steps to solve problems and the other is conceptual which involves understanding of the larger mathematical ideas (Tapper, 2012, p. 12). When learning

mathematics, students benefit in understanding the connections of the mathematical ideas. For the students who understand the concept behind the learning it becomes as Tapper (2012) states, “a gateway to deeper mathematical ideas” (p. 14). This idea of understanding concepts is vital to the struggling learner. By teaching conceptually to students who struggle, they begin to see connections and can make meaning of the mathematics.

Conceptual Understanding and Procedural Interventions

Highly effective teaching of mathematics stems from the development of an integration of both conceptual understanding and procedural skill and fluency processes (NCTM, 2014, pp. 42 – 43). Determining the balance of these in teaching of mathematics to students who struggle is essential to their long term success. If there is a rush to fluency, it could weaken a student’s confidence and possibly interest in mathematics which in turn is often considered a cause for a student to have math anxiety (Ashcraft, 2002).

Research by Ketterlin-Geller, Chard and Fein (2008) analyzed a conceptually based intervention for students who were low-performing students in the intermediate-grades in mathematics. This intervention provided a re-teaching of fundamental mathematics and extended time in the core curriculum. The intervention was two-prong including a defined program, Knowing Math, shared with a schedule for extended time in core mathematics content. The program intervention included conversations with students on the concepts learned as well as discourse with students on their learning while the extended core time included the teacher supporting concrete examples and feedback on the students’ thinking (Ketterlin-Geller, Chard, & Fien, 2008, p. 38).

Findings from this study share that this intervention may support students who struggle as the results show that when students used the Knowing Math intervention the students developed foundational skills for application to advanced concepts due to the previous re-teaching fundamental skills. “indicate that both strategies may help students gain proficiency in mathematics” (Ketterlin-Geller et al., 2008, p. 41). Furthermore, Ketterlin-Geller et al. (2008) share the mathematics interventions with teacher feedback may in fact support the learning of the conceptual as well as the procedural knowledge of the students. Additionally, results from the study would suggest when a mathematics intervention supports the re-teaching of mathematical concepts and procedures of fundamental mathematics alongside additional core content time, the students’ achievement in mathematics may improve (Ketterlin-Geller et al., 2008, p. 42)

Fluency Interventions

In an effort to support students who have math difficulties, the use of programs to address fluency and automaticity is a method of addressing the gaps in learning. The students’ gaps in learning can be related to the student’s lack of number sense, memory processes or processing ability. Additionally, the gaps in learning may be related to issues concerning the teaching of the content or curriculum inadequacies. (Graham, Bellert, & Pegg, 2007, p. 173). While the cause of the difficulty may vary, Graham, Bellert and Pegg (2007) study the need for a focused fluency intervention to determine the effect on student learning in their traditional mathematics classroom (p. 173). The program used for the intervention in the study was designed to address mathematics mathematic? basic fluency skills and student learning of the basic skills. Then, observe students in higher level tasks to determine if the intervention impacted their higher level learning. Next,

through standardized testing results, the researchers determined if the intervention to close the fluency gap did narrow the gap and result in academic gain (Graham et al., 2007, p. 174).

The intervention was done outside the traditional classroom in small groups in three 30-minute sessions per week for 26 weeks (Graham et al., 2007, p. 175). This intervention created an opportunity to support the students with learning difficulties by focusing on the basic skills and automaticity. The program used, QuickSmart, included a number fact check, flashcard activity, speed challenge, independent work, assessment and game time (Graham et al., 2007, p. 175).

The results of the intervention showed that students who experienced the QuickSmart program did positively impact achievement for most students. Out of the 42 students, 32 of them showed an increase in the post test percentile scores from the standardized test (Graham et al., 2007, p. 176). The findings supported the use of programs that focus on basic facts and automaticity. The results show that when students have increased basic facts and automaticity they can in turn have increased performance when more complex skills are tested (Graham et al., 2007, p. 176). This intervention was completed outside the traditional class time in the study, although the components of the study could be completed through a traditional class time when adapted for teaching and instructional practices with the intervention that allow students to experience success (Graham et al., 2007, p. 181).

Technology Interventions

The use of technology, including everything from calculators to software designed to support student learning of mathematics, is often debated in the mathematics

community. Many reform-minded teachers are supportive of technology that supports students gaining a clearer and deeper understanding of concepts in mathematics (Checkley, 2006, p. 31). The concern with the use of technological interventions is when the tool isn't used as intended to support the learning. A few practices that will handicap the use of computers to support learning include: training for teachers that focuses on the skills in the product instead of implementation for student learning, the lack of support for teachers with ongoing professional development to support integration into the classroom, and teachers who choose easier software to use with students because it appears engaging instead of higher order aligned software (Burns, 2005, p. 49). Ultimately, the use of any technology should be used to deepen student learning (Checkley, 2006, p. 35).

In a study to determine if technological interventions improve student academic achievement, Jerry Mathews and Mark Neill (2009) specifically looked at subgroup results including students who have English as a second student language, students with learning exceptionalities or economically disadvantaged students. In the study, Neill and Mathews (2009) included three study groups of students, with two of the groups having academically at risk students involved in two different types of learning interventions using technology and a third group with a traditional teaching strategy. The results showed that students who were at-risk and participated in the technology intervention had an increase on their state test from the prior year which indicated the technology intervention was a possible cause and effect (Mathews & Neill, 2009, p. 64). The results of the study can inform teachers to potentially support learning for struggling students through the use of technology.

The use of technology is one method of impacting student achievement when it is implemented to do more than just enhance the learning (Leinwand, 2009, p. 93). When selecting technological supports, "the key is how students experience these technologies and how the classrooms use them to support the development of mathematical concepts" (NCSM, 2014, p.34). The technology intervention should be well planned, appropriate for the student and intentional to support the student's development of mathematical thinking processes (Leinwand, 2009, p. 94).

Conclusion

Through evaluation of the student learner and mathematical mindset research, the understanding of knowledge related to student learning for struggling math students can provide insight into intervention programs that will best support their learning. In addition, through the analysis of programs from the lens of conceptual understanding, procedural skills, fluency intervention and technology supports an increased repertoire of programs will give insight into the most effective learning environments for struggling learners Through this research and the program evaluation, it is my hope that this will provide recommendations for best practices in future designed programs and appropriate support recommendations for students struggling in mathematics.

SECTION THREE: METHODOLOGY

Research Design Overview

Patton (2008) shares, “Improvement-oriented approaches tend to be more open-ended, gathering varieties of data about strengths and weaknesses with the expectation that both will be found, and each can be used to inform and ongoing cycle of reflection and innovation” (p. 116). Through evaluation of the intensive mathematics program used with grade 6 students, I evaluated the strengths of the program that impact student achievement and analyzed any weaknesses to inform ongoing improvements. By using the data collected in my evaluation, it helped serve to define the progression towards outcomes, implementation problems, and perception of the program (Patton, 2008, pp. 116-117).

The formative evaluation involves collecting data for a period of time to look for possible improvements and to make sure outcomes are being met (Patton, 2008, p. 118). My evaluation of the intensive math program implementation was designed to gather student achievement data on the Florida Standards Assessment (FSA) from the school district for students in the intensive math program. Information was gathered from teacher input and math leaders and administrators through interview responses on implementation perceptions and processes.

The program lends itself to formative evaluation in that I was looking at how the program is perceived by educators and the impact on student achievement. The perception and implementation input provided qualitative information on the success of the program for students. Thus, the focus on improvement implications in mathematics intensive programs to impact student learning was the nature of analysis.

My main research question related to what impact does the Intensive Math program implemented in grade 6 mathematics classrooms have on struggling learners' mathematics achievement. In my research, through evaluation findings looking at student achievement data for students with fidelity implementation usage who were on the program the minimum hours suggested by the program, through the experience of the practitioners who use the program with students daily (teachers) and through experience reported through the program support personnel (the coaches who work with the program), I aimed to answer the main question of impact of struggling learners. Patton shares (2008) that using different groups leads to the triangulation. My intention in the research was to have triangulation through the use of student data, survey results of the teachers with fidelity in implementation and the Math Coach interview input.

Participants

The participants of the study were grade 6 intensive math teachers from up to 48 middle schools who choose to participate in the online survey (Appendix A). The participants were mathematics teachers who teach grade 6 intensive mathematics at middle schools in Gilbert School District. The number of participants were up to 55 total teachers and males or females with an age range of 21 to 75. The teachers for the online survey were teachers of grade 6 intensive math in one of the 48 middle school sites. Each of the teachers received the voluntary participation letter (Appendix C) by email to them along with a copy of the Informed Consent for survey participation (Appendix D) as an attachment. By accessing the online survey, the teachers showed agreement to the informed consent.

Additionally, I conducted interviews with mathematics leaders (mathematics coaches, mathematics subject area leaders or assistant principals) at up to 48 of the

middle schools. The interviews lasted up to 30 minutes and provide perception insight regarding implementation and connections to other mathematics programs (Appendix B). The participants were mathematics leaders including math coaches, math subject area leaders or assistant principals for curriculum who oversee or supervise implementation of intensive mathematics at middle schools. The number of participants were up to 48 total math leaders and will be males or females with an age range of 21 to 75. The mathematics leaders were able to voluntarily participate in the study. During a meeting with all math leaders, I provided the overview of the study and asked for volunteers to participate. Those that wished to participate, they signed up and I contact them individually for an interview time at their convenience. During the interview time, I provided the math leader with the Informed Consent (Appendix E) and let the participants know they had the opportunity to answer all of the questions or could choose to not answer any questions that they decided they preferred not to answer (Appendix B). The participants were given the option to discontinue participation in the interview at any time.

Data Gathering Techniques

To gain insight into the evaluation of this program, I used the following processes and procedures to gain data. The review of district data gave insight into the student data across the district over time. The surveys gave a view into the teacher's perceptions of the program both the compute portion and the book resources. The interviews allowed for input from mathematics leaders to look deeper at school level implementation and overall perception of the program.

Document Review

District Level reports from the Math 180 computer portion of the program that are available to the Supervisor of Middle School Mathematics in Gilbert School District to view for school level information. The district level reports for all 48 middle schools that included data from approximately 3,000 students each year that used the computer portion of the intensive math program will be reviewed. The reports were range from school years 2015-2016, 2016-2017 and 2017 -2018. The reports included school level data of time on computer by school total, how many lessons are completed in a time frame and total number of students in each quantile based on the computer-based test in the program.

A Gilbert School District level report entitled, "Movement of Students Achieving a Level 1 on FSA Math 2015 by Intensive Math Participation and School" that is provided by the district Assessment and Accountability Office was reviewed. This report provided school level data for all 48 middle schools related to the percentages of students showing increases in state levels of achievement and mean scale scores comparisons from the 2015 school year to the 2016 school year on the Florida Standards Assessment.

Surveys

The survey for up to 55 grade 6 intensive math teachers at the 48 middle schools was a computer based online survey (Appendix A). The survey was sent as a link on the Informed Consent letter (Appendix D). Teachers were asked once initially to complete the survey and then one reminder email was sent to complete the survey. The teachers took the survey during non-student time which could have been done before school, after school or on a planning time. The online survey, which took approximately 10 minutes to

complete, provides usage and perception input related to the program and student learning. The teachers received a letter to indicate that the participation was voluntary (Appendix C) and was embedded in the email text and the informed consent (Appendix D) as an attachment to the email. By accessing the online survey, the teachers accepted the consent form and then access the survey to complete.

Individual Interviews

The interviews were for up to 48 mathematics leaders at the 48 middle school sites. The mathematics leader could include the mathematics coach, mathematics subject area leader or the assistant principal for curriculum. The interview occurred during non-student time which was before school, after school or on a non-student time during the school day. The mathematics leaders participated in this study by signing the consent form (Appendix E) indicating that they understand the purpose of the interviews and agree to participate in one 30-minute interview, with possibly up to 4 email exchanges in order clarify any questions I may have regarding interview data. I was able contact the participants for clarification by email or phone. The mathematics leaders were given to opportunity to answer all or any of the questions they choose (Appendix B).

Ethical Considerations

Through the research on the program, all processes to provide privacy and confidentiality for the teachers and Math Coaches who participate in surveys and interviews were maintained. Participation in this study was voluntary and participants were able to discontinue participation at any time with absolutely no negative effects. I respected all participant views and followed all required procedures for informed consent forms.

For the teacher online survey, I provided the grade 6 intensive mathematics teachers at the 48 middle schools, which could be up to 55 teachers total, with the survey informed consent form (Appendix D) through an email to the teachers.

For the mathematics leadership interviews, I interviewed up to 48 mathematics leaders and prior to the interview process, I explained the interview informed consent form (Appendix E) and answered any questions. I shared with participants that the interview was audio taped to record the participant's responses and gained their verbal response of approval to audio tape the interview. The participants kept one copy, and I retain a signed copy. The participants were provided with the informed consent at the beginning of the interview (Appendix E). During the interview the participants answered all questions or those that they choose to answer. The participation in the interview was voluntary and the responses are kept anonymous. For the data requested from the district, I included the request for the data related to the district level results for schools and program usage reports in the district level application for research request.

There was no impact on minors in this research as no student was interviewed or used for survey data collection. I kept the identity of participants, the school, the district, and all participants confidential, as it will not be attached to the data and I used pseudonyms for all participants in the report. Only I will have access to all of the survey and interview data and transcripts, in a locked cabinet at my home or on a password protected hard drive for up to 5 years after the completion of this study, at which time I will shred all data.

Data Analysis Techniques

For the data analysis, I used data from district level reports, teacher surveys and teacher leader interviews. The data from the teacher surveys was compiled to analyze

themes that developed related to the program. The process allowed me to gain an understanding of the teacher's response to using the program with students and also their perceptions as to what worked well and what was not working well in the intensive math program. The data from the teacher leader interviews I used their open responses to analyze trends from the leaders as to their perception of the implementation of the program. Using both teacher and teacher leader responses, I analyzed the responses to gain insight through a cross analysis with the surveys and interviews to look for any indication of a common theme from both groups. The data from the district was analyzed to gain insight into student performance and impacts on student achievement for students who were in the intensive math class.

Document Review Analysis

An analysis of reports that include school level data of time on computer by school total, how many lessons are completed in a time frame, and total number of students in each quantile based on the computer-based test in the program provided a comparison for fidelity on program usage. Students that are not using the program as prescribed were used in the data analysis. This evaluation included information to indicate usage and if time on the computer portion impacts student quantile scores.

Additionally, a district level report entitled, "Movement of Students Achieving a Level 1 on FSA Math 2015 by Intensive Math Participation and School" that was provided by the district Assessment and Accountability Office provided comparison data for students in the program and those who are in the Intensive Math program and their achievement level on FSA. This report provided school level data for all 48 middle schools related to the percentages of students showing increases in state levels of achievement. The mean scale scores comparison from the 2015 school year to the 2016

school year on the Florida Standards Assessment were also included for all 48 middle schools.

Surveys

The teacher surveys allowed for information on what is perceived to be working well in the program and what is not working well. A qualitative evaluation provided insight into the teacher perspectives. Looking for themes related to the responses allowed for qualitative data trends analysis. For the questions in the study that included a Likert scale, a quantitative process provided comparison data.

Interviews

The interviews were with math leaders at any of the 48 middle school sites which included a subject area leader for mathematics, a mathematics coach or an assistant principal for curriculum. The responses to the interview questions provided insight into what was perceived to be working well with the program in a more global view of the program impacts. The responses allowed for trends analysis for a qualitative evaluation. The qualitative analysis stems from the coding in the interviews to look for trends together for all interviewees regardless of leadership position as well as by the position they hold to gain their perspective on the program.

Conclusion

The analysis of student data combined with teacher and coach input provided an evaluation for the Intensive Math program. The detailed review of the data allowed for triangulation of the data for purposes of future implications and recommendations for mathematics programs in education. This evaluation suggested organizational change to provide impact on student achievement in mathematics.

This evaluation is important to school districts at large in that it impacts student and teacher scheduling, curriculum budgets and the results in students' mathematics achievement. Through my experience as a mathematics supervisor, I often evaluate the impact of programs on student achievement, as well as, financial impacts of purchased curriculum. When a curricular program is not showing a positive impact on student achievement, it is often eliminated for use with students or evaluated to propose possible changes in implementation. The evaluation of this program is important to the community at large as it will assist other schools and districts in determining the impact of Intensive Mathematics on student achievement and what impact the of such programs have on student performance over time. Students who are tracked are limited in their achievement and teachers report that these students in low level classes are capable of work at a higher-level (Boaler, 2016, pp. 113-115). The parent stakeholder group often voices concern when students are taking a second Intensive Mathematics class. The parents desire to know that there is a positive impact on their child's overall mathematics performance if they indeed participate in the Intensive Math program. Parents often have questions when their child is placed in an Intensive Mathematics course and need help to understand the purpose of the placement and to discuss possible support options. To that end, this study is valuable to address the parent concerns of their child's placement and mathematics performance.

CHAPTER FOUR: RESULTS

Findings

Overview

The study conducted included the use of surveys, interviews and data review to develop the evaluation of the grade 6 mathematics intensive math program. The surveys were provided to the teachers who were teaching and using the program during the survey time frame, the interviews were held with math leaders who serve as a coach or subject area leader. The data review was completed by reviewing district data and program data. The results of all the data collection instruments and methods allowed for an evaluation that provided multiple perspectives of the program.

Intensive Mathematics Teacher Surveys

The Grade 6 Intensive Math Survey (Appendix A) was sent to 42 grade 6 intensive math teachers in Gilbert County Schools. The teachers were sent an email that included an overview, the consent form, and a link to the online survey. I sent one reminder to complete the survey seven days after the initial survey was sent. Only one respondent requested additional information and requested that the survey link be resent. I responded to the email and forwarded the information. Of the 42 surveys sent to the grade 6 intensive math teachers, I received 10 completed surveys thus giving a response rate of 23.8% for the survey results.

The survey was designed to collect some initial demographic data on the teachers who teach grade 6 intensive math. The first three questions provide information on teaching years overall, with intensive and use of the intensive math program. By looking

at the demographics, I was able to consider implementation and teaching experience in the overall study.

For question 1, which asked the respondents how long they have been teaching mathematics, the category of 0-5 years with 4 teachers (40%) responding. Only one respondent was in the range between 5 and 10 years as well as the range of 15 and 20 years with only one respondent. For the category of between 10 and 15 years, there were 2 respondents and for the more than 20 years teaching mathematics, there were 2 teachers. This information was in line with what I have experienced in mathematics departments at schools. Typically, when working in schools, I experience newer teachers often are assigned to the intensive classes as this data indicates 40% of the respondents where teachers between 0 and 5 years were teaching the program.

For question 2, the question asked for the years teaching grade 6 intensive math. The data showed that the majority of the respondents were new to teaching grade 6 intensive math. For the category of 0-5 years, the response at 80% which was the highest with 8 respondents selecting that category. The next two categories, between 5 and 10 years and between 10 and 15 years each had only one respondent. The other categories of 15-20 years and more than 20 years had a response of zero. I would expect the data to yield these results as it is in line with more new teachers teaching the intensive course as well as the formal grade 6 intensive math program was developed over the last 5 years. The other 2 respondents who have been teaching intensive math longer would have experience with a less formal intensive program or experience outside of Gilbert County Schools.

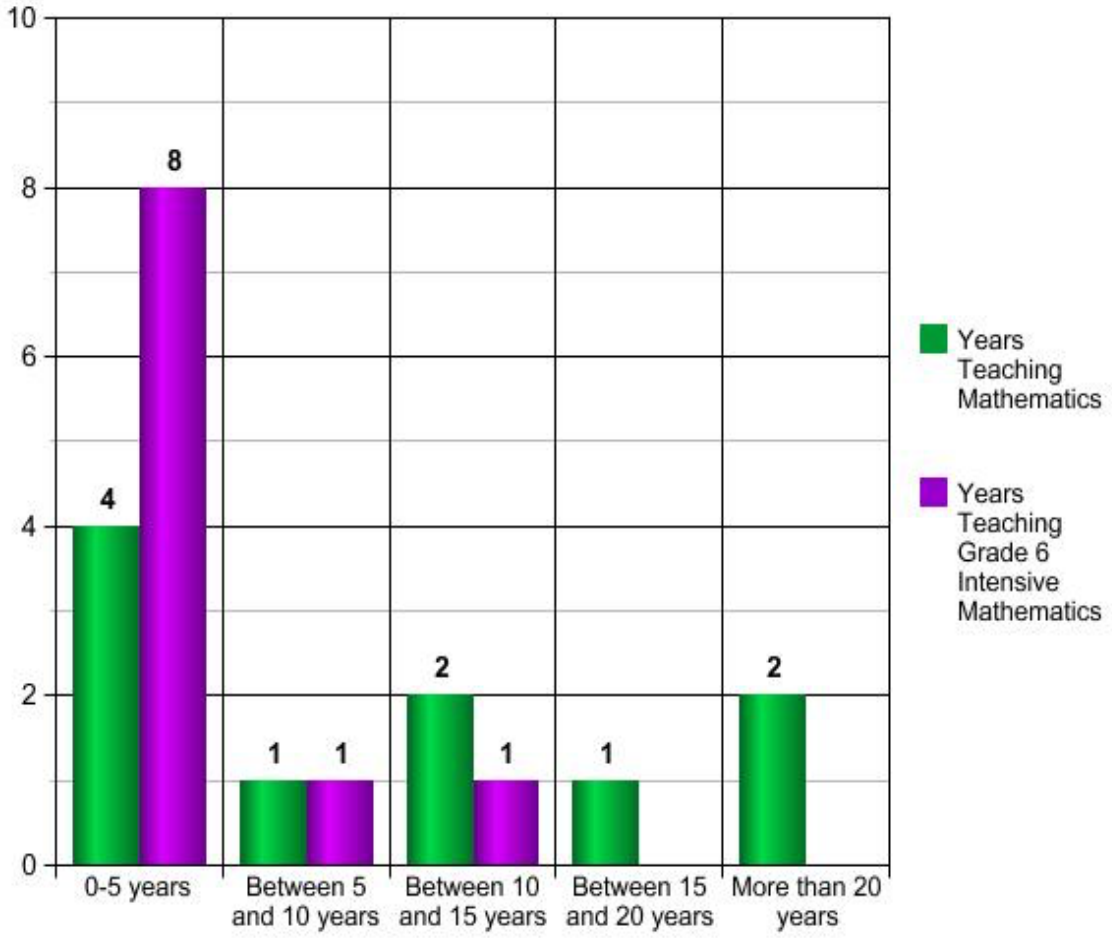

Figure 1. Survey Question 1 & 2: grade 6 intensive math teachers' responses to years of teaching mathematics and teaching grade 6 intensive mathematics. (n = 12)

Question 3 asked the respondents to share how long they have used the grade 6 intensive math program, Math 180. All 10 respondents (100%) gave the response of 0-5 years. All other categories were zero. I expected this data as the formal Math 180 has been in the district for just 5 years. If the data would have shown a respondent who had more than 5 years, then they would have had experience outside of Gilbert County Schools with the Math 180 program.

For Questions 4 and 5, the questions were designed to determine implementation support. Question 4 asked if the teachers attended the training to learn how to implement the Math 180 program. Of the 10 responses, nine teachers (90%) did attend the initial

training for implementation support. One teacher reported that the training was not attended. I was pleased to see this data and it confirmed that the training being offered for the teachers in a large group training or on school site campuses was attended by the majority of the respondents. This shows that the opportunity to have support in order implement the program was acquired by the teachers. In Question 5, the teachers were asked if they had a Math 180 Coach assigned to them for support of the implementation of the program. Seven of the teachers (70%) responded that they received the support of the coach. Two teachers (20%) chose the option, no, to the question and one teacher (10%) did not respond to the question. This data supports the implementation and follow up of having a coach to support the program at the school level with teachers. I was surprised to see that two teachers did not have coach support. This would mean they either opted out of having support or no support was provided to the teacher during the use of the program throughout the school year.

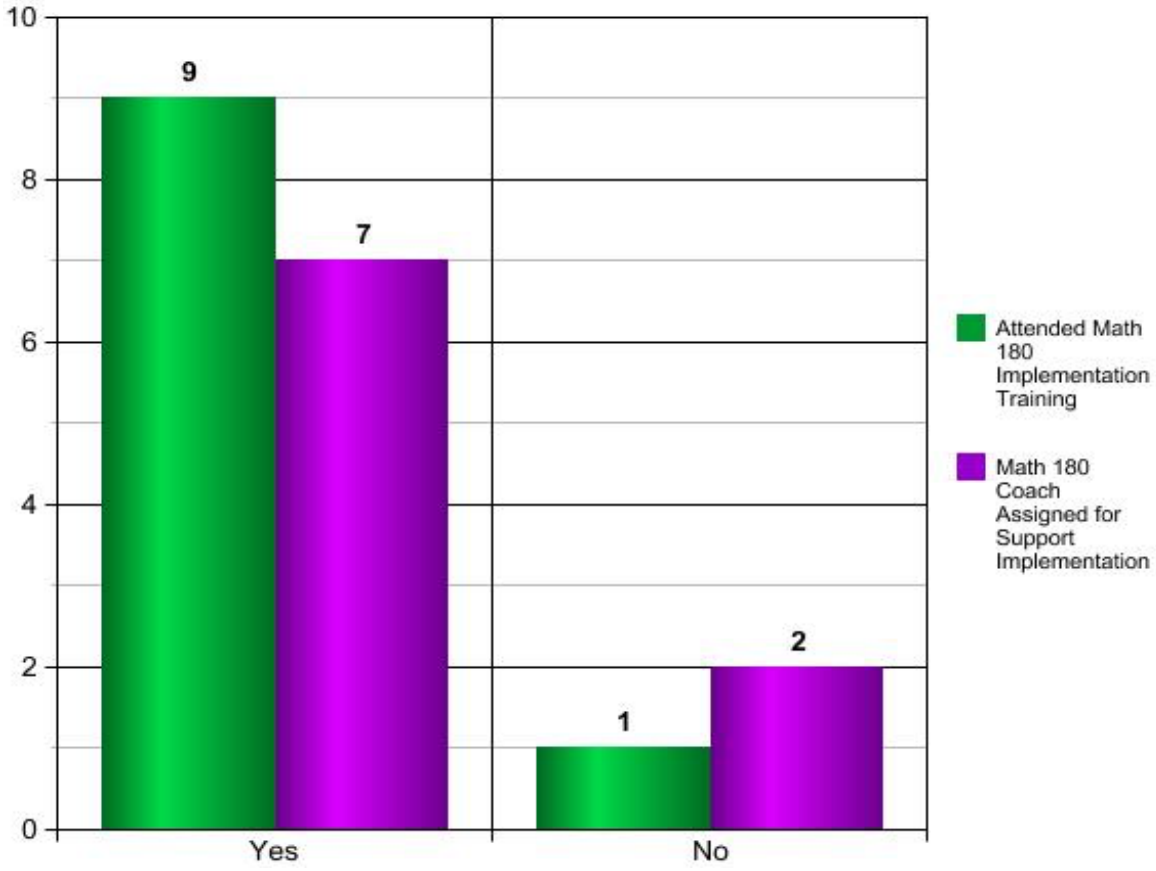

Figure 2. Survey Questions 4 & 5: grade 6 intensive math teachers' responses to attending training for implementation and coach assigned for support implementation. (n=10)

For question 6, the respondents were asked about the use of the suggested implementation model. The question asked if they used the "two-prong" model of implementation with half of the instruction on the computer and the other half in small group. Of the 10 responses, 8 of the teachers shared that they did follow the suggested implementation model while 2 teachers shared they did not use the suggested model. I was pleased to see that the majority of the teachers were using the recommended model of implementation. The data showed that from question 4 that 9 out of 10 teachers went to the training on implementation and 8 out of 10 teachers were using the model of instruction. The training that teachers attended specifically shared with teachers the steps

to take to implement the two-prong model of instruction. The data shows that the majority of the teachers were able to implement the model that was presented during the training directly in their classrooms as a result of attending the training.

Question 7 relates to the implementation of the two-prong model in the grade 6 intensive mathematics class. For the 8 teachers that responded yes for using the suggested two-prong model, 4 out of 8 teachers (50%) responded that the model was used five days a week with the students in their intensive math classroom. Three of the teachers responded that they used the model 4 days a week. One respondent gave a response of using the model 3 days per week. I was pleased to see that all respondents that did use the recommended model for the program at least 3 days as this shows they were using the program as intended and making steps toward following the two-prong model for implementation.

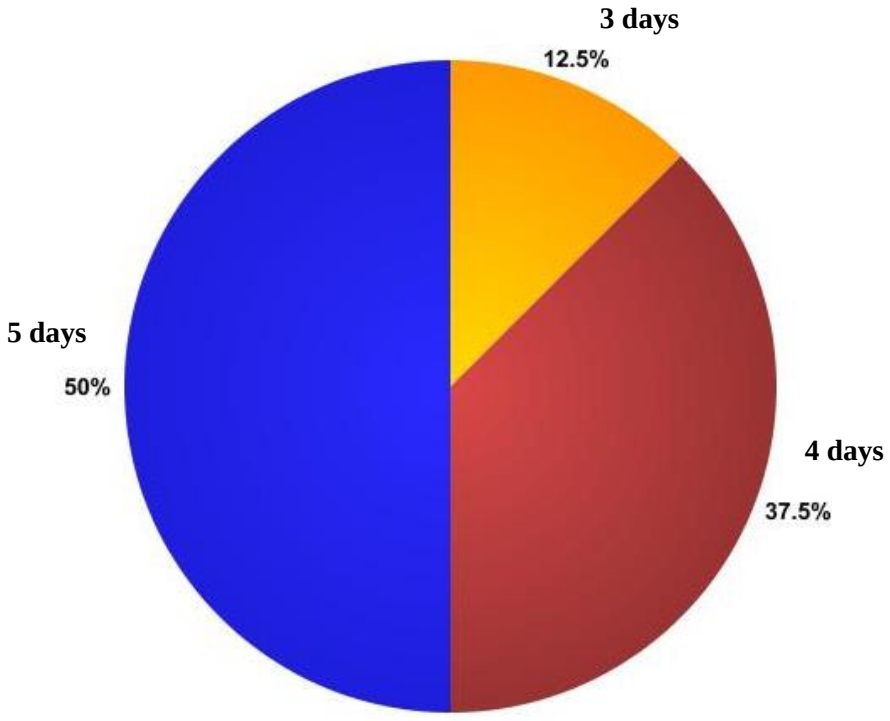

Figure 3. Survey Question 7: grade 6 intensive math teachers' responses to number of days they used the suggested implementation two-prong model for teaching. (n=8)

Question 8 asked if the teacher responded no to the use of the two-prong model in Question 6, to indicate why they made the change in implementation. Of the 10 respondents, only two indicated they chose to change the implementation model that is suggest by the developers of the program. One teacher responded that she changed the model due to limited computer access time for class which resulted in her alternating days between the computer lab and doing the teacher directed workbook time. The second teacher responded that the model implementation was due to a lack of the Math 180 books to use during the teacher directed time which resulted in using the computer portion during the duration of the class period. In both responses, the teachers shared the change in the model was based on lack of resource access either computer or book related. Based on these responses, in order to support the implementation, the recommendation is to ensure the resources are in place at the beginning of implementation which is often the start of the school year.

Question 9, included nine statements related to the program implementation that respondents would respond with Strongly Agree, Agree, Neutral, Disagree, or Strongly Disagree. The first statement, the initial training to learn how to use the program provided information to be able to use the program immediately following the training, had a response rate of 90% with agree or strongly agree with one respondent with disagree. This data mirrors that of question 4, with 90% of the teachers attending the training and one (10%) not attending. The results are encouraging in that if the teachers attend the training they feel they are able to use the program.

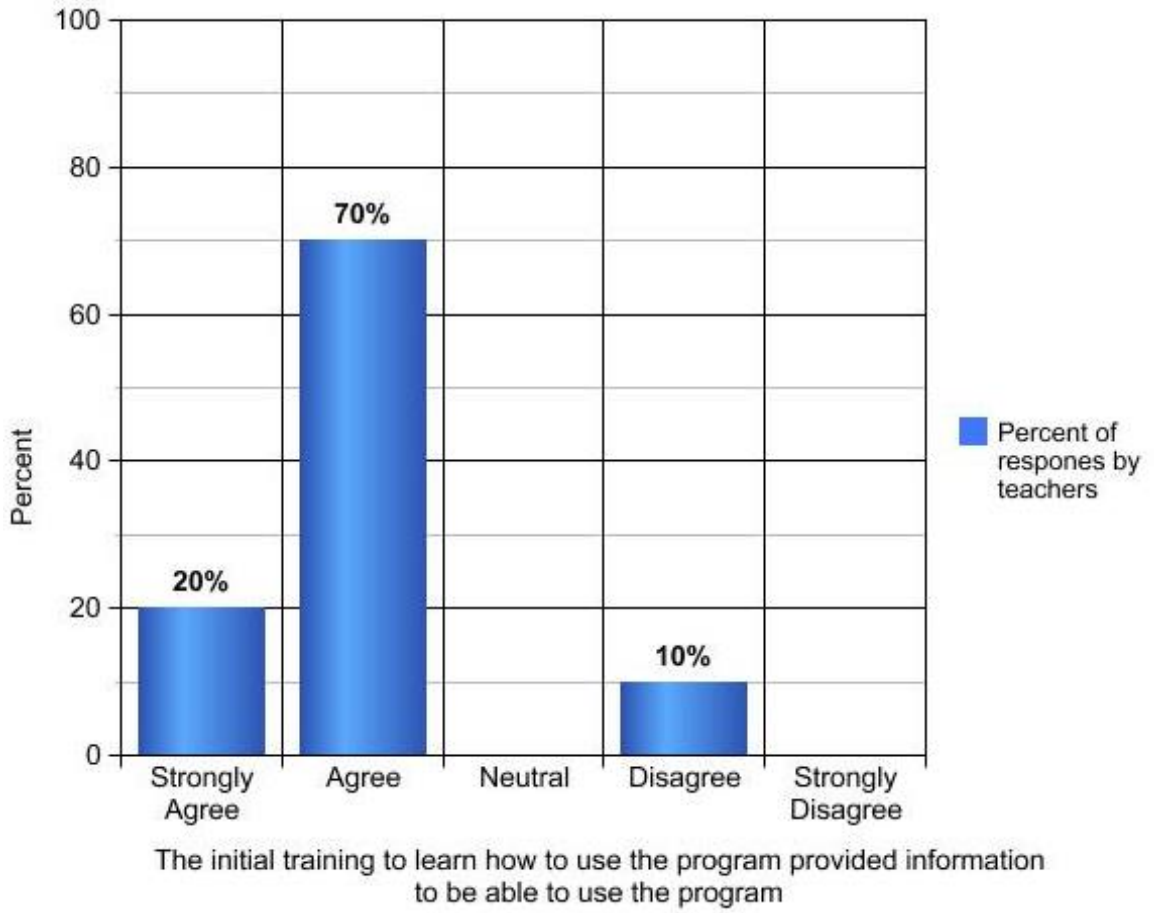

Figure 4. Survey Question 9 grade 6 intensive math teachers' responses. (n=10)

The second statement in question 10 was provided to gain insight on the printed materials for the intensive math program. The statement, the printed teacher materials for lesson planning are clear and easy to understand, resulted in 80% of the teachers agreeing or strongly agreeing to the statement, 10% or one respondent neutral and one respondent disagreeing with the statement. This data is what I would have expected with the majority of the teachers stating that the materials are clear and easy to understand as the book portion is designed to be followed through the lesson.

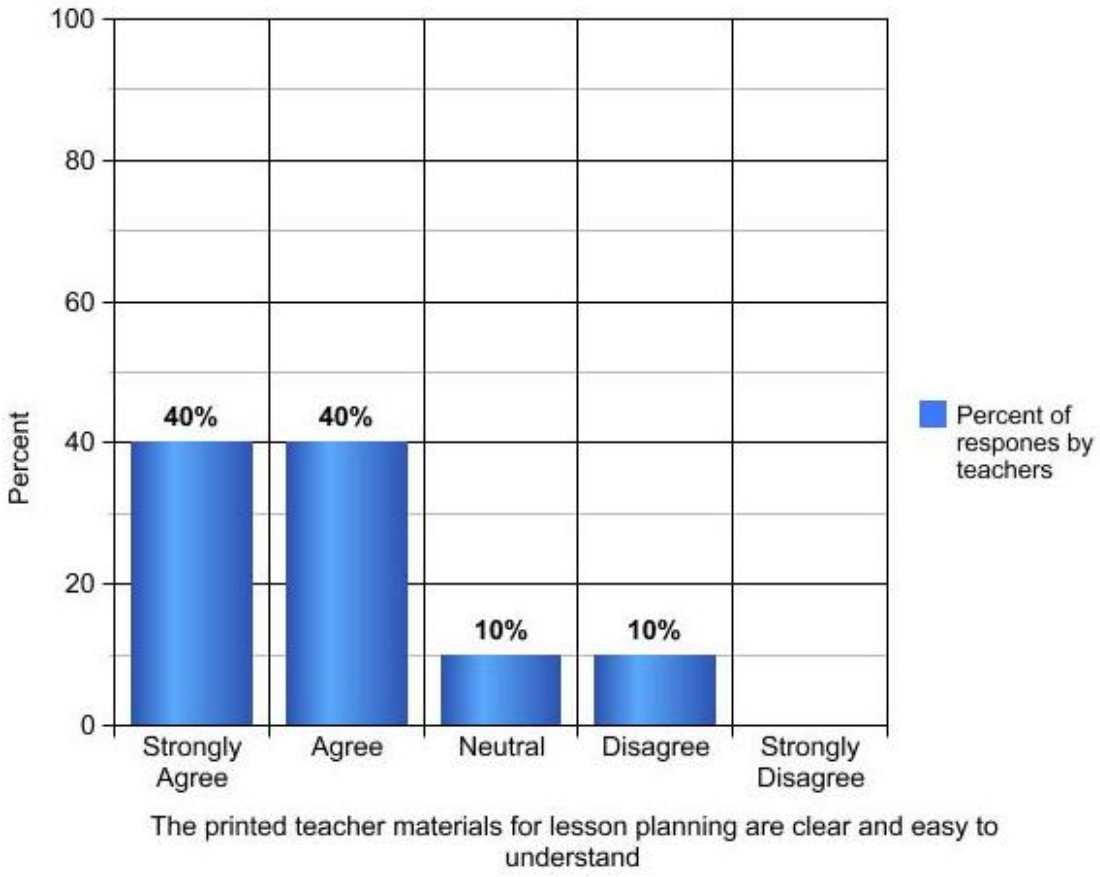

Figure 5. Survey Question 10: grade 6 intensive math teachers' responses. (n=10)

In survey question 11 the respondents shared in response to the statement, the teacher edition for the print version of the text provides information that is easy to use during instruction. For this statement, three of the teachers responded with strongly agree and four of the teachers responded with agree giving a majority of 70% for this statement agreeing or strongly agreeing. One teacher chose to disagree, and two teachers chose a neutral response. The results are in line with the expectation of the print version of the teacher's edition as it is designed to be used as instruction is happening and guides the work in the small group time with students.

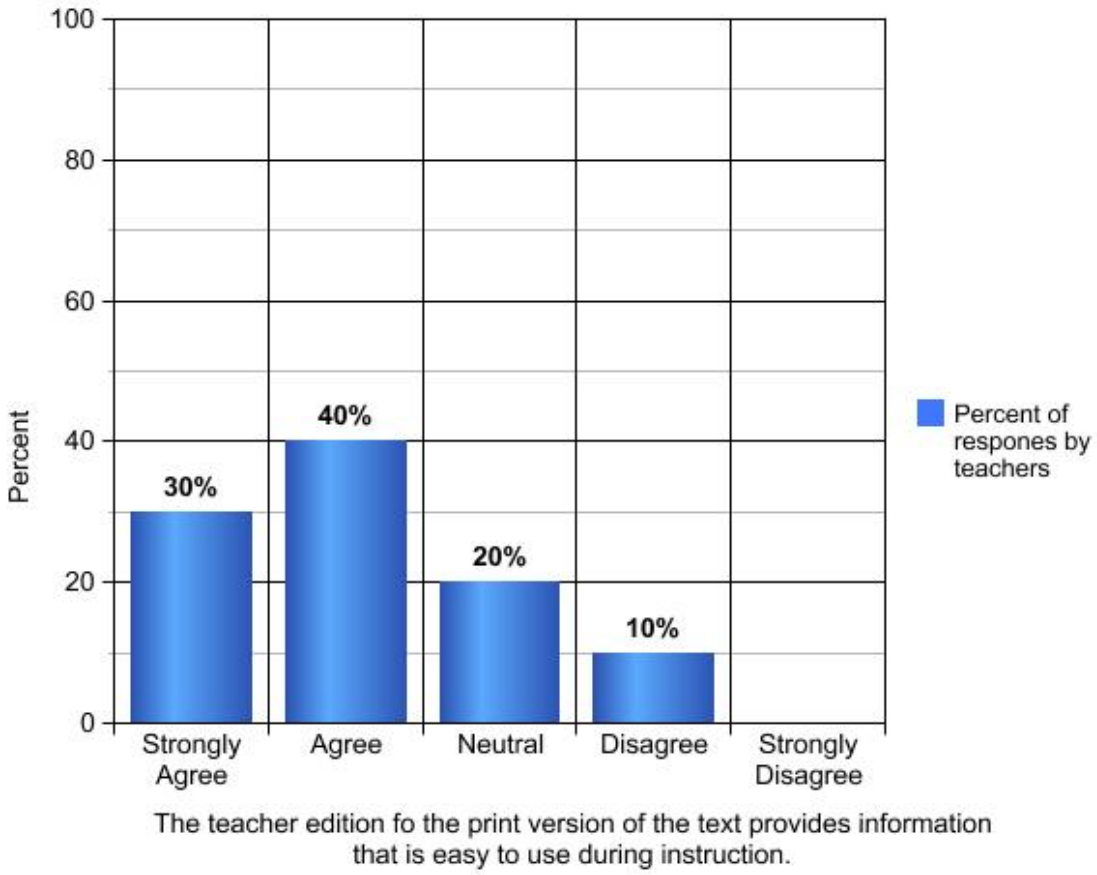

Figure 6. Survey Question 11: grade 6 intensive math teachers' responses. (n=10)

Question 12 focuses on the computer portion of the grade 6 intensive math program. The statement, the computer portion of the program for the teacher to access student data is easy to use, had 70% of the teachers sharing that they agree or strongly agree. The other 30% were split between neutral (20%) and disagree (10%). The response is mirroring the results of the teacher edition used in the small group station. The use of the computer portion ease of use for teachers showed that a majority were able to use the program to access student data which reflects the ability to support students who may need remediation or in the program be moved to a higher-level block if they are progressing well.

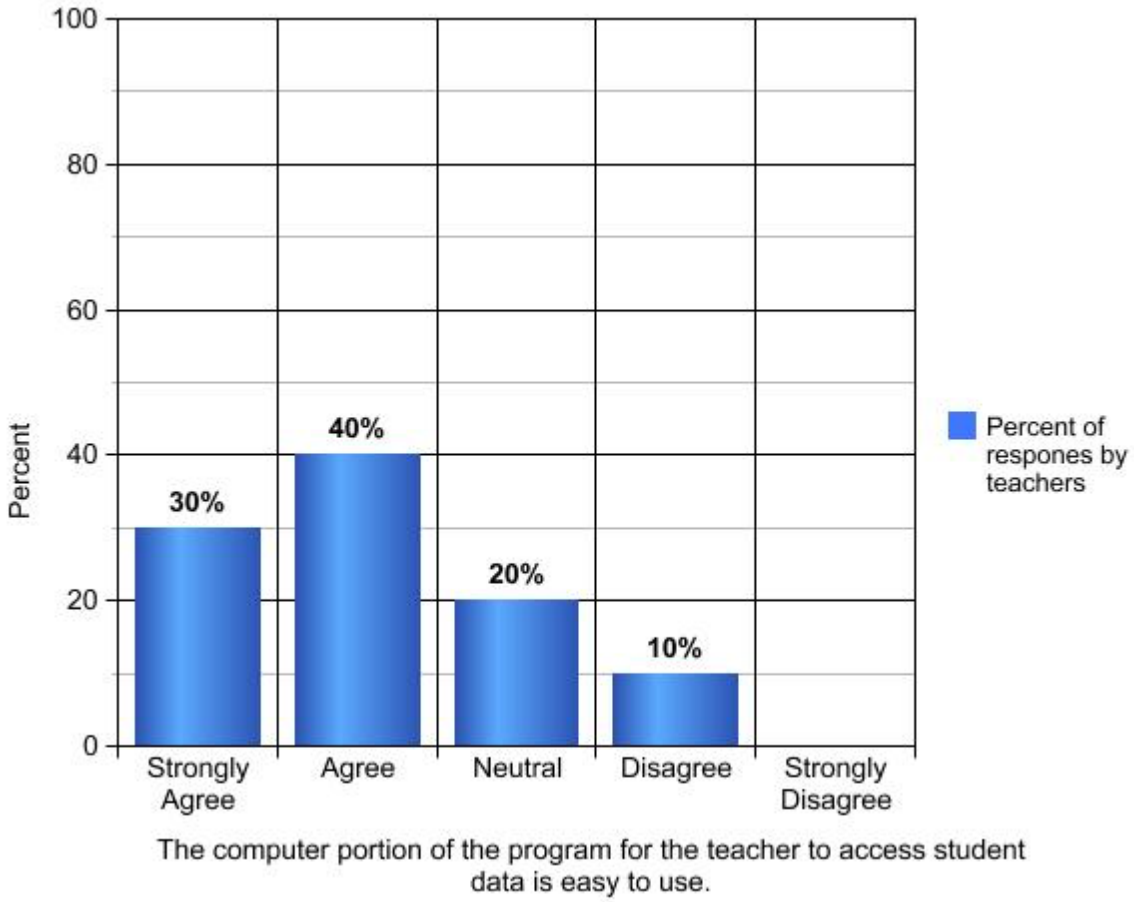

Figure 7. Survey Question 12: grade 6 intensive math teachers' responses. (n=10)

Question 13 is designed to understand how teachers can use the computer portion of the program as a monitoring tool. The statement, the computer portion of the program allows the teacher to understand what skills students are struggling with or proficient at during the school year. From the survey, 70% of the teachers agreed or strongly agreed with the statement. Showing a majority found the use of the program to help with monitoring the blocks students were working on during the year. This data supports the teacher decision making in the intensive classrooms when students are evaluated to determine if they should move from the foundational skills in Blocks 1, 2 and 3 to Block 4 of the program to begin more on grade level work. Again, the data shows 20% of

teachers are neutral on the statement and 10% or one teacher disagreeing with the statement.

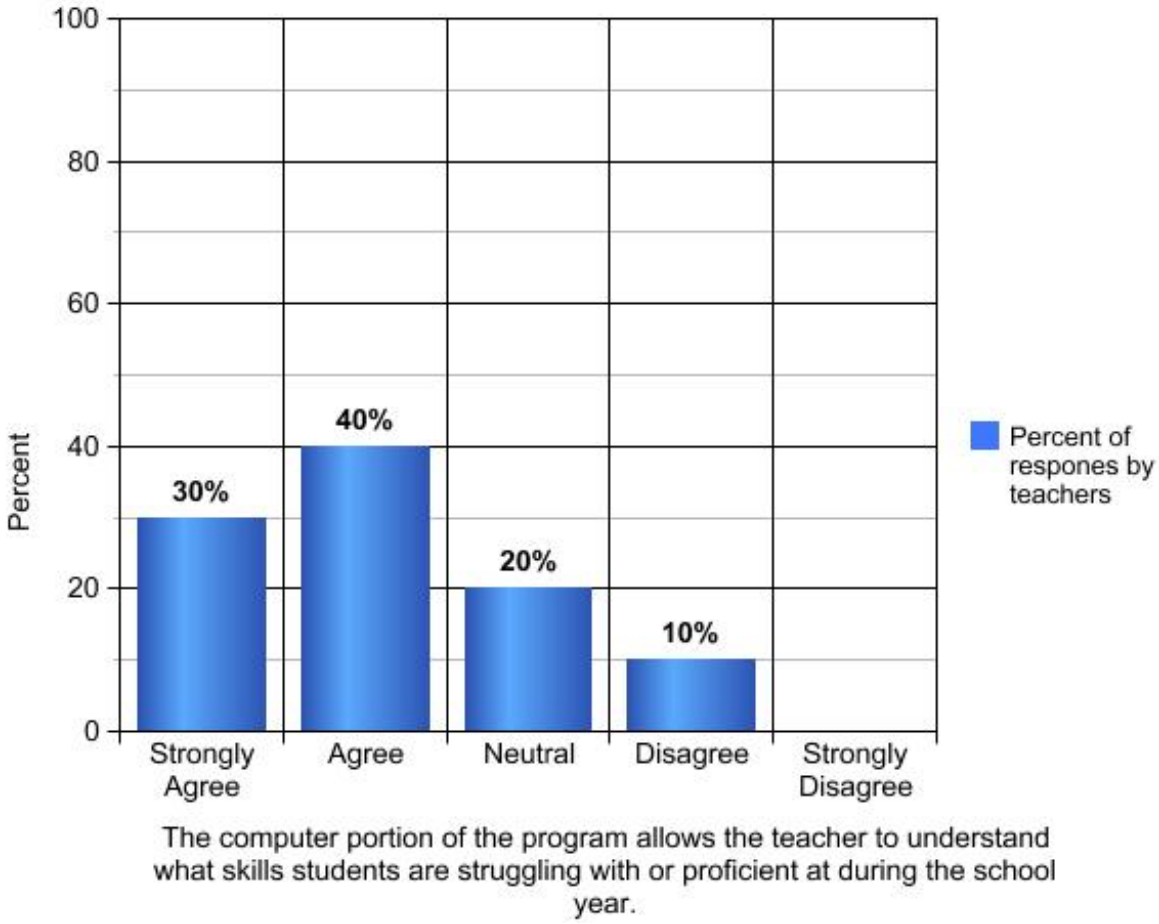

Figure 8. Survey Question 13: grade 6 intensive math teachers' responses. (n=10)

The next questions relate to the teacher perception of how students respond and work with the computer portion of the Math180 program. In question 14, the students are able to follow the directions on the computer portion independently. For this statement, 5 out of the 10 teachers (50%) agreed and one teacher (10%) strongly agreed. The rest of the teachers were split evenly with 2 out of 10 (20%) responding neutral and 2 out of 10 (20%) choosing to disagree with the statement. The results showed that most students could work independently following directions on the computer portion. In most classes, the students were in the two-prong model so the ability of students to work independently

would support the teacher in having time to work with the small group station using the print materials. This data and the results of question 6 with 8 out of 10 of the teachers (80%) using the two-prong model indicate that most teachers are able to manage both stations during the class period of instruction.

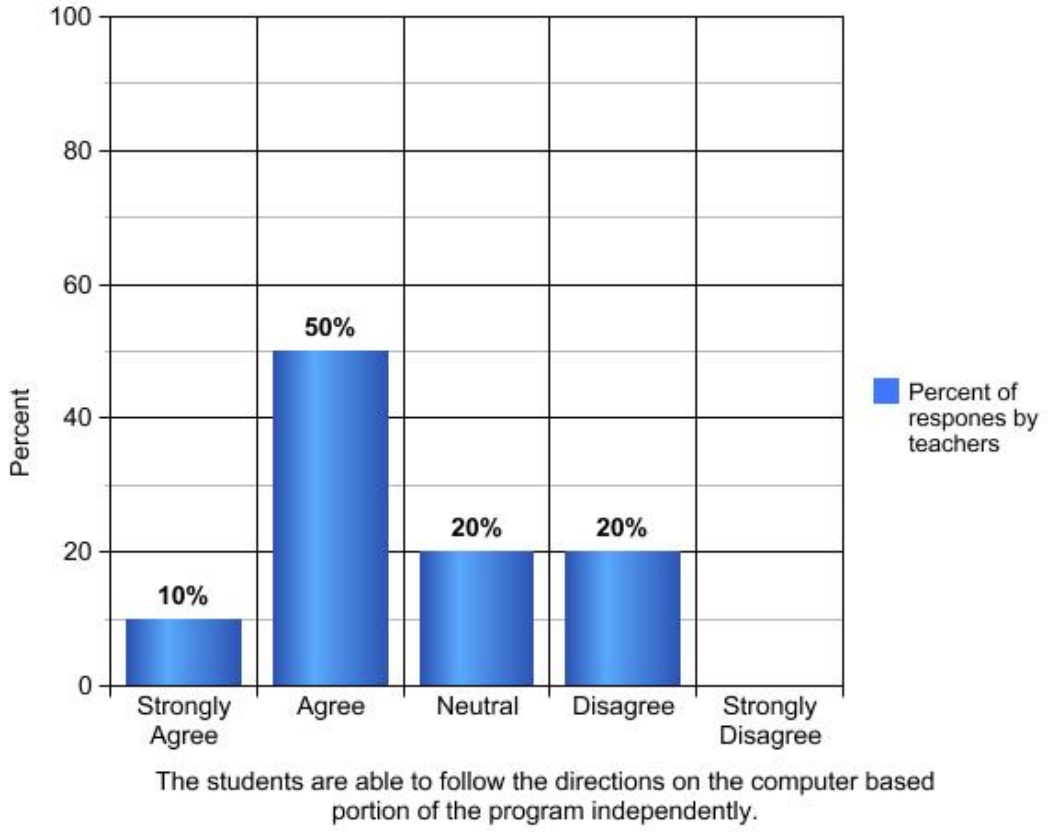

Figure 9: Survey Question 14: grade 6 intensive math teachers' responses. (n=10)

Question 15 addresses the student being able to do the work on the computer program. The statement, the students are able to work through the computer-based material independently relates to their work on the mathematics during the computer time. The results show that 30% of the teachers disagreed or strongly disagreed that students could work independently. One teacher responded with neutral and 6 out of 10 (60%) of the teachers chose to agree or strongly agree that they could work

independently. While the majority shared they could work independently, 3 out of 10 (30%) of teachers who felt students were not able to work independently may be an area to further address. The intent of the program is to work as a two-prong model so that both the computer portion and the small group with the teacher work concurrently. If students are unable to work independently on the computer, the small group portion would not be led with fidelity.

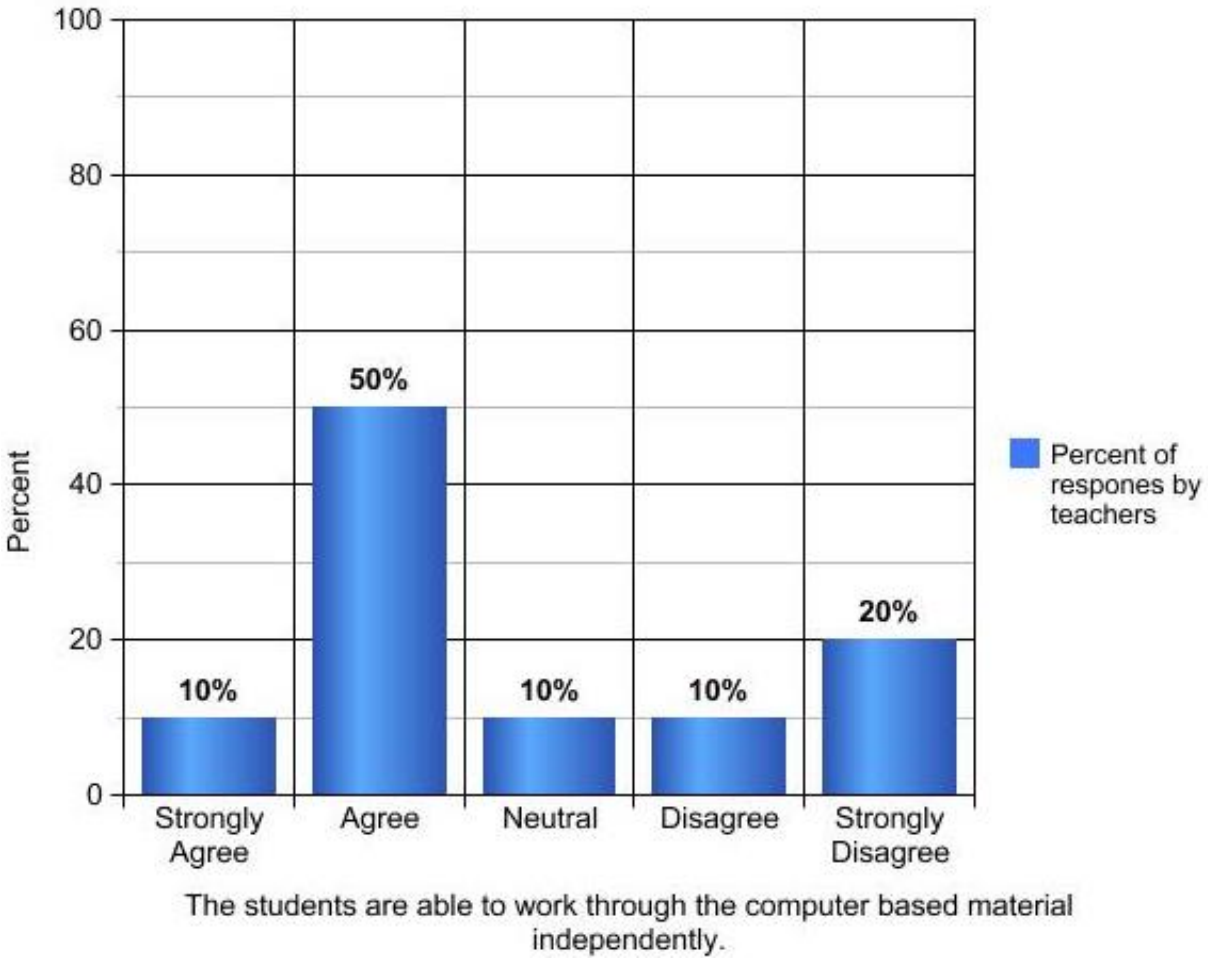

Figure 10. Survey Question 15: grade 6 intensive math teachers' responses. (n=10)

For the next statement #16, students who spend more time on the computer portion have increased confidence in the mathematics skills they are weak in, is intended to gain insight on student's mindset. The results show that 6 out of the 10 teachers (60%)

agreed or strongly agreed with the statement. While the other 40% either disagreed or strongly disagreed. The results of 60% to the agree side of the scale is encouraging for working with student's mathematical mindset toward mathematics. The 40% response for the disagree end of the scale is of concern and should be reviewed further. The program is designed to support students who need to fill gaps in learning and a positive mathematical mindset would support the student in believing that the gaps can be filled to make gains in mathematics.

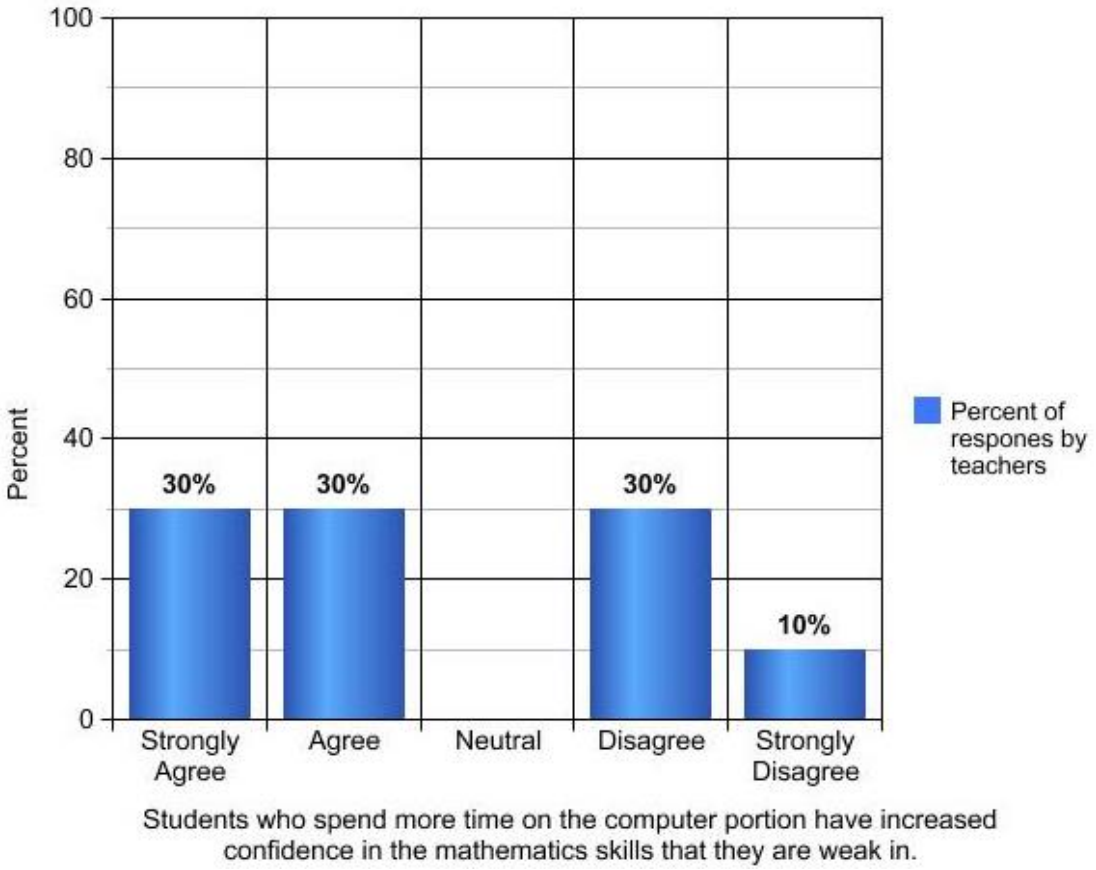

Figure 11. Survey Question 16: grade 6 intensive math teachers' responses. (n=10)

For question 17, the teachers responded to the statement, students who use the Math 180 program show gains in math knowledge greater than the students who have not used the program. The responses were split with 5 of the 10 of teachers (50%) agreeing

or disagreeing and the other 50% percent either neutral, disagree or strongly disagree. The split in the data may be related to the teacher not being able to make the comparison with other students or years teaching the intensive math class since the data from question 2 indicated that 80% of the teacher were in their first five years of teaching the program. In addition, this should be addressed further in that the program should indicate to the teacher that students are making gains that would be evident through progress monitoring in the program and district data could be used to compare the work with the students over time.

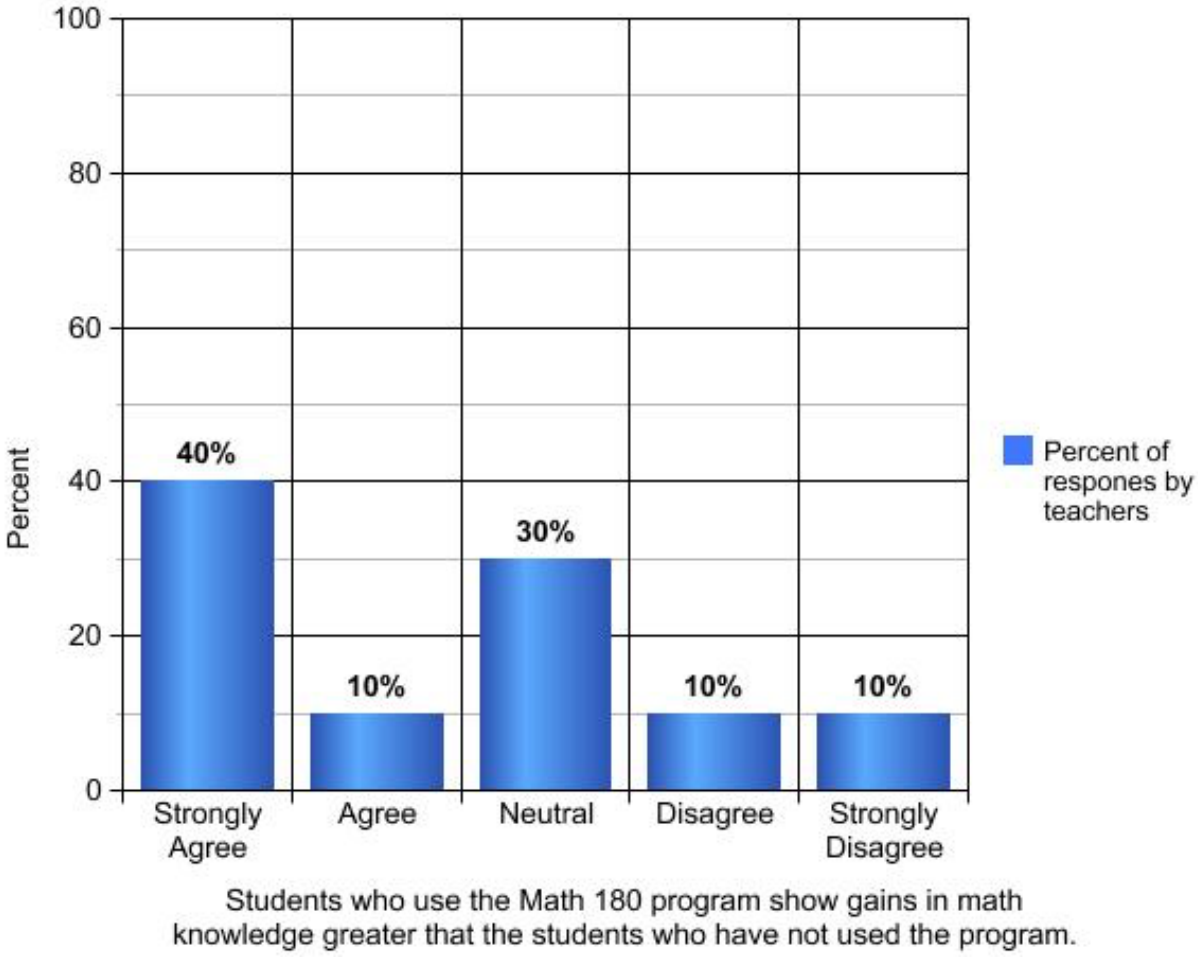

Figure 12. Survey Question17: grade 6 intensive math teachers' responses. (n=10)

Question 18 an open-ended question asked, what is working well in the Math 180 program, all 10 teachers responded (100%), and two response themes emerged. The first trend theme reported by 2 out of the 10 responses (20%) was correlated to student's motivation during the class period. One respondent stated, "having the flexibility to alternate between computer and workbook keeps the students on task and motivated" while another shared "students are building their confidence and making gains throughout the school year." A response theme reported by 2 out of the 10 (20%) is related to the student usability of the program. The respondents reported that the program is easy to use for the teacher and that students are "in control of pacing" and "the students can easily follow the directions independently on the computer-based program." Additionally, one teacher responded that the program provides the teacher with a lot of data about the student's progress. One response focused on the program's design by "pushing students to maintain a growth mindset." I was pleased to see a variety of components of the program that the teachers felt was working well with the program. The teachers each seemed to focus on the component that reflected what they found beneficial to their work. The strength of a program is in the way it meets the needs of the end user, so I was glad to see that the usability was shared.

For Question 19, the teachers where asked what is not working well for the students. The question resulted in two themes one related to the model of the program and the other related to the curriculum alignment. The theme related to the computer portion of the program was reported by 3 out of the 10 teachers (30%) and shares the lack of time in a class period to get through the lessons on the computer as well as the students watching the video lessons multiple times or choosing to watch them instead of

progressing through the lesson. The other theme reported by 2 out of the 10 teachers (20%) is related to the curriculum in the program and its lack of alignment to the grade 6 curriculum in the student's traditional math classroom. Additionally, related to curriculum, two respondents stated that the basic skills the students are working on involve steps that are difficult to follow. The concern about the basic skills is related to the computer program assessing where students are in their mathematics knowledge and placing them at their skill level which can often be as low as 3rd grade. When analyzing the responses, I found the themes to be helpful in looking for ways to improve the program implementation. While the curriculum is set in terms of its design, the ability to support the teachers with implementation strategies is evident. It is clear that the computer portion of the program's implementation is an area where teacher support is needed.

Question 20 addressed the question, what are the greatest challenges with the Math 180 program? The one theme that emerged was related to students and math skills. Three of the 10 (30%) related the greatest challenge to student's struggle with foundational skills. The lack of student skill knowledge to understand the mathematics such as multiplication and fractions. While this is an intensive mathematics program, the teachers reported students did not "know their multiplication facts." Two respondents (20%) shared the theme that a greatest challenge was related to the resources. They lacked classroom space and computers needed to fully implement the program. One teacher shared that the lack of alignment to how it is being taught in their current grade level created challenges to help students when the program uses strategies different than the core math class uses to teach topics. The responses shared regarding the resources is a

challenge that can be found in many schools even beyond Gilbert School District as funding and building space is often limited. This does provide insight to support schools to ensure that when preparing the schedules to look for room assignments that will allow accessibility and access to computers around the classroom. The theme related to the lacking basic skills continues to be a concern for all mathematics educators and steps to articulate with elementary schools to support the coherence of instruction is important to help bridge this gap.

For Question 21 the teachers were asked to share ideas on how to improve the Math 180 program. One theme from 3 out of the 10 (30%) teachers that emerged is related to the curriculum itself. The responses shared they would like more flexibility in determining if the skills and steps in the program are necessary for the students and aligning the curriculum. Related to the mathematical concepts teachers wanted to improve the program through assessing concepts that are challenging for students earlier, and alignment to grade 6 curricula. The other theme to improve the program that was shared by 2 out of the 10 teachers (20%) was related to the computer portion of the program. One teacher responded, “make the computer portion easier for students to learn on their own” and another stated, “Making the computer program more user friendly for the teachers would be nice.” Two respondents (20%) also shared that a way to improve the Math 180 program is to limit class size. The responses indicate that teacher autonomy for use of the program and allowing them to teach in a less scripted prescribed model and class size would improve the Math 180 program. From the responses, it is evident that a structured model needs to have some flexibility in order to maintain buy in and support of the program from the teachers.

Question 22 asks the teacher the question, when comparing students who are in the Math 180 program to those who so not take intensive math, are there any changes in confidence in mathematics? Six out of 10 (60%) respondents shared the theme that there were changes in confidence in students in the Math 180 program. Three of the six who shared that there is increased confidence stated that was related to motivation, confidence and mindset towards mathematics. The other three of the six who responded related the increased confidence to academic success due to increases in test scores or gains in mathematics achievement scores. Of the 10 responses, four (40%) responded that they did not see any changes in confidence in mathematics with students in the Math 180 program. The response data indicates that teachers who do see the increase in confidence relate it to either academic testing or student confidence in mathematics. With the increase in confidence, it impacts the student mindset which in turn often impacts achievement. In question 17, the teachers were asked if they saw gains in mathematics knowledge in the students and 5 out of 10 (50%) of the teachers strongly agreed or agreed to statement. The results vary as often student growth takes time for struggling students yet the teacher perception from the 60% indicate an increase either through confidence or student achievement.

Question 23 asked the teachers to respond to the yes or no question, does there appear to be any relationship between the amount of time on the computer-based portion of the program and student achievement in intensive math. Seven of the teachers (70%) responded with yes and three of the teachers (30%) responded no to the question. The theme for responding yes to the statement relates the amount spend on the computer and that it does show a relationship with student achievement in intensive math from the

teacher perspective. The response is encouraging in that the time spent with the program apparently does have an impact knowing there are parts of the program the respondents would like to have changed as discussed in question 21 as the teachers felt the computer program should be easier for students to work on their own. This data shows that even with teachers feeling the program needs to be improved for student usability, the majority of the teaches who responded to this question see a relationship between the computer-based portion of the program and student achievement.

Interviews

To gain additional qualitative data for the study of the Math 180 program, I conducted interviews (Appendix B) with 3 middle school mathematics coaches and 2 mathematics subject area leaders who lead the mathematics implementation at their schools. From the interviews conducted, none of the respondents were in the role of assistant principal for curriculum. The range of the interview times were 6 minutes and 7 seconds to 10 minutes and 21 seconds with an average length of 8 minutes. These leaders support teachers in their respective schools with curriculum and implementation of mathematics. The mathematics coach, who does not teach classes of their own, provides in classroom support for teachers and works with small groups of students. I interviewed five such leaders with three of them serving only as a mathematics subject area leader and three of them serving as both a mathematics subject area leader and mathematics coach. From question #1 of the survey, the leaders have served in their roles for a range of 3 to 17 years. In question #2, they were asked if they had taught intensive math prior to becoming a math leader, three of the five leaders (60%) have also taught using the Math 180 program as a classroom teacher. The questions asked were designed to gain

mathematics leader perception input for the qualitative data analysis as it relates to the leader's experience with leading mathematics and prior knowledge and usage knowledge of the Math 180 program.

The first interview question to share leader perception (questions #3) was designed to gain an understanding of how often the mathematics leaders visit the Math 180 classrooms. The responses ranged from daily to once or twice. Two of the respondents who are both mathematics coaches shared that they visit the class once or twice weekly. One respondent who is a mathematics subject area leader shared due to scheduling has only been in the class twice. The leader's responses and the role they have, and the support and class visits vary greatly. The responses were what I expected in that the leaders who teach as well have limited time to visit the classes. With the math leader having less release time during the school day to support the intensive math classes, the classroom teacher has less support for implementation and coaching feedback.

The next question, #4, related to what types of supports the mathematics leader provides during a visit to the Math 180 classroom. Four mathematics leaders shared a similar theme of helping students and that they often help with the small groups of students either directly while on the computer, helping students with staying on task, or planning for the small group instruction. The responses show that the time with supporting the teacher in small groups helps the teacher with implementation and student on task time which aligns with the intention of the mathematics leadership position. One leader responded that they see their role as providing the Math 180 teacher the opportunity to share what is needed for support and then assist as based on the request of

the teacher. This leadership support can certainly help with implementation of Math 180 when teachers need assistance to individualize the learning thus supporting student achievement.

The next interview question number 5 was designed to gain perception from the mathematics leader related to what is working well for the teacher related to the Math 180 program. The responses to this question varied greatly thus an overall theme was not found. One of the leader's response related what was working well is the use of the small groups in the class while some students are on the computer. For one leader, the response for what is working well for the teacher was not related to the program directly but to the support from the help to plan from the provided support coach from Math 180 program. One leader felt the computer program itself is working well for the teacher and shared the reason as the teacher "does not have to come up with any of that." Additionally, one leader shared that the computer-based software and other resources were what was working well. One response did not fully answer the question responding that direct instruction and computers are going on, not stating if it was working well. The responses were varied mostly due to the varied implementation models described by the leaders through the question. The individual implementation and use of the program clearly is key to what works best for the teacher and with fidelity of implementation the math coaches and leaders can support the teachers with a more defined process.

The next question number 6 asked the mathematics leader to share what their perceptions are for what is not working well for the teacher. The responses again varied greatly thus having primarily individual response perceptions for what is not working well for the teacher. One theme from two of the leaders indicated the teachers primarily

leave the students on the computer portion of the program or only whole group instruction and do not use small groups two-prong model as a way to manage student behavior. Thus, keeping all students on one aspect of the program at a time creates more structure from their perspective. One leader shared that the part that is not working is that the Math 180 program does not match the way the teacher would have students learn through their own traditional teaching or the way they may learn in their additional core math classroom. Another leader shared a similar response and added that the program doesn't follow the regular grade 6 curriculum. These responses indicate that the change in methodology of teaching through the intensive math program versus traditional classroom strategies present a challenge for implementation. One leader thought students in the same classroom being at different places on the program might be hard for the teacher. This response relates to the challenge of mitigating through where students are on the computer portion and the need to understand the lesson presentations. The responses show that based on the individual teacher decisions and the classroom implementation model, there is a variety of reasons shared for what is not working well. This information is key to support steps for the program implementation. The design of the student small group learning occurs in the recommended two-prong model and teachers modifying the program potentially impacts the intended learning opportunity of the small or individualized instruction in the teacher time as well as during computer-based learning time.

The next question, number 7, changed the focus to what is working well for the students instead of from the teacher view. One theme focuses on the small group intentionality of the program. Two math leaders shared that the small group and

individualized attention is working well for students. The students have time with the teacher in the recommended model which in most cases is a small group of 12 - 13 students which allows more individualized support. The rest of the math leaders shared a variety of responses as to what is working well from their perspective schools with the program. A single response that was shared is related to what is working well is fidelity of implementation. The leader expresses that when the students who are in classes that follow the program with fidelity, the students are learning more and capturing new knowledge. Connected the impact of fidelity comes the ability for students to use the program more easily as one math leader shared that what worked well for the students was the layout of the program stating that "they know what to do at each point" and "it's easy for them to follow along." This same math leader also shared the students are able to show her how to follow along when she works with them in small groups. Which supports that when students know the program's intent, they can learn the usability of the program to assist them in learning. Another math leader focused on the remediation supports in the program and felt that when the content they are learning aligns closely with what the students are learning in their regular mathematics class it is working well for the students. This response was one that was a single response and prior indications are that the skill level and content did not align well. The concern for me in the responses is that teacher decisions on changing implementation has an impact on the student's ability to learn through the program. The program is designed specifically to use the two-prong model to allow for the more individualized support for learning mathematics and the ongoing computer pathway for each student and when teachers vary from the model,

often one portion of the program is not addressed with the intentionality that it was designed to have for student success.

Question number 8, for the math leaders was designed to determine what is not working well for the students with the program for the students. A theme developed from the response of the math leaders of what is not or would not be working well for students is related to class size. They felt the class sizes due to school scheduling are too large for this program implementation. One shared that when the class size is too big, the "individualized help is diminished." Another theme that developed is related to what is not working well for the students is the lack of use of small groups. One math leader felt that if the teacher doesn't "pull students for small groups" then the program is not working well for the students. Another leader related it to the support in the small group time and that the students may not get all the help they need if the pace of the program is too fast. While the responses varied, the one concern I have is that the impact of student learning and what is not working well for the student is based on the structure of the class size and the teacher providing the support in small group as recommended for the program. When class sizes are too large, there is often a lack of computers for the two - program implementation which impacts the flow of the class time for the teachers. The teachers who make the choice to not pull small groups or attend to pacing in the groups, impacts the intent of the program as the focus on the teacher time in the model is designed to give students focused mathematics support. With this time diminished or eliminated, there may be an impact on student achievement.

Question number 9 was designed to gain insight on the connections that math leaders see between the intensive math, Math 180 and the traditional grade 6 mathematics

class thus the leaders were asked to share any connections they see students making. One theme that developed was related to mathematics knowledge connections. The math leaders shared they see the students making connections to the basic skills and the "connection to breaking down numbers." One leader shared that when students are focused it does help them "fill gaps for their regular ed class" and another leader shared, that students that "were able to relate concepts, they were remembering it." I was pleased to see that the mathematics leaders shared they could see students making academic connections to support their learning. The program is designed to fill mathematics knowledge that students may be missing as the transition from elementary school to grade 6 mathematics thus the math leaders seeing the connections being made in their intensive math programs shows that students are having the opportunity to fill the gaps of skill content.

The next question number 10 is designed to provide mathematics leader perception on ways to improve the grade 6 intensive math curriculum. There was a theme related to aligning the intensive curriculum to the traditional mathematics course curriculum for grade 6 in the responses. Another theme that was shared related to the pacing of the program. The shared response related to the pacing of the curriculum and not completing all of it and sharing that they have not made it through the whole curriculum in the past couple of years. I feel the insight from the mathematics leaders could provide support in development of the curriculum for Math 180 as they shared the alignment and pacing concerns. The alignment theme may need to be addressed from suggestions from both the math leaders and the math teachers to support the core program as well as gaps in mathematics basic skills from elementary school. The pacing concerns

center around the program development that has the students move through blocks of material on the computer portion. Unless a teacher moves a student to a block farther into the curriculum, the students often do not move through all the blocks of the program.

In question #11, the mathematics leaders were asked to provide recommendations to the implementation of the grade 6 intensive math program. A theme from 2 out of the 5 leaders (40%) made the suggestion to maintain the fidelity of the program to ensure the use of small groups. One teacher leader shared that the implementation model is good but suggested that the curriculum needs to be aligned to the core mathematics class. One other teacher leader shared that the implementation would be improved if the math leaders who work with the teachers had an opportunity to attend the same training the teachers receive. I think the leaders are very insightful in their suggestions for implementation needs. I can see that they are aware of the challenges and have suggestions for improvement of the implementation. By using the information from the leaders alongside the teacher parallel suggestion of aligning the curriculum, the district may get more support from the teachers to use the program with fidelity.

The next question, number 12 asked the leaders to share information about the implementation model and if when they observe the classroom are the students using the computer portion of the program about half of the class period. Four of the leaders (80%) responded yes that they do see the two-prong model when they observe. One leader shared that even the teacher who has modified the two-prong model felt over a week's time students were on the computer portion of the program half of the class time. The other leader shared that no the students were not on at least half the class period. I was

pleased to see that most of the teachers were using the computer portion at least half the time even with modifications.

The next question, number 13 addressed the use of the computer portion of the program for students to determine if the students are able to move through the content easily with minimal teacher support. The theme shared by two of five the leaders (40%) was a response that no the students can't move through the program easily. One of the five (20%) shared that they are moving through it but maybe sometimes confused and not sure they are understanding it. An additional response from one leader shared she felt most students could move through the program, but some do need help with it. These responses provide insight in the need to give guidance on the program itself or implementation as students in the small group computer time are expected to work independently while the teacher is addressing the other half of the class in the teacher directed small group time.

To determine the greatest challenge with the Math 180 program, the mathematics leaders were asked in question number 14, from their perspective what the greatest challenges with the intensive math program were. All five interviewees gave different responses. One leader responded that students have two math classes when they are in the program and miss out on elective classes, sharing that students say, "you are the reason I don't have PE." Another leader shared that with the class being the second math class, they "don't really want to be there so probably behavior tends to be the biggest challenge." One challenge described by one math leader was related to students and the challenge students face when working on the content. She shared, they are confused and when it's hard for them they give up. The next response related to the curriculum and the

leader's answer related to alignment of content to the core class in her response sharing that the program would be more beneficial if that was the case. The other response is related to teacher implementation and the leader felt the greatest challenge is related to teachers not wanting to "follow the program plan." The range of responses show that math leaders have varied experiences with the program at their school sites. All suggestions are valuable and should be considered for follow up. The student perceived challenges should be addressed to determine if having two math classes does negatively impact student performance.

The math leaders were asked in question number 15 to share ways to improve the intensive math program for the next interview question. All leaders shared their ideas through the lens of wanting the students to make academic progress. Two of the math leaders (40%) shared the same theme regarding a way to improve the program. They both felt the alignment with the core class would improve the program. One math leader that the program at her school would be improved if it was taught with fidelity but often student behaviors they have not been able to do that. One of the math coaches felt that the way to improve the program was to use all parts of the program including the hands-on pieces of the lesson. One math leader shared an idea to create a program portion that incorporates movement and getting students outside, so they could have a math movement lesson coordinated with their PE class. I was pleased to see that the ways to improve the program were thoughtful and provided information that could be used to take next steps to develop a stronger program. The next steps from their suggestions would include an analysis of implementation and a focus group meeting to determine if the use of activities such as outside time would enhance the curriculum.

The next question, number 16 asked the mathematics leaders to compare students who have intensive math to those who do not take it along-side their core math class and to state if teachers share any evidence of increased confidence in mathematics. The overall trend from 4 out 5 responses (80%) was no there was no increased confidence through only the Math 180 program. One shared that the additional time helps boost confidence and another shared that supplementing the learning helps but just the program, no. And, one leader shared that it's not just because of intensive math it's partially because of the regular classroom. The responses to this question were concerning in that part of the intention behind the program is to address student's growth mindset towards mathematics and confidence, thus a need for additional research on student confidence in additional math support courses may provide more insight.

The last interview question, number 17, was asked to provide insight on any relationship there may be between the amount of time on the computer-based portion of the program and student achievement in intensive math. Two of the math leaders felt they were unable to answer the question and one felt that there was not a relationship at all. The other two who felt there was a relationship due to in one case the teacher only uses the computer-based portion of the program and the other felt that by having more time on the computer portion there "is an increase in their achievement." The results on this question indicate more information is needed to determine if there is a relationship. The results of the teacher survey to the same question regarding a relationship of the time on the computer and student achievement showed that 7 out of 10 teachers (70%) shared that there was a relationship to the amount of time and student achievement in intensive math. This result and the math leader results show that the teachers may have a more direct

connection with how students are doing with the program and the math leaders are not as involved with the results end of the program often enough to share insight into the relationship.

District Reports

To gain insight into the overall district data at the beginning of implementation of the Math 180 program, I evaluated a report entitled, Movement of Students Achieving a Level 1 on FSA Math 2015. The report provided the number of students in the district who were level 1 in grade 6 during the 2015 school year and their results on FSA Mathematics in 2015 compared to FSA Mathematics results in 2016. The total number of students who were a level 1 in grade 6 was 3,143. Of that number, 1,549 students were enrolled in the in intensive math program and 1,594 were eligible but were not placed in the program. The percent of students who went up a level on the state assessment test district wide was 24%.

Additionally, during the 2017-2018 school year, the end of year results from the Math 180 program showed that only 2,204 students were enrolled district wide. While this number is much less than the reported number in 2015 of 3,143, there have been changes in state and district policy that contribute to the decrease. Students who were a level 1 use to be required to be serviced through a structured intensive math course. Over time, the requirement changed to state that the students must be provided additional support. For some schools, this meant using other time in the school day such as a lunch and learn 20-minute program to support students who need additional support. Also, some parents, once the requirement was lifted and they knew their student no longer needed to be enrolled in the additional intensive math course alongside the core grade

level math course, opted to have the student removed. The enrollment numbers have declined over time but the importance of supporting the students in the intensive class is an important part of ensuring an opportunity to support struggling learners and ensuring equity for all levels of students to have access to high level curriculum. The intensive math program is designed to provide the support needed for students in an intentionally focused program for struggling learners thus the study of the Math 180 program will evaluate the program as an analysis to assist is determining the potential impacts on mathematics achievement.

Table 1

Student Enrollment in Intensive Math 180

School Year	Enrollment
2015	3,143
2018	2,204

The 2,204 students enrolled in Math 180 during the 2017-2018 school year given the Pre and Post Math Inventory test for analysis of growth overtime. The data only supports students who have 20 or more sessions on the computer-based portion of the program and the tests have to be given 8 weeks apart. Based on that criteria, 50% of the students moved up a quantile level, 33% stayed within a quantile level and 17% of the students moved down a level. The data indicates that there is growth for about a half of the students, yet this means that the other half are regressing or not showing growth. This finding requires more in-depth study to determine why the students are not making gains despite the use of the computer-based portion of the program.

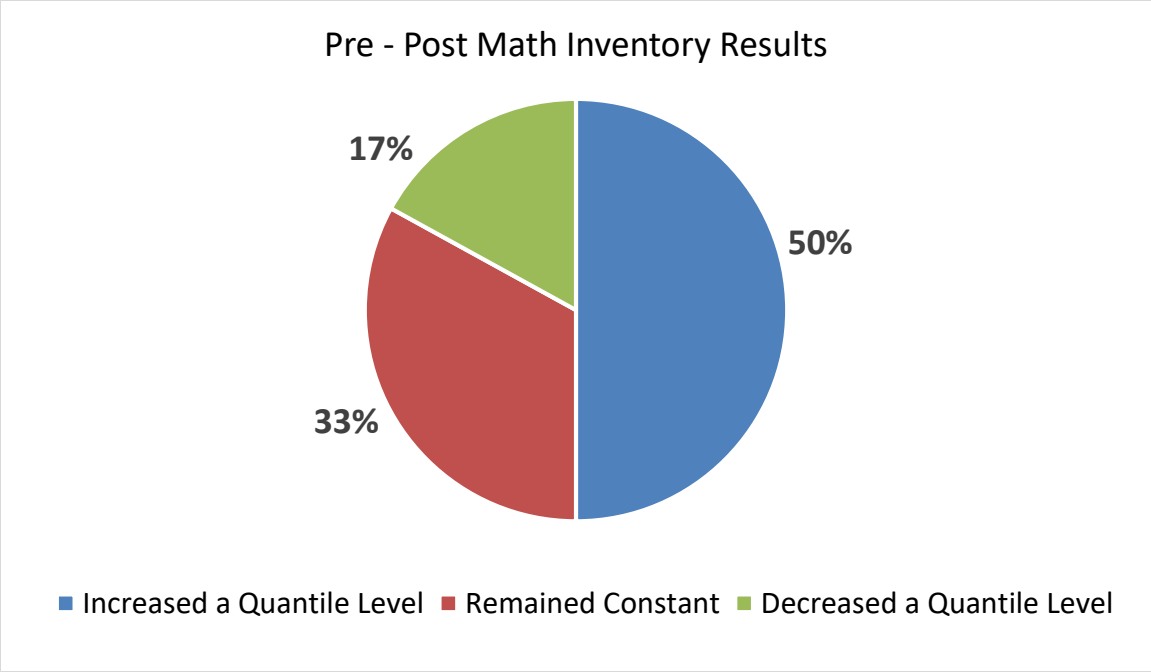

Figure 13. Pre and Post Math Inventory results for students enrolled in Math 180 during the 2017-2018 school year. (n=2,204)

The report also shares the placement of students in the program based on their results on the initial quantile placement test. Once students take the initial test, the program will recommend placement for students, or teachers can also move students to a higher block of instruction if students are ready for higher level instruction. For students who were placed above level and completed an average of 67 sessions on the computer, they made an average of 185 quantile points. Students who were place at the recommended level and completed an average of 71 sessions on the computer software showed a mean increase of 98 quantile points. The students who happened to be placed below the recommended level, which could occur through teacher placement, and had an average of 77 session on the computer portion of the software, decreased in average quantile by 31 points. This data supports that when students are placed below their ability

level, they can actually decrease in overall achievement. The data shows that students who are placed above level thus pushing their mathematical ability, made the most gains.

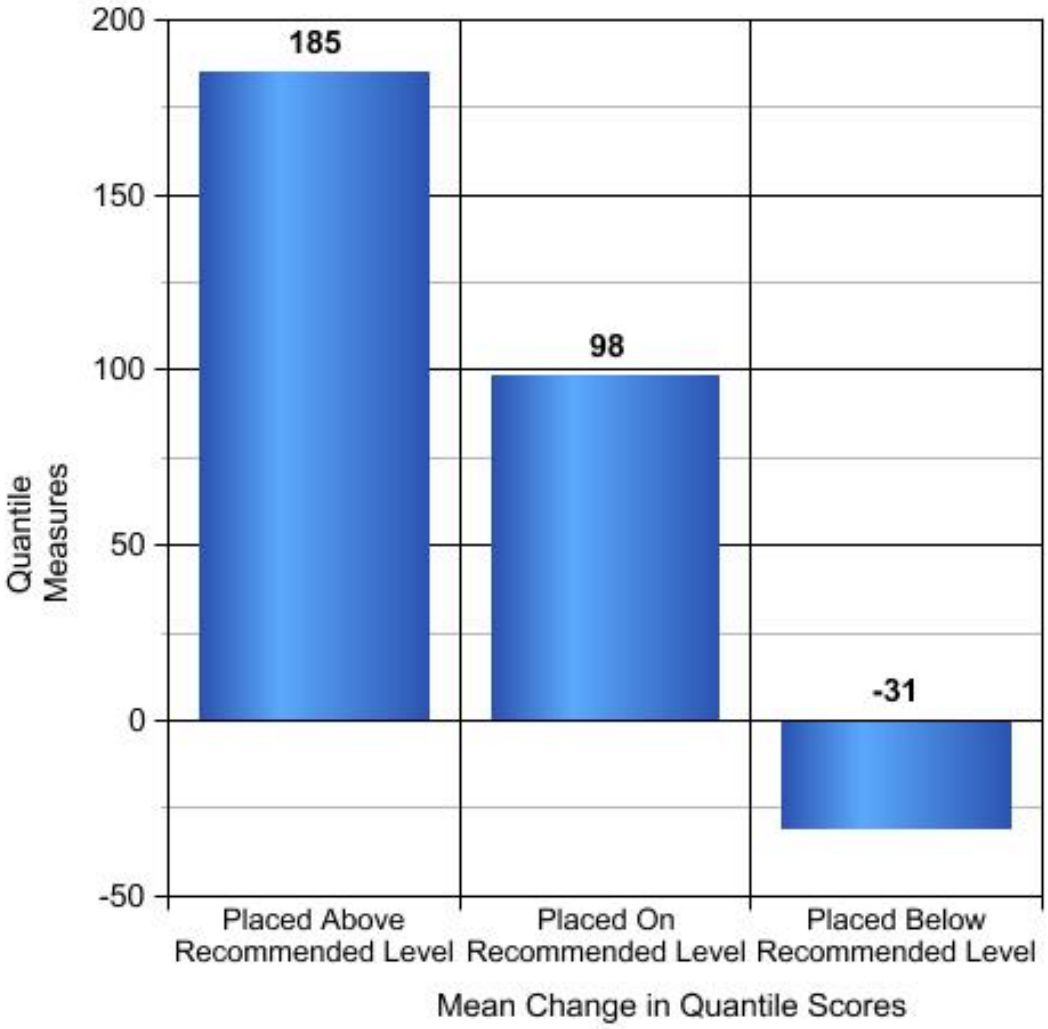

Figure 14. Placement of students by Level of computer software and results based on level placement. (n=2,204)

Overall, the findings show that in both teacher and mathematics leader responses the students and teachers indicate that teachers are able to use the Math 180 program in their classrooms with varying levels of implementation and with some challenges to resources for high quality implementation. The variance on teacher implementation is based on the shared responses including teacher training and the ability to implement the

program within different school settings. The findings also suggest a need for alignment of the intensive math curriculum with the core content course as this was reported by both teachers and teacher leaders. In addition, data from the usage of the program shows that student computer usage increases with more time allotted for the program and students being placed appropriately in the program's content blocks impacts their overall potential for increased academic achievement based on the quantile levels.

Organizational Changes

One organizational change based on the program evaluation of the grade 6 intensive math program is to develop and ensure that intensive math programs are designed to support student achievement in mathematics. In order to ensure that students needs are met the content taught in a remedial program such as intensive mathematics should have an alignment to what is taught at grade level for the students in the core class. The focus in the intensive mathematics program has a model for cycling back to very early mathematics as low as third grade. Students need opportunity to have scaffolded learning at the grade level standard. In order to address the change, there will need to be a revision of the intensive curriculum to focus the content at grade level with supports through the core content aligned program.

An additional organizational change suggested is to recommend that teachers who are assigned to teach courses that have struggling learners are trained appropriately and have high content knowledge and experience in education. The teachers who teach the students must be well prepared to address learning gaps and have strong content knowledge that includes prior standards and future mathematics standards thus supporting the coherence of learning for the students. This change is needed as typically

in courses that require teachers to work with struggling students in the field of mathematics, are teachers who often are new to teaching and lack the understanding of the gaps that students have to be successful in core grade level content.

I selected this organizational change based on teacher and mathematics leaders survey data as well as based on my own experience in mathematics education for 28 years. I have taught students in mathematics from grades 5 through high school and seeing the gaps that students have in their mathematics pathway through elementary school into the middle grades impacts their trajectory for the opportunity in higher level mathematics. When students have gaps in foundational skills, their opportunity to show mastery in the higher-level courses decreases unless an intervention such as intensive math course or program is in place. In order for students to graduate from a high school in Gilbert County they must pass the Algebra 1 course and the End of Course (EOC) state exam with a level 3. To prepare a student to be ready for the gateway course of Algebra, it is vital that the foundational courses be aligned in such a way to support their long-term success in mathematics.

I used the 4 C's model from Wagner et al. (2006), to support the change suggestions regarding the intensive mathematics program. The intent is to think "systematically about the challenges and goals of change in schools" by looking at the context, as well as culture, the conditions and finally the competencies (Wagner et al., 2006, p. 98). The As-Is chart (Appendix F) is used to support this analysis model is shows the interrelated 4C elements, context, culture, conditions and competencies and their impact in increasing learning, the practice of teaching and leading (Wagner et al., 2006, p. 106).

The transition from where the program is now and the where I hope the program moves to will be shared in the "To-Be" chart (Appendix G). From the quantitative and qualitative data collected, I was able to use the findings to determine areas in the program that need to be changed. The intent will be to use the organizational plan to develop a program that supports student learning while addressing the concerns raised by the current program as described in the "As Is" chart.

Context

The context of the study centers first around the concern that students who are a Level 1 in mathematics, based on their results from the state assessment test, are not meeting the state required proficiency level in mathematics. This suggests that the students will need additional supports to be successful in mathematics as well as throughout their trajectory in future mathematics courses. Additionally, in geographic areas of higher poverty, the number of intensive math students is greater than other geographic higher socio-economic areas. This creates a concern for students having access to a variety of courses and impacts equity for students. This lack of equity and access is due to the students taking the additional intensive math course have limited opportunities for taking electives due to the requirement for additional support provided through the second math course, intensive math.

Culture

The culture related to the study is two-fold, first the belief system surrounding students and their ability in understanding mathematics. When students are in intensive math, students often believe that they are unable to learn mathematics at a higher level. By being in the intensive math class, it impacts their mindset and you will often hear

comments such as, ‘I am not good at math,’ or ‘I am not a math person’. The second belief system is also related to mindset but at the school building level. Teachers who teach intensive math are thought of as the teacher who is not performing at a high level of teaching and that they don’t know the mathematics content. Often schools place the newly hired teachers or even struggling in the intensive math teaching assignment as they feel it is their second math class and if the instruction is not going well at least the students have their core curriculum math teacher. Both of these belief systems have an impact on the achievement of students in intensive math. Students who feel defeated often will shut down which prevents what would be a positive impact by having additional mathematics learning time. The lack of a high-quality teacher working with struggling students creates an ongoing mathematics learning gap when students don’t have access to high level teaching and learning.

Conditions

The conditions for the study related to the intensive math program include a state and local concern. The first is a state concern related to the state department of education requirement that all students who score a Level 1 on the state assessment must receive additional supports. This requirement can be met and implemented through a traditional intensive math course as done in Gilbert County Schools or through documented support programs such as a dedicated tutorial time. The results of the study show that students are mostly served through the district intensive math program but as reported in Table 1, the numbers have decreased since 2015.

The local concern for the study is that scheduling students for the additional intensive math course during the school day gives students two periods of mathematics,

one is the core math course and one is the intensive math class. Through the need for scheduling of the intensive math course, the grade 6 students are then limited to one elective thus often not having access to physical education or another elective. In the study, the math leaders shared that this was a concern and that looking at other options for students to have both math and PE through a math movement time may benefit students.

Competencies

The competencies related to the Grade 6 intensive math study address two key development needs. First, the lack of understanding of school leadership including principals and assistant principals to understand the intensive math curriculum and the intent of the program to impact student learning. Often administers are not aware of the classroom environment needs such as the space or computers needed when scheduling classrooms. They also are not aware of the intended structure of the curriculum and will often question the content on the computer-based portion of the program. Thus, resulting in teachers concerned about their classroom evaluations. Due to this, I as the mathematics supervisor have shared with administrators what they should look for in an intensive classroom to help bridge the understanding of the program.

The second competency is the lack essential standards level mathematics needed by the teachers in the intensive mathematics classes that are often taught by less experienced teachers. The need for knowledgeable mathematics teachers to teach the neediest learners is essential in ensuring the students receive high level content. During classroom walk throughs of the intensive math classrooms, I will see the new teachers often struggle with understanding the coherence of the mathematics which prevents them

from being able to share the strategies of early learning of mathematics with the current middle grades learning. For example, connecting conceptual early learning with the standard algorithm for multiplication.

Through the study of the Grade 6 intensive math program, Math 180, I have unanswered questions that relate to the curriculum, implementation and teacher development. These questions guide my thoughts as I create a plan for change in the intensive math program. The most overarching of the questions, is if the curriculum is aligned to standards-based core content during the intensive math time, what is the best option for filling gaps in mathematics for students who are multiple grade levels behind in the basic math skills? The responses from the study show this is an area that needs to be considered. A possible solution would be to analyze the suggested model to see if another model would provide the same research-based results such as a 2-day/3-day model for teacher time and computer time. Another possible solution would be around scheduling and ensuring the core math and the intensive class were blocked together to provide time for integrating both programs.

The next question relates to implementation for any model that would be proposed, or the current two-prong model used in instruction. What steps can be taken to develop or support implementation so that the students receive high quality instruction in the intensive math course? This context of this question is important for both the student as a learner and the teacher. The students and teachers need to have support through implementation as the format for learning is different than the traditional mathematics setting. When a school does not have a math coach to support implementation, the impacts on the level of implementation vary. A possible solution would be to ensure all

schools allocate funding to provide math coaches at every school to impact the implementation of this program as well as other courses to maintain focus on mathematics instruction for all students.

Additionally, how can school and district leaders increase support for teachers who lack and need content knowledge in mathematics in order to have a deeper understanding of grade level and above expectations? Often teachers come to teaching from another field or without a mathematics background. This creates concern for two reasons. One that the teacher may not know the mathematics content at the level needed to teach it. Secondly, the teacher may not have the knowledge of how children learn mathematics. One recommendation is to implement an ongoing support plan to meet monthly with the teachers to pre-teach the content to teachers who need support. Another recommendation is to offer programs to allow teachers to gain knowledge to increase their own mathematical understanding. Teachers who only know the level of mathematics they teach are at a disadvantage to be able to connect to future learning.

My next steps to create an organizational change plan includes a multi-step approach that includes stakeholders, curriculum experts and an implementation plan. First, the implementation plan will be developed to include a timeline and steps for development. The plan will include steps to analyze curriculum and data related to student achievement as well as a reiteration process for any changes made to the implementation of any new curricula or teacher professional development. The gathering of curriculum experts for input will be one of the first steps following the timeline development. The need to analyze the curriculum is related to the results of both the teacher and math leaders survey requesting a more aligned curriculum to the core content

class. Following this process, the next step will be to develop a professional development plan for curriculum implementation, understanding mathematical mindset, administrator training to understand the needs and purpose for students who struggle with mathematics. And, lastly seek input from stakeholders at multiple levels including parents, elementary, high school and college professors to assist in ensuring the program meets current and longitudinal needs of the students.

As I meet with stakeholders, the input from the community will be vital in the collaboration efforts to implement the change plan that impact the students of greatest need mathematically. Wagner (2006) shares that through an envisioning phase it is critical to include not only teachers and community members but ensure they gain understanding of what is needed to improve student learning to help with the planning process. Additionally, Wagner (2006) suggests that it is important to include teachers and administrators to create a solid vision for focusing on teacher skill level and the administrator as an instructional leader. In agreement with Wagner, my plan will include a collaboration meeting with elementary teachers, high school teachers and the community input from local state colleges and universities. By having planning sessions with state colleges and universities, it will help establish the longitudinal goal planning for mathematics programs and progression documents which will better help in our understanding of why the intensive mathematics programs are vital to student success.

Interpretation

The results from the study in Gilbert School District provide a picture of what is working well for students and what needs to be assessed and analyzed for change to support future gains in student achievement. Many school districts face challenges in

determining the best programs to support students who need additional support and remediation in mathematics. From the teacher and mathematics leader input in this study, the need for an analysis of the curriculum and implementation model was clear and will allow me, as a mathematics supervisor, to think more critically about what is best for struggling students in grade 6 mathematics.

First to focus on what is working well, there were indications that the program can be used by students easily for functionality and when used with fidelity can support student learning. This means that the student usability of the program is in tack and the next step would be to determine barriers for solid implementation for each school. Student achievement increase will occur through the implementation of high-quality curriculum that engages students in the learning and supports the needs of the learner through the program implementation.

The program should go through a district reiteration process to determine what should change to support future gains for student achievement. The process should include a school by school evaluation of the environment for learning space. Additionally, the scheduling of the course should be analyzed to determine if placing the intensive class with the core class is a block would be beneficial as well as determining the appropriate teacher to have the best impact on the struggling learners.

The results of the study are significant in that this information will allow me to look at the program at a deeper level to suggest improvements for increased student learning gains. Some respondents in interviews and through surveys shared positively aspects of the program such as students working in the two-prong model showed motivation as they were moving to a new station about half way through the class period.

Yet, there was also some concern of students not using the computer time as intended and either not making progress or watching videos repeatedly. The significance of the computer-based portion and its implementation it is the portion of the class period that is designed to fill the long term gaps that students have and if it is not being used with fidelity, there will be continued long term effects on mathematics knowledge for the students.

One concern that is of significance is that the data in the school district shows that less than a quarter of the students who are a level 1 on the state assessment made gains enough to move to a level 2 in the district report from 2015. The implementation of the program over time and teacher turn over are areas that need to be addressed for future planning. While some of the responses shared provide insight into what is working well and should continue to be a part of the program, there is some data that indicates a reiteration of the program should occur.

The results of the study turned out the way they did from the teacher leader interviews as they were given the opportunity to share openly at a time that worked well for them and they were able to answer openly what was working and what needs improvement from their perspective. Leaders at school level often focus on structures to support student learning thus participating in the study allowed them an opportunity to be a voice for change. The teacher input turned out the way it did as the teachers were provided the survey at a time in the school year when they had worked with the program for at least 8 months. Thus, the timing of the survey allowed for wholistic input based on an approximately a full school year. The questions were designed for teachers to share feedback on what was working well and what could be changed. This input will allow the

district to implement change based on the feedback but also share with the community of mathematics at large that use the intensive math program.

Judgments

Through this study, I aimed to answer research questions to assist in determining the next steps needed to ensure a high-quality intensive mathematics program to impact student achievement. The primary research question for the evaluation of the Intensive Mathematics program used in grade 6 is: What impact does the Intensive Math program implemented in grade 6 mathematics classrooms have on struggling learners' mathematics achievement? This question was the overarching focus of the study.

From this overarching question, the supporting questions to the main primary questions focused on the first one, what do teachers report is working well in the Intensive Mathematics program? When looking at the results of what is working well with the grade 6 intensive math program, one finding indicates that in the program the opportunity for small group work and individualized attention for students is important to the success. The opportunity for small group and movement to groups aligns with the finding that teachers felt the program did offer motivation for students in mathematics. These two findings of small group and motivation are two areas to consider in development of future math programs.

Next, what do teachers report is not working well in the Intensive Mathematics program? The findings for what is not working well with the grade 6 intensive math program were diverse and provide insight into further need for discussion on classroom structures. One area not working well is related to class size that should be a focus of scheduling students as the need for individual work with the teacher is vital to support

learning. Additionally, the concern of the alignment of curriculum is not working well. These two findings along with the implementation concern of small group time as a relationship to class size will need to be considered as development of programs continue. Gaining more insight from teachers and administrators regarding scheduling for class size should be followed up on as I continue to support intensive math programs.

The third question focuses on leadership perspective, what do school level leaders and teachers report as the greatest challenges with the Intensive Mathematics program? The teachers and mathematics leaders shared multiple challenges with the program. They shared concerns that indicate their input is necessary to make adjustments to have a program that supports both student learning and teacher knowledge of the students. The teachers were concerned about student prior knowledge and how the program instructs the lower level mathematics concepts. This also ties in with the ongoing challenge they discussed in interviews regarding the alignment with the core curriculum. Additionally, the challenge of student motivation with them as they take two math classes per day missing out on elective time. It is necessary to spend time learning more about the challenges shared and steps to make change.

The next question focuses on improvement and what do the school level leaders and teachers report as ways to improve the Intensive Math program? The ways to improve the program align with the challenges. Both survey and interviews results show that teachers want more autonomy of using the program itself and the data to help the instruction. The need for fidelity in implementation of the program and alignment of the curriculum with the core math class are two key areas that both teachers and leaders felt needed to be improved in order to support in student learning. With these suggestions

given in the study, it makes me consider steps to change the model of the program and curriculum structure.

The additional secondary research questions related to the evaluation were designed to look deeper at the program for the students. The first one, when comparing students who have intensive math to those who do not take it along-side their core math class, do teachers see evidence of increased confidence in mathematics, was intended to focus on the student's mindset and how the intensive math class impacted their feelings of confidence towards mathematics. The next secondary question, in the Math 180 program, the students use the computer portion of the program, as well as, the small group teaching component; does the amount of time on the computer based differentiated portion impact student achievement in Math 180, was designed to help determine if the computer time impacted student overall success.

The secondary question regarding student confidence in mathematics through having intensive math had mixed results. While the teacher's responses indicated that there was an increase in confidence due to the motivation in the program and evidenced by test scores, the math leaders shared that they did not see the same increase in confidence. With one of the intents of the Math 180 program to support student mindset and confidence, the mixed results from the study indicate that further information is needed.

The last secondary question that approached the idea of whether the use of the computer program impacted the student's learning gave great insight into teacher and leader perception. The teacher's mostly felt that the time on computer did have an impact whether it was based on more time on the computer or working through the program.

Interestingly in other study questions, teachers and math leaders shared the content in the computer program often required one on one support for students to use it easily. The wondering around these results are if despite the difficulty of the program to understand for some students, the time on the computer is perceived to show student increase in learning from the teachers. These results suggest that follow up conversations with teachers and math leaders should occur to gain deeper understanding.

The results overall from both the teachers and the mathematics leaders were generally positive. The opportunity to gain insight from the groups was appreciated and I believe the math leaders in the interviews felt comfortable providing suggestions and feedback. Some results related to the computer program were unclear and will require follow up in order to develop changes in the program. The results showed that usability of the program varied yet students were able to access the program and work through the blocks at varying paces. The variance in pacing through the curriculum may be related to the implementation models. As designed, the students should have time on the computer portion each day yet as shared from the teacher leaders, some teachers modify the model and do whole group instruction during the week.

Additionally, the concern with alignment while provided in a positive way came up in multiple responses and will need follow up to support the program. The alignment relates to the core content course. Some responses shared that the connection to the core class instruction may support student learning at the point that students are learning new content. The program is designed to support some of the core content and also fill gaps through the computer program instruction. The district pacing guide also varied from the intensive math curriculum thus another factor in the misalignment.

Recommendations

Based on the results of the study and my own professional experience in developing and overseeing the grade 6 intensive math program in Gilbert County Schools, I believe a change in curriculum through focus group input should take place. The focus group should consist of multiple stakeholders including parents, teachers and leaders. The change in curriculum to focus on the alignment to the standards will first require a communication plan. The plan will allow for an opportunity for increased understanding of the research to support the change that would promote the curriculum to be taught at the standard level with scaffolds to support. This may be new learning for stakeholders so beyond a focus group would be a need for ongoing learning opportunities for parents to understand ways that this work is supporting the students.

Next, the curriculum review should involve multiple levels of educators including teachers of intensive mathematics, core mathematics teachers and math leaders. The opportunity to discuss the curriculum from the conceptual framework to extent to the understanding of the use of algorithms in the context of grade 6 mathematics will provide a response to one the concerns from the program study. The program's content presented some challenges in sharing with students the conceptual learning and through the data in the program evaluation, this was an area to consider in the change process. The response of some teachers indicated they needed to determine what they should teach in the program and why. Thus, creating the need to address the alignment.

To address the alignment concern that transcended through both teacher and teacher leader responses, a focus group could create an analysis to determine both the pros and cons of an aligned curriculum with the core mathematics class. This would also

allow the core mathematics teachers to determine what learning is taking place that should be aligned and at what times of the school year it is vital for alignment. The analysis would then help in determining if the alignment should occur all year or at points of the curriculum.

Looking at the implementation goes hand in hand with the curriculum alignment and should be analyzed as well. By looking at these two areas together, curriculum and implementation, along with the concerns of; class size, resources, computer usage and student skill knowledge, a plan for adjusting the math intensive program can be developed. The plan will need to focus on the course as it currently is used and scheduled to develop possible solutions to flexible scheduling, the alignment of the content with the core curriculum and the teachers understanding of student needs as related to the content and adolescent learning.

The first organizational change that I would recommend for intentional development of the intensive math program is related to human resources. The change for human resources would involve schools placing highly effective teachers in the intensive mathematics classes. Often schools place new or inexperienced teachers in low level math classes and the more experienced teachers with higher level math classes or advanced level classes. The change is personnel allocations would then be providing our most struggling students with the highest quality teacher at the school to support implementation of the program, ensuring teacher mathematics knowledge and potential improvements to student achievement.

The next change that I would recommend is related to school level planning for scheduling and student class size. The school level planning change is related to

supporting the need to maintain small class sizes. This supports the teacher and math leader's concern of increased class sizes impacting small group support for students. When the class size exceeds the recommended 24 students, the groups become too large for teachers to give the attention needed in the small group time. The recommendation is to address the scheduling of intensive math as a separate class and consider flexible scheduling in the school day. In a flexible schedule time for tutorial supports can be put in place such as an extended lunch time that would allow for small group time. Another consideration is for small group work in the core classroom that uses the scaffolds needed to move support students as the reach to attain the standard level.

Lastly, the third change I would recommend is related to instructional support for teachers related to their mindset for struggling learners. The need to address the students as a whole child as a learner is important to the learning of mathematics. Supporting teachers through the understanding of mindset towards mathematics and implementation of processes on a more direct ongoing basis during the school day is vital to changing the thinking around mathematics learning.

I selected this issue related to the intensive math programs due to the need for students to feel confident in mathematics and have the opportunity to meet the level of standards expected by all students. The need to support struggling math students has great impact on their trajectory in mathematics as they enter high school. Students must pass the state end of course exam for the Algebra I in order to graduate from high school. Thus, the need to ensure that all students reach the level of the standards through middle school is vital for their personal goals whether it be for college or career. In addition,

when more students are educationally prepared as they are graduating from high school the positive impacts are much greater for the work force and community.

CHAPTER FIVE: TO-BE FRAMEWORK

Introduction

Through the program evaluation, the need for improvement of the implementation and content alignment were evident and I will suggest a plan to develop a more comprehensive approach to support for low performing students in grade 6 that will support schools and families in their student's academic achievement. The work on evaluation is of high importance due to the need for ensuring success for students as they progress to Algebra and then into additional higher-level math courses. By establishing a solid foundation, students will have more confidence in their coursework moving forward. The need to include the community of parents and educators is vital to this work not only for looking at grade 6 curriculum but additionally what steps can be taken to support our early learners in K-2 to ensure a solid foundation of mathematics to potentially decrease the need for remediation in the middle years of school. This chapter will take the work shared in the previous chapter related to Wagner et al. (2006) through the "As-Is" discussion as it relates to grade 6 intensive math and address areas that are in need of change to impact student mathematics achievement. The next step in this chapter will be to consider the impact related to student achievement based on the "To-Be" tool as Wager et al. (2006) describes as a vision of what a program would look like if it were producing the results needed for all students.

Review of Literature Related to Change

The first step to consider the impact related to student achievement through change is to understand the components of the literature related to change and mathematics teaching and learning. The research shared addresses the need for equitable

mathematics programs and ensuring mathematics content is appropriate for all students. Additionally, a focus on literature related to the impacts of early learning of mathematics will be discussed. To support students and learning of mathematics, research related to the art of teaching mathematics and changes in system structures are necessary foundations to make the connections between the learner and the instructor of mathematics.

Mathematics Content for All

In mathematics teaching and learning, often students who are considered low performing immediately are tracked into low level classes that often lead to no way out of the perpetual path to "I'm not good at math." Intensive math programs while designed to fill gaps in learning can limit the access to grade level core content. At times schools and teachers will get overwhelmed by students who have lack basic skills and will look for an easy fix and that results in poor choices for instruction (Bimes-Michalak, p. 122, 1998). The poor choices can result in programs that are not aligned or require the teacher to use scripted or computer-based programs for students. Bimes-Michalak (1998) goes on to share that when "students come lacking skills, schools often respond by "dumbing" down the curriculum, for achievement-the one of: high expectations, high content and high support for all students." The curriculum or programs used should provide an avenue to ensure that students can learn grade level content with scaffolded supports on prior knowledge that may be lacking while not preventing access.

A review of what should be in any mathematics curriculum is often researched and discussed. In Montgomery County Public Schools(MCPS), they decided to do an audit of their math program to look for any weakness or any area that they may be

underperforming (Childress, Doyle, & Thomas, pp. 42-43, 2016). One piece of the audit that showed a need was the focus on basic math skills that were in essence preventing the students from moving toward broader concepts and opportunities for critical thinking (Childress et al., pp .42-43, 2016). This finding led to some discussion on what should be in a new revised curriculum and MCPS eventually looked for additional support from universities, College Board and Achieve, Inc. to assist in finding the balance of rigor and computation. Childress et al. (2016) share that from the audit the findings included a need for curriculum implementation and alignment of a coherent curriculum as well as a review of the achievement gap with minority students. For any program, the key is ensuring access for all students to mathematics content that will provide a pathway for success.

Early Learning of Mathematics Impacts on Student Achievement

Developing a pathway for success in mathematics has to begin long before a student ends up in a remedial or intensive math program in middle school. This learning should begin in the early years of life. Reading is influenced by children in the home through language development and learning of new words, yet the learning of mathematics often happens once students begin formalized school (Ravitch, p. 53, 2014). This situates the beginning of their learning of the two areas, reading and math, at different places. Reading is often a foundation from the home where math starts at school.

When thinking about early reading and early math learning, reading is often used in schools as a predictor of success. Yet, there is indication that the early learning of mathematics may be just as important or more important. The impacts of early math

skills are more predictive than reading (Pellissier, p. 1, 2018). These impacts are not only for the early years of learning. Additionally, the more math that is done prior to kindergarten, the better students will understand mathematics when they are in school (Pellissier, p. 1, 2018). To further see the impacts of the trajectory of mathematics on student success, Pellissier (2018) shares, "Early math skills foretell higher aptitude in high school math and higher rates of college enrollment." By building student knowledge of mathematics at an early age, it begins the thinking processes needed for reasoning and logic which are foundational skills in mathematics. The need to focus on early learning of mathematics is a systemic change that requires support from community, schools and teachers to begin to impact the cycle of students falling behind and ultimately ending up in remedial programs.

Supporting the Art of Teaching Mathematics

The art of teaching mathematics as with any content area takes time to master. The importance to the teacher's role in the classroom is one of the most impactful. Teacher clarity has an effect size of 0.75 which is in the high zone of effectiveness in changing student achievement (Hattie, Fisher, & Frey, pp. 38-40, 2017). The idea of effect size shares, through extensive research, which influence on students will have the most impact. An effect size greater than 0.40 indicates a normal impact equal to one year's worth of learning growth in school. Thus, teacher clarity which encompasses organization, explaining and instruction of content as well as assessments having an effect size of 0.75, there is more than a year's worth of growth when teacher clarity is present in the mathematics classroom. By having a high-quality teacher with students, the impact on student achievement is increased. Having a high-quality teacher with students

who struggle in mathematics, can provide an avenue for them to have an increased opportunity to learn mathematics.

In order to ensure high quality teaching of mathematics, teachers need support systems and professional development to provide them with the knowledge needed to support all students. Teachers need to have the professional development that provides the avenues, skills, and supports to help them reach all students. We often believe teachers need strong knowledge of the content of mathematics to increase student achievement and while that is important, just as important is the training on cooperative learning structures, classroom routines and management as well as social-emotional learning techniques (Slavin, 2019). Struggling students need strategies to help them engage in the learning process. Too often the phase of learning in a collaborative structure is neglected and not an established part of a teacher's routine (Fisher & Frey, pp 7-10, 2014). When teachers have learned to include collaborative structures in class it can help students thinking and understanding. Salvin (2019) shared that by incorporating learning structures the students had a less threatening environment that allowed struggling students more opportunity to ask for an explanation and see how other students were approaching more difficult problems. By teachers learning ways to build these structures into lessons, there is more motivation, engagement and opportunity for students to be challenged which in turn enables teachers to achieve the success they desire as a teacher (Hirsh, p. 7, 2019). There is a balance of teacher's content knowledge and understanding student learning needs that must be a part of a teacher's professional development to support the needs of mathematics learning for all students.

The challenge to support change in teacher practice is finding the best way to support teacher learning and planning. Often teachers are given increased time to plan as an avenue to what school's hope will develop into an increase in student achievement or told to collaborate with others, yet those steps alone do not impact the teaching quality (Stigler & Hiebert, pp. 149-150, 1999). Teachers need structured time to fine tune their practice with concrete steps that engage the teacher as a learner. Stigler & Hiebert (1999) suggest a plan where the teacher becomes a researcher through lesson study that enables them to investigate their own practice. The work of lesson study involves working collaboratively with colleagues to share in the learning process. The collaborative process also supports teachers both intellectually and emotionally as they work towards outcomes to impact student achievement (Hargreaves, Earl, Moore & Manning, pp. 36-39, 2001). When teachers can come together to learn from each other in a natural way without mandated requirements, they are able to build relationships and work towards a common goal to support student achievement.

Changes in System Structures

In order to transition to the steps that must be in place for change in a system to support mathematics teaching and learning, the first step is to remove the structures that allow for a sense of complacency and then create a sense of urgency (Kotter, pp. 38-45, 2012). There is a need to look beyond the historical teaching of mathematics and develop a case to show that all students need to learn through collaborative structures with teachers who are invested in the teaching of mathematics and envision it as the stepping stone to college or career. The need to impact all learners is vital to support all students having equal access to high level mathematics and decrease the need for intervention.

Often developing a strong sense of urgency means that leadership will have to be bold and possibly take actions that hold a risk (Kotter, p. 45, 2012). The teaching of mathematics has been a stand and deliver experience historically and creating a sense of urgency for change can be difficult for leaders and school districts. The vision for the change must focus on the students and the student learning needs.

Focusing on the students means that the teachers and leaders will need to acknowledge and discuss their beliefs and mindsets about student's abilities that often come with judgements on students stereotypes and academic ability (NCTM, p. 64, 2014). There must be a systemic focus and commitment that all students have the ability to meet or exceed the standards at their grade level. This will support educators, so they can then have an avenue to move away from their past ways of practices that include tracking of students to transition to productive steps that support all students learning high level mathematics (NCTM, p. 65, 2014).

The system support for change starts with school building leaders. Principals may not be able to attend the level of professional development that teachers do for mathematics to understand the content and pedagogy, yet they play a pivotal role is supporting the vision for high quality teaching in a mathematics program (Van de Walle, Bay-Williams, Lovin, Karp, p. 105-106, 2018). Principals need to have an opportunity to understand and experience the mathematics curriculum through teacher conversations, classroom visits and student conversations. This will help with understanding the reasons behind the strategies required to focus on steps and professional development learning needs to engage all mathematics learners.

In order for a principal to support the changes and challenges that could come with systemically changing a mathematics program, such as eliminating a regular track in grade 6 and supporting a plan to provide an advanced level track to all students, the principal must be aware of the cultural change. Successful change comes from the understanding of culture change (Reeves, pp. 36-40, 2009). Change in mathematics structures can be challenging as they come with the obstacle of beliefs of the way it was done when "I was in school," thus the culture of mathematics instruction that is often a barrier to change in education. This is where the change in culture takes a forefront to the steps to make a change in programs.

Change in school district and systems is in essence a qualitative issue and not a compliance issue (Johnson, pp. 12-13, 2005). Interestingly Johnson (2005) shares that, "To change teaching, leaders must first understand people's understanding of learning." When we reflect on our need for change and what we must do to change the student learning experience, there is a parallel need to understand the teachers learning experience. Both teachers and students need to be an active part of an emotionally safe and academic environment, so every student has the opportunity to meet their full potential (Dujon, p. 16, 2018). Keeping the foundation of classroom learning through systemic change, supports both teachers and students as the navigate the change process.

Envisioning the Success TO-BE

Through the evaluation of the grade 6 intensive math program and delving into research around supports for high quality teaching of mathematics, early learning impacts and challenges, there are areas that show a need for change to support increased success for students. The goal of the intensive mathematics program is to support student learning and fill gaps due to prior missed learning in mathematics. To make change occur that could impact student achievement, change should occur in the areas identified from the evaluation's data collection as well as the information related to the literature review including mathematics content, early learning and school supports. To envision what the

change plan could look like, I created a vision of context, culture, conditions and competencies (Appendix G) using Wagner's 4 C's analysis process. Using this as a tool for visioning will allow me to focus the next steps for change in the intensive mathematics program.

Contexts

The context of the proposed changes is focused on student gains and increased access. By having a clear roadmap to support students, the districts, schools and teachers will have a path to determine what students needs are both academically and emotionally. The impact of the changes will support the students and allow greater access to mathematics and electives.

The main focus is to ensure students who have scored a level 1 on the state proficiency test and are showing signs of need for additional support are addressed without a prescribed class or program. This could include taking time to look more deeply at their data and having conversations with teachers. It is vital to the success of students in mathematics to know where the hinge point that caused the lack of knowledge occurred and address the issue. This creates a need to develop individualized learning plans for students in lieu of a blanket curriculum model.

For all students who struggle in mathematics, there is an access issue to high level coursework and often even more so for students who are in high poverty schools. The need to increase mathematics achievement for students who have historically struggled in schools of poverty is an issue that is important to address to make real systemic change. A district policy should be considered to allow schools that are of high poverty to analyze and choose a high-level, research-based curriculum that would provide the access to rigor-based core mathematics and develop a plan for supports. This exception to district led mandated curriculum would allow schools the autonomy to support students and begin the process of a more individualized plan for student success.

Students who struggle in mathematics need opportunities for success. This success may need to come from another avenue that may be found through an elective class such as art or physical education. When students have the scheduled intensive math class, it prevents the opportunity for the elective time. Schools should have the opportunity to plan for flexible scheduling and provide the mathematics support through other times in the school day, such as a tutorial time, to allow students access to electives versus an additional mathematics class.

For these three areas of context, individualized learning plans, high poverty schools the autonomy to access curriculum, and flexible scheduling to transpire, there will need to system wide understanding. For some parts of the system, this will mean thinking out of the normal expectations in schools and providing research-based training for schools and stakeholders to understand the reason for the need for change. This will include a need for some professional development as well as working collaboratively to build and establish the new ways of addressing the mathematics gap.

Culture

In order to establish the new ways of addressing the mathematics gap, a culture shift and change will be addressed within all levels of the system. The culture change will include an understanding of the why behind change as well working with teachers and staff on their mindset related to low level learners and their academic potential. The culture changes focused on mindset are two-fold.

First, the mindset towards student ability and belief that students who once struggled with mathematics can learn mathematics at a high level will need to be openly discussed and addressed. Second, changing the mindset of teachers that don't agree with

or even support putting high quality teachers with the most struggling students will require the support of research. Both of these mindset areas will require a culture change that will need to be embedded in the system and the schools in order to establish a new mindset related to the culture of learning.

To incorporate cultural competences in the program, the teachers and school level leaders will have to gain understanding of the research behind the student's mathematical mindset. Boaler (2016) shares that there is new information and evidence to show that everyone who has the right teaching and messaging around learning mathematics can be successful in mathematics and additionally they can learn math in school at the highest level. This is often hard for teachers to accept in the culture of teaching and learning mathematics as socially people will say they are either a math person or not a math person.

There are often some teachers who find it difficult to even accept the idea that anyone can learn high level mathematics as they have spent many years teaching students based on who can do math and who can't (Boaler, p. 4, 2016). The system itself sets teachers in a position to teach students in through classes where students are grouped as those who know math and those who don't. This stems from the scheduling of students in advanced honors classes versus regular or remedial classes. Knowing these challenges, a plan for understanding the learning of mathematics through a professional development plan will provide teachers with the opportunity to better understand the importance of the shift needed in mathematical mindset.

Conditions

The ideal condition for learning in the study puts the attention on learning for the development of the adolescent learner. Students need to have the support they need in mathematics learning and still have access to courses and electives that provide them opportunity for educational opportunities that support them as a whole child. The district and schools should conduct a review of the scheduling processes for struggling students. This will allow schools to determine the options for support for mathematics outside of the required intensive mathematics class. Thus, allowing time and a focus on providing students additional courses that can provide an opportunity to gain an additional skill or knowledge such playing an instrument in band. The process will require schools to look at non-traditional scheduling options and incorporate student and teacher input.

The two conditions, additional support for mathematics learning and time for electives will require all stakeholders including parents to understand the process. This may mean understanding of a new way of scheduling during the school day such as a tutorial lunch time and the communication to parents will be important to that success. The support plan will be the condition that needs the most support from the stakeholders as the increase in elective time will be an increased opportunity for students.

Competencies

The competencies to ensure and support results in effective change include multiple levels of the system to have impact for students. At the foundational level, there is the curriculum changes for support classes and the standard alignment to core curriculum. School leadership understanding for support is the next step. Then, a plan for experienced teachers to be assigned to support the lower performing students.

Addressing the competency of aligned curriculum comes from the teacher and teacher leader interviews. Students need access to the level of curriculum that is at grade level to support their learning. A plan to provide teachers an opportunity to understand the need for a solid Tier 1 curriculum alongside support resources is a priority for this work. Then, working towards this understanding for teachers, there will then be a need to develop the structures for the aligned curriculum and develop a plan for scaffolding the mathematics content in the core mathematics class.

School administrators will need a deeper understanding of the aligned curriculum for support time and through teaching in the mathematics core curriculum. While principals often know of the need for change, moving deeper to understanding the reasons behind the change and potential impacts are more important. This allows the principal or other administrator to share the vision of alignment with stakeholders. Thus, they will be able to advocate the change and support through any potential challenges that may occur.

The next competency that has to be addressed is the assignment of teachers in mathematics. Schools will need to evaluate the way teachers are assigned to teach in order to address the need for high quality teachers in classrooms with the neediest math students. Students who struggle need teachers who are proven as highly effective and have experience in teaching mathematics. Often new and less experienced teachers are given the low-level classes or intensive mathematics classes thus putting students with teachers who are less experienced and potentially lack the knowledge of scaffolding and pedagogy. This change will require working closely with teachers and leaders to support

student needs and also with district leadership and potentially union representatives to ensure teachers are in agreement with the assignment changes.

Conclusion

Making the transition from the "As-Is" (Appendix F) state of mathematics in the district based on the results of the study along with the research surrounding mathematics instructional needs that resulted in the recommended changes in "To-Be" (Appendix G), has opened the door for me to view what needs to be improved and share possible solutions. The areas of context, culture, conditions and competencies provide a framework for next steps. The changes proposed will come with a need to provide steps for implementation as well as stakeholder understanding systemic changes and potential challenges that can occur to plan for a successful transition.

CHAPTER SIX: STRATEGIES AND ACTIONS

Introduction

The main areas that need to be addressed to make systemic and specific change to impact the grade 6 intensive mathematics program come from the ideas developed from the use of Wagner et al. (2006) "As-Is" analysis to the vision of the "To-Be" analysis for change. The "To-Be" analysis led me to determine four main areas to address that stem from the context, culture, conditions and competencies. Each area plays a role in the changes that need to be addressed to change the current intensive math program and also to plan for system wide change to impact student learning and future student's mathematics achievement. Each of the areas of improvement are described to show the strategy and action as well as presented in Appendix H.

Strategies and Actions

The strategies and actions center on four main areas. The first two focus areas are related to the resources needed for implementation including students supports and the time and teacher allocations. The next focus area looks at the curriculum and changes that need to be addressed to ensure a viable curriculum for all students. Lastly, the focus is on the school and district leadership to share steps needed to support the changes to impact the program and student success.

Focus Area: Student Supports

The area of student supports comes from the need that is at the forefront of this work, the student needs. The goal is to ensure that students needs are met so the learning potential can be increased. The two areas that will be addressed are the need to

understand the mathematical mindset of the students and the need for individualized student learning plans to support student intentional growth.

In the area of mathematics, the focus is primarily on the mathematics content itself when teaching even at the middle school level. Through the teacher interviews and research on mathematics learning, there is a clear need to address the mindset behind the learning of mathematics. To gain understanding of what teachers know about mindset and its impact on student learning is an initial strategy to determine the depth of the need for supporting students. The action to address this strategy will be the development of a survey to collect data on what teachers currently know about mathematical mindset and the impacts on learning.

To further address the understanding of mindset, I will use the survey data alongside the strategy step to review research available on mathematical learning and mindset. Then, using both the survey data as a basis for understanding where the current level of knowledge is and the research, the development of a professional development opportunity will begin to support teachers. The teachers will engage in professional development session to gain understanding along with an action study project to put the professional development learning into practice in their own classroom. Then, participants will reconvene for peer to peer support to discuss the implementation of their own study of mathematical mindset in action.

Additionally, to meet student needs, schools need to develop individualized learning plans (ILP's). The plans will use the knowledge of learning and mindset to develop a plan to address student cognitive and content needs. The strategy to begin addressing this goal is to identify any school who has a similar structure of ILP's in place

that would allow a starting point for a system wide approach. The action to move forward with this level of student support would be to develop a plan that would support individualized plans for use during flexible scheduled time during mathematics class or in a structured time during the day such as a tutorial time. This innovative student focused process would provide students with a focused plan of support that meets student needs without having a second math class and also creates an opportunity for greater potential beyond a whole class dosage of mathematics instruction. The planning and development of using ILP's in core instruction would require input from teacher groups as well as strong curriculum writers to assist in implementation.

Focus Area: Time & Teacher Allocations

The intensive grade 6 mathematics class is taken in addition to the core math class thus having the students take two periods of mathematics during the school day. This prevents the student from having an elective during the time that they have the intensive math class. This type of scheduling can keep a student from exploring other learning options by missing time for the arts, career and technical program or physical education. The goal in this focus area is to ensure students are scheduled for a support time that meets their needs other than the second math class. Even with the change in scheduled time the expectation is that the time is still supported by a highly experienced mathematics teacher.

The first strategy to address the scheduling is to identify current schedules at schools to determine if any schools offer remediation that is not during an additional full math period, intensive math. The action would then be to create a data base of any school that has developed an option that addressed struggling students outside of the district

model of a period of intensive math. That data base will be used to provide a foundation for discussion in a focus group to develop possible options for support.

Next, in order to implement possible options, the next strategy is to analyze school schedules to determine time available in the current school day for remediation of student skills. Then, the action to address this is to use the school schedules to develop flexible scheduling options for schools that still meet state teaching minutes. This would allow district schools to share practices on how to provide support to struggling students outside of the typically prescribed intensive math class. A further next step needs to be evaluating what is being taught during the tutorial or support time which will be addressed when looking at the alignment of the core curriculum with support scaffolding.

During the flexible scheduled time which may during an extend lunch time or during another preset time, the need for high performing teachers to support struggling learners is evident. The main strategy at the school level is to identify which teachers are high performing in mathematics instructional practices that could be scheduled to support the flexible scheduled times for students who struggle in mathematics. The action to develop the program would be to start by investigating options to provide additional incentives for teachers who agree to take on the additional role to support students during this flexible scheduling time since it may be beyond contractual time. An additional action step to consider in planning, would be to include a peer teaching program. Then, students could be helping students along with the high impact teacher.

Focus Area: Curriculum Alignment

From the insight of teachers and teacher leaders in this study a common theme is for the intensive math class to have a common content alignment with what is being

taught in the core mathematics class. Even knowing students have gaps in their learning, there is still a need for the alignment. Students need access to mathematics at grade level to provide equal access and opportunity for the future to high level mathematics coursework. The goal for this focus area is ensure that students have access to content aligned to the core curriculum with included scaffolds to support any learning gaps.

The strategies needed to address the alignment of curriculum include analysis of the intensive mathematics curriculum as well as the core mathematics curriculum. Then, two action steps need to take place to focus on proper and intentional alignment. First, the creation of an alignment crosswalk to determine where the core and the intensive or remedial skills meet so they can be scaffolded and taught at the standard level.

Next, due to the pedagogical shift, the development of professional development for teachers will be a priority. The professional development will need to be ongoing for consistency and to ensure understanding of the needed scaffolds for students who need additional support in the core mathematics class. From my experience as a mathematics educator for 27 years, implementing curriculum must be monitored for fidelity of implementation thus I would suggest monthly meetings with mathematics leaders to discuss the upcoming curriculum. The leaders would then be expected to go back to the classroom teachers to share areas to focus on in instruction and have dialog about student misconceptions and learning needs.

Focus Area: Leadership Support

When changes in curriculum come about, the principal or other school leaders play a valuable role in implementation. The goal of leadership support is to ensure that school and district leaders have an understanding of all the moving parts of the change in

mathematics support structures that are proposed. This would include; mathematical mindset research, student learning needs, scheduling and curriculum expectations.

The first strategy to is to identify what needs the leaders have to understand and support the implementation. Understanding their current knowledge base will help guide the work and provide focus for the plan for implementation. To this end, the creation of a survey to gain baseline data on what the leaders already know about the current program and mathematics instructional practices as well as their thinking around potential changes. This data will provide the district mathematics leaders that will eventually implement the professional develop an understanding of where to focus the training and what the leaders need specifically to support the change.

Next, a strategy to implement a plan for long term professional development to continue the learning for school leaders will be developed. Often leaders who have large system wide roles don't always know what parts of the change they need to know and when. To provide just in time training on the topics in a roll out model will give them smaller short-term learnings to then follow up on at the school level. The trainings will include mindset research, how students learn math, needs for flexible scheduling and curriculum alignment expectation. This professional development plan could be implemented through monthly meetings or through an option of online modules that could be done with the other leaders at the school site. Providing the online module option for site-based learning would also allow the teachers to learn side by side with the leadership.

The next strategy that is vital to change in the mathematics learning process is related to communication with stakeholders. The need to develop a community and

stakeholder common message to address the shifts related to the intensive math class scheduling and curriculum is vital to parent and community support. The action step needed is to create a district developed common message around the focus on high level curriculum, the impacts and the need for change. Establishing the why and having a vision is key in the work to produce change by giving direction that aligns and inspires actions for large groups for people (Kotter, p. 8, 2012). The messaging would allow the vision to be shared through a timeline of implementation and provide an open dialog for stakeholders.

Conclusion

The four major areas of focus, student supports, time and teacher allocation, curriculum alignment and leadership support, comprise the strategies and actions needed to begin to make change to support students who struggle in mathematics. The four areas are built on the program evaluation and research linked to the context, culture, conditions and competencies of the program. The vision developed through the "To-Be" model of analysis has allowed me to use the information to plan a roadmap for change in mathematics to support the most struggling learners. Having the direction for change and my intentional focus on ensuring all students have access to the opportunities that come from the knowledge of mathematics, there comes my personal roadmap to develop policy around this work. Focusing on policy around the learning of mathematics for all students, provides the avenue for student achievement at all levels of the K-12 system.

CHAPTER SEVEN: IMPLICATIONS AND POLICY RECOMMENDATIONS

Introduction

The results of the grade 6 intensive mathematics program evaluation provide insight into next steps for the Gilbert School District. Considering the data in this study for the school district shows that less than a quarter of the students who are a level 1 on the state assessment made enough gains to move to a level 2 in the district report from 2015. The concern from this data is that the district has chosen to maintain the intensive course despite a change in the state mandated requirement of the course. In 2015, the state House Bill 7069, Section 1003.4156 deleted the requirement for middle grades students who score a Level 1 or 2 on the Mathematics FSA to be enrolled in a remedial course or a content course where remediation strategies are included. The understanding and decision on providing additional support then became a local decision. Despite the change in requirement, Gilbert district's decision was to maintain the grade 6 intensive math course to be take in addition to the core content mathematics class.

The impacts of House Bill 7069 and the district's decision to maintain intensive math as a stand-alone course directly relates to the program evaluation as through the evaluation of the current grade 6 intensive program there are areas that need to be addressed in the course. With the district maintaining the current two classes of math and the data showing a need for reiteration of the scheduling and curriculum alignment, there is a cause for change. The organizational change plan focuses on the need for supporting students outside of the intensive mathematics class as well as potentially removing the intensive course for students and for a specific review for standards alignment to the core curriculum. Using the data from the program evaluation as it pertains to the structured intensive math class, there is a need for change to move to a plan that will potentially increase student opportunity as well as student achievement.

Policy Statement

The policy that I will recommend for the school district is related to the findings of this program evaluation, research on mathematics learning and over 27 years as a mathematics educator, is related to the requirement for Level 1 students to take an additional mathematics course alongside the core mathematics class. One reason for this policy change is related to the low numbers of students who make gains in the program. By continuing the program despite low success rates, it is not providing high level opportunity for students. Additionally, students need for time for elective courses at the middle school level to support the growth of the adolescent mind and body. Lastly, students who do require some additional support can be an embedded opportunity in the core class as well as through other school time that is focused on remediation needs where they can be scaffolded to the grade level content. With these three reasons in mind, the policy recommendation is to eliminate the required intensive mathematics course and provide a pathway for success in mathematics that addresses student needs.

Analysis of Needs

Based on the policy statement recommended, the next step is to analyze the impacts due to the potential policy implementation and change of practice. The first area for analysis will address the educational impacts on students and teachers. The impacts from the policy change related to possible economic, social, political and legal perspectives will provide a more global view of the effects that may occur. The moral and ethical impacts of the policy change focus on educator responsibility and steps that need to be addressed. When changes occur even when there is potentially a positive outcome, staff and community must be considered and analyzed to ensure support and

understanding through the process. Each of these areas of need are intertwined to provide a comprehensive analysis that allows for impact response steps to be considered based on the policy.

Educational Analysis

With the planning and implementation of the new policy, the schools and teachers will need to develop a transitional plan to prepare students who are in need of filling mathematics learning gaps as they transition to middle school from the elementary setting. Prior to this policy, schools would have simply scheduled students in intensive math without any data points other than their Level 1 status on the state assessment. The new policy will require schools and teachers to develop a more individualized approach to address student needs.

Student needs are a priority in the new policy as it focuses on where the student is in mathematics and the individualized steps for growth and attainment of grade level mathematics versus a student being assigned in an additional mathematics course based only on one test score. The students will be provided a scaffolded pathway for success in mathematics. Breaking down challenging work through step by step scaffolding works as all students then have a measure of success (Bimes-Michalak, p. 8, 1998). Additionally, there will be an opportunity for students to experience additional course work through gaining the elective class period that was previously taken away due to the previous requirement of the intensive math class.

Economic Analysis

Looking at the policy change from the lens of economics there are two key factors that can be impacted by this policy. The initial most immediate one centers on the local

impacts of students given pathways that provide more success in mathematics and increased quarter and yearly passing rates. The local impacts center on the schools through possible financial savings by not having to use additional funding for after school tutorial programs for credit recovery or summer programs for remediation for promotion. Often funding for these programs come at the expense of other aspects in the education system, by decreasing the number of students who need remediation, there could potentially be greater funding for enrichment opportunities.

Another key impact could potentially be for parents who spend money for students to have private tutoring when they have not been successful in mathematics at school. Parents often seek tutors to pay when the student is showing any type of misunderstanding. From my experience in working with teachers and families, private tutors for mathematics range from $30 to $85 per hour and tutoring companies cost $200 to $300 per month. With a policy that shows a pathway to success through the core mathematics class and in school supports, parents could potentially have more financial resources for other aspects of their living expenses

Social Analysis

The policy has social impacts as the changes in scheduling will allow for an increased opportunity for students to engage in electives at school now that they will no longer have the previously required intensive mathematics course. The opportunity for electives opens doors for students to experience job related skills, technical and computer skills and the arts. Adolescents want to learn about life beyond classroom work and are curious about the world around them and through experiences and the ability to produce real world products, they learn to serve a genuine need in society (Bimes-Michalak, p. 9,

1998). While these opportunities may have been a possibility for some students, providing the change in the scheduling to allow the elective time increases access for all students thus increasing the social opportunities for students.

Political Analysis

Looking at the policy from the political analysis, it has a myriad of impacts that directly and indirectly impact the change. State leaders work to address the educational issues that surround mathematics education in multiple ways. Political leaders cross over to mathematics education by looking at the early mathematics learning impacts and requirements in elementary school that transcend into middle and high school, such as state testing and levels of proficiency required at grade 3. The political impact related to the policy I have suggested came from the prior requirement for level 1 students to have the additional remedial math class. Now that the state requirement is gone, the decision for remediation became a local one. With the elimination of the requirement, the ability to implement my proposed policy was now a possibility.

Also, political influences have come with national and local calls for increased standards as presented by the move to Common Core and the push for more teachers to pursue mathematics education through the university system are other impacts on mathematics education policy. The political influence in mathematics education has even come to the core of the teaching in the classroom, directly to the teaching of the standards. More specifically, what standards will be taught.

In 2019, the Florida state governor signed an executive order to implement a review and issue a call for revision of the standards including a directive to bring a recommendation to him within a ten-month period. This review process had impacts to

state mathematics adoption for materials as the state suspended the adoption due to the potential standards change. By suspending the adoption and the governor's executive order, the teachers were impacted as they again will face another change in standards that had just happened five years prior. This creates angst in what will happen next at the classroom level. The policy I have proposed has the ability to be integrated into any changes in standards that may occur as a result of the governor's executive order as the suggested policy works to provide a pathway for success in mathematics as called for in the executive order.

Legal Analysis

One legal implication that could come from the policy I have proposed is related to the impacts on teacher evaluations and having low performing students in class with the same expectations of all students meeting the level of standard for mathematics achievement. Since teachers will be required to follow the policy requirement to scaffold learning in the core classroom, the evaluation for teachers may need to be reviewed to ensure it is about the teaching of students and not the level of the student in the classroom. Teacher evaluations ratings for teachers have become a reflection of who they teach and not necessarily how well they teach (Ravitch, p. 112, 2014). Ravitch (2014), poses the question, "why punish teachers for choosing to teach the students with the greatest needs or for being assigned to a class with such students?" Her question directly relates to the potential legal implications of my policy change.

The district will need to ensure the components for teaching and scaffolding on the teacher evaluation are rated fairly and appropriately to ensure teachers receive ratings based on the teaching of students. Any unfair evaluation that is not focused on teacher

improvement and accurate ratings could be an open door to legal implications for unfair processes. Unions work to ensure fair process for teachers and any policy that would impact teachers could move to a legal action.

Moral and Ethical Analysis

The policy I have proposed is designed to support all students and provide a pathway for equal access to high level mathematics curriculum which is a moral and ethical responsibility. In order to provide an equal education opportunity for all students, there cannot be a group of students who have access to a complete balanced curriculum while other students get a large dosage of basic skills (Ravitch, p. 237, 2014). This imbalance provides an unfair opportunity for students. The unfair opportunity may even damage the minds and hearts of children who experience the lack of equal opportunity by being shortchanged in their education (Ravitch, p. 237, 2014).

It is a moral and ethical responsibility of educators to focus on the student's educational potential. The Code of Ethics as provided by the state of Florida's Department of Education (2018) through its Principles of Professionals Conduct for Educators, require that there is a focus on student's potential. Specifically, to address the connection to my proposed policy, it states in the Principles of Conduct that, "The educator's primary professional concern will always be for the student and for the development of the student's potential." In my policy, I have removed the roadblock that was preventing students from access to their academic potential by eliminating the requirement of grade 6 intensive mathematics. It is an ethical responsibility to provide access to grade level content with expectations that all students can succeed as it is ultimately what is best for every student.

Implications for Staff and Community Relationships

Change in programs or curriculum can be difficult for staff at the school level and for district support personnel who will be supporting the change process. The proposed policy will impact teacher schedules and the need for professional development. By no longer having a teacher assigned to an intensive class, their new teaching assignment may impact other teacher's schedules in mathematics and electives. This can create challenges with staff relationships if teachers are not open to the changes that occur. Some teachers have traditionally only taught the upper level math classes now may be asked to teach a variety of levels of classes or students.

I believe the support system with the district personnel can help bridge the concerns that may come from teachers. This support from the district can come through professional development focused on the reason for the change to include rationale and next steps for implementation. By including all teachers in ongoing learning to address needs of all learners should also be included for a deeper understanding of the why. From my experience during a previous change related to using two textbooks for teaching the same course that had a big impact mathematics curriculum in the district, the teachers were initially not on board with the co-alignment of two books for the same class as they were very different. The support of the district resource teachers working with teachers was vital to the implementation during that change of direction. I expect the support with district personnel and strong teacher leaders through this policy change related to intensive math will develop into a successful transition.

The policy implications for the community will first come from the need to communicate the change. If the school level leaders are able to share the policy with their

school community to show the potential gains for students through the changes, then they will gain support of the parents. Once parents see students having access to the core curriculum and that the students will have an elective course that they would not have had before the policy change, I am hopeful they will understand and even share with the community at large. The hope is they will also advocate for the change with elementary school parents who will have students coming into the middle level years.

Other stakeholders that will be impacted by the change in policy will be publishing companies that would previously present materials for district purchase to specifically target the intensive mathematics class. While this change is focused on one district, should the results due to the policy change show gains in student mathematics achievement, other districts will be interested in the model. Thus, publishing companies may begin to consider development of a solid core curriculum with intentional scaffolding embedded at point of standard and not as an additional supplement that teachers have to try to navigate to support their learners.

Conclusion

The policy change is based on the findings of the study and will be a stepping stone to ensure equal access for students in mathematics for their long-term success. The moral and ethical responsibility to provide access for all students to high level course work is important in other core subjects in school, yet there must be great focus and intentionality in mathematics. The success of a student in mathematics is often used as a predictor for success in college. Through this policy change, the opportunity for success for all students and for a greater opportunity to be prepared for the gateway course of

algebra is increased. Thus, supporting students for increased access to higher level course work at the high school and college level.

CHAPTER EIGHT: CONCLUSION

Introduction

The theme for this program of study centered on the grade 6 intensive mathematics course that served as a second math class for the students. The analysis of the program focused on the impacts related to the students, curriculum and scheduling. The study allowed for an analysis of the teacher input, teacher leader perceptions, school and district data as well as research related to intensive math programs resulting in implications based on the program evaluation results that are powerful for improvement of mathematics education. With changes in mathematics standards and state and national test requirements for students, educators must discern what steps are needed for struggling students to ensure that regardless of the changes that occur due to state or national policy, students have equal access and opportunity to mathematics. Struggling math students deserve, as all students do, access to instructional supports that address learning at their grade level, high quality teachers and school and district systems that support growth and learning for the whole child.

Discussion

The purpose of the program evaluation was to determine the impacts of the grade 6 intensive mathematics program on student achievement and gather data on potential changes needed to support student learning. The focus the program study and evaluation results maintain the overarching umbrella of ensuring access for all students to mathematics that is supported by growth mindset and focusing on the individual learner. Being able to gain insight from teachers and teacher leaders on the intensive math program allowed me to see the theme that resulted in the needs for improved aligned

curriculum and ensuring an implementation plan for support that meets the needs of students.

Looking first at the need for aligned curriculum, the program evaluation provided me with the opportunity to dive deeper into the impacts of a solid core aligned support program. Both teacher and teacher leaders shared the need for the alignment of the intensive math curriculum with the core. The research from Bimes-Michalak (1998) shared that schools often make the curriculum easier for students when they lack skills. This practice limits access and creates a wider achievement gap for struggling learners. As it continues to deny students access to on grade level content with scaffolding opportunities to meet the level of the standard. In order to make systemic change for struggling math students and make steps to close the mathematics achievement gap, it is an educator's responsibility to ensure there is equal access for all students to grade level content.

When students do struggle to meet the grade level content, the next theme from the study to mention is the need to provide an implementation plan for support that allows access to individualized support on the areas of mathematics that students truly need. To systematically place a student in an additional year long math course, does not address the individual needs of the math learner. The process of assigning all students to an intensive math class based on a state test score is a blanket response to providing support. In order to make real change in student learning, schools must focus on individual needs and ensure steps are in place to address the mindset to learn mathematics.

In addition to the needs for curriculum alignment and flexible scheduling options, through my organizational plans, I recommended that highly qualified teachers are scheduled to work with the students who need targeted remediation. This supports the structural need to shift the culture in schools that often puts the best teachers with the highest achieving students. Instead, even in tutorial times, the best teachers should have time to support the neediest math learners. Additionally, the mindset development of students is vital to the organizational change plan in order to develop the growth mindset of struggling math learners.

Through the lens of context, culture, conditions and competencies around program of study, a change plan was developed based on the program evaluation and research. The need for change emerged in response to the focus on the adolescent math learner. It became clear that the content of the intensive math course needed alignment to the core math class. Additionally, the implementation of the program needed structural changes and the need to address learning for the whole child is key for in the middle grades. These together with a critical need to ensure access and equity for all students, resulted in the specific policy to suggest the elimination of a required full year additional mathematics course for all students who score a level 1 in mathematics on the state test.

This policy opens the door for students to have access to additional learning opportunities in their schedule and allow for a class in the arts, music, STEM, foreign language or physical education. It allows them to walk into a class that supports the adolescent learner's need to explore their world and grow. Through a targeted flexible scheduling intervention there is still the opportunity for an individualized plan to support the students as a math learner in any areas where they have deficits. The individualized

learning plan accomplished through flexible scheduling provides opportunity for schools to develop the student's mathematical mindset and allow students to develop self-confidence beyond the stigma of being a struggling math student who takes intensive math. The opening of the door for students puts the child as a learner first before systems.

Leadership Lessons

The initial leadership lesson learned centered on recognizing the value of doing research and the impacts it can have on change both on a small scale and potentially in a more global sense. This experience also allowed me to reflect on my leadership skills and potential impacts of my own leadership influence. Specifically, the leadership lessons learned from the process of the study stem from the opportunities to listen to the math leaders through interviews, learn from teachers sharing their insight through surveys and going deeper into mathematics and change research.

The math leader group that I was able to interview for the study allowed me to experience focused time to really listen to their views and concerns around the intensive math program. The targeted time to share what they really felt worked well and what wasn't working well allowed let me focus on their thoughts as leaders and support for the program's implementation. So often as a supervisor as much as work to really listen, I am focused on the day to day needs. I often use what is shared when talking to leaders to problem solve in the immediate need versus being able to gather multiple leaders input and use the information to develop plans and strategies. This process allowed me to see the value in looking systemically at change processes and the value of stakeholder input.

The survey results from the teachers, the end user, of the program allowed me to learn more about teacher needs. While some survey responses didn't provide the depth

that others did, it was still clear they find value in sharing their experiences. From this initial step of gaining insight through survey responses, as a leader I have grown to realize that the end user in any organization including education truly has the best insight into changes needed. While often in my career as a district leader, I have asked for feedback on procedures and programs from teachers, the results were typically reactive to the initial feedback. With the intentionality of using the survey results to develop a more detailed systemic change process plan, this provided a valuable leadership lesson that shared roadmap for me to follow in the future when facing systemic changes. It also is clear that as a leader, a change plan that values the end user's insight is important to true change and in turn develops the teacher support needed for the change movement.

The opportunity to dive deep into mathematics and change research provided great growth in learning for me as a leader. Learning from the research about mathematics learning and change impacts created an opportunity for me in analyzing other leader's work at a level that I had not previously experienced as a leader. As a leader in the district, I would read and actually read quite often, books on current trends in mathematics education. Yet, the readings were often in isolation. The leadership lesson from this experience with research is to be able to take multiple authors, articles, books and lectures to then compile the works for a richer understanding around the topic of study. Thus, building a new level of thinking that allows for a compiled mountain of knowledge to expand beyond a single view or idea.

Conclusion

Through the process of this program evaluation, in addition to the results of the study that provided recommendations for schools, leaders and a specific policy around

the intensive mathematics program, I was able to grow as a leader and advocate for students. While there were times in my career I thought that providing intensive math as an additional course that focused on low level skills to fill gaps would bring a student up to speed, it is clear to me from this work that it is only a band aid to cover the bigger need. I have also been an advocate for students and learned over my 27-year mathematics career that students need and deserve more than a band aid education.

The evaluation provides insight into the need to support the changes for grade 6 intensive math. Including steps to make change from the structure of the day to support student to the clear need to align support content to student's grade level core content. Additionally, a policy recommendation to provide systemic change around the requirement of a second math class is not only shared but includes the creation of a plan to focus on the individual needs of students. Yet, even more than those results, the evaluation provides insight into the real issue that is to provide every student regardless of background, where they live or family income, the opportunity and access to learn and experience mathematics learning. The realization is that all educators have the moral responsibility to provide an equitable and accessible mathematics program for all students.

The intentionality to focus on mathematics before a student is labeled a struggling math learner is vital to future generations. Knowing that the early learning of mathematics impacts students throughout their education, leaders must advocate for math time and math play in K-2. Until we take a stand to end the generational impacts that come from decreased or less focused math learning time that eventually develop into students facing struggles in mathematics, education systems will continue to only attempt

to fill the gaps in learning. The ongoing need for struggling learners to face a curriculum filled with basic skills continues to create the achievement gap. Ravitch (2014) shares, "We cannot provide equal educational opportunity if some children get access to a full and balanced curriculum while others get a heavy dose of basic skills." An educational system commitment that all students have access to meet grade level standards, experience mathematics through a growth mindset and see the beauty in mathematics must occur to change the landscape of each student's future.

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Appendix A

Grade 6 Teacher Intensive Math Survey

This survey is being conducted to learn more about program implementation and teacher perceptions. All responses will remain anonymous.

	Respondent Information	0-5 years	Between 5 and 10 years	Between 10 and 15 years	Between 15 and 20 years	More than 20 years
1	How long have you been teaching **mathematics**?					
2	How long have you been teaching **Grade 6 Intensive Math**?					
3	How long have you been using the **Math 180 program**?					
	Program Implementation	**Yes**	**No**			
4	Did you attend training to implement the Math 180 program?					
5	Did you have a Math 180 Coach assigned to you to support implementation?					
6	Did you use the “two-prong” model of implementation with half of instruction on the computer and the other half in small group with you, as the teacher, leading?					
	Program Implementation Follow-Up	**1 Day**	**2 Days**	**3 Days**	**4 Days**	**5 Days**
7	If you answered YES to the question above about the “two-prong” model, please indicate how many days each week you followed the suggested model?					

8	If you answered NO, to the question above about the “two-prong” model, please use the space to the right to indicate what model you used and what prompted you to change your implementation.					
	Teacher Perceptions	Strongly Agree	Agree	Neutral	Disagree	Strongly Disagree
9	The initial training to learn how to use the program provided information to be able use the program immediately following the training.					
10	The printed teacher materials for lesson planning are clear and easy to understand.					
11	The teacher edition for the print version of the text provides information that is easy to use during instruction.					
12	The computer portion of the program for the teacher to access student data is easy to use.					
13	The computer portion of the program allows the teacher to understand what skills students are struggling with or proficient at during the school year.					
14	The students are able to **follow the directions** on the computer based portion independently.					
15	The students are able to **work through** the computer based material independently.					
16	Students who spend more time on the computer portion have an increased confidence in the skills					

	that they are weaker in mathematics.					
17	Students who use the Math 180 program show gains in math knowledge greater than students who have not used the program.					
	Please respond to the following free—response questions. Your ideas are very much appreciated.					
18	What is working well in the Math 180 program?					
19	What is not working well in the Math 180 program?					
20	What are the greatest challenges with the Math 180 program?					
21	What ideas do you have to improve the Math 180 program?					
22	When comparing students who are in the Math 180 program to those who do not take intensive math, are there any changes in confidence in mathematics? If so, describe what you observe.					
23	In the Intensive Math program, the students use the computer portion of the program, as well as the small group teaching component; Does there appear to be any relationship between the amount of time on the computer based differentiated portion and student achievement in Intensive Math?					

Appendix B

Grade 6 Intensive Math Interview Questions for
Mathematics Leader at the School Level
(Math Coach, Subject Area Leader, or Assistant Principal for Curriculum)

Thank you for taking time to share your experience with supporting the grade 6 intensive math program. During your interview I will be recording your responses to ensure I capture your thoughts as you shared them.

General Information from the Mathematics Leader

Question	**Research Notes**
1) How long have you been in a role to lead mathematics?	
2) Have you ever taught or co-taught the grade 6 intensive mathematics course?	

Mathematics Leader Perception and Support Questions

Question	**Research Notes**
3) In your role as a math leader how often do you visit the grade 6 intensive math class?	
4) When you visit the intensive grade 6 class what types of supports do you offer the teacher and/or students?	
5) When you visit the intensive grade 6 classroom, what would you say is working well with the program for the **teacher**?	
6) When you visit the intensive grade 6 classroom, what would you say is **not** working well with the program for the **teachers**?	
7) When you visit the intensive grade 6 classroom, what would you say is working well with the program for the **students**?	
8) When you visit the intensive grade 6 classroom, what would you say is **not** working well with the program for the **students**?	
9) For any of the students who you are able to see in both intensive grade 6 and their traditional math classes, what	

connections do you see the student making in the traditional class?	
10) What recommendations would you make to improve the grade 6 intensive mathematics **curriculum**?	
11) What recommendations would you make to **the implementation** of the grade 6 intensive program?	
12) Considering only the computer based part of the program, when you observe students in the classroom, are they using the computer based portion about half the class period?	
13) Considering only the computer based part of the program, when you observe students using the computer based portion of the program, are they able to move through the content easily with minimal teacher support?	
14) What do you feel are the greatest challenges with the Intensive Mathematics program?	
15) What are ways to improve the Intensive Math program?	
16) When comparing students who have intensive math to those who do not take it along-side their core math class, do teachers share any evidence of increased confidence in mathematics?	
17) In the Intensive Math program, the students use the computer portion of the program, as well as the small group teaching component; Does there appear to be any relationship between the amount of time on the computer based differentiated portion and student achievement in Intensive Math?	

Appendix C

Email Letter for Participation in the Teacher Survey

Dear Participant,

I am currently a doctoral student at National –Louis University working on a research study regarding the Grade 6 Intensive Mathematics program in our middle schools and I would like to invite you to participate in the study through completion of a survey.

The survey is designed to collect information on the implementation and usage of the Grade 6 Intensive Mathematics program.

For this study, participation is completely voluntary, and you may decline altogether or leave any questions blank if you choose not to answer. There are no known risks to participation beyond those encountered in everyday life. The responses you provide will remain confidential and anonymous. The reported results will be a collective total from all respondents. Only I will have access to all of the survey data, which I will keep in a locked cabinet at my home or on a password protected hard drive for up to 5 years after the completion of this study, at which time I will shred all survey data.

If you agree to participate in the study, please answer the questions on the online survey which should take approximately 10 minutes to complete and should not impact classroom instructional time. I appreciate your time to complete the survey and help in this very valuable study.

Sincerely,

Tammy Dery

Appendix D

Informed Consent: Adult Participant Survey

My name is Tammy Dery, and I am a doctoral student at National Louis University, Tampa, Florida. I am asking for your consent to voluntarily participate in my dissertation project. The study is entitled: "Intensive Mathematics Program Impacts on Student Achievement in Middle School Mathematics." The purpose of the study is to analyze the Intensive Math program's quality and design, as well as, address the impact of the program to determine whether the intensive mathematics class impacts student mathematics achievement.

My project will address the process of implementation of the grade 6 intensive mathematics program. I will use the data I collect to understand the process and changes that may possibly need to be made regarding intensive math in the district. I would like to survey you in regards to your thoughts on the implementation of the grade 6 intensive math program at your school.

You may participate in this study by clicking on the link below on this consent form indicating that you understand the purpose of the study and agree to participate in and online survey. It should take approximately 10 minutes for you to complete the survey. All information collected in the survey reflects your experience and opinion regarding the grade 6 intensive mathematics program.

Your participation is voluntary, and you may discontinue your participation at any time with absolutely no negative effects. I will keep the identity of you, the school, the district, and all participants confidential, as it will not be attached to the data and I will use pseudonyms for all participants in the report. Only I will have access to all of the survey data, which I will keep in a locked cabinet at my home or on a password protected hard drive for up to 5 years after the completion of this study, at which time I will shred all survey data. Participation in this study does not involve any physical or emotional risk beyond that of everyday life. While you are likely to not have any direct benefit from being in this research study, taking part in this study may contribute to our better understanding of the implementation process of the grade 6 intensive mathematics program at the school or district and what changes, if any, need to be made.

While the results of this study may be published or otherwise reported to scientific bodies, your identity will in no way be revealed. You may request a copy of this completed study by contacting me at trush1@my.nl.edu.

In the event you have questions or require additional information, you may contact me at: trush1@my.nl.edu If you have any concerns of questions before or during participation that you feel I have not addressed, you may contact my dissertation chair, Dr. Carol Burg, cburg@nl.edu ; or EDL Program Chair, Dr. Stuart Carrier, scarrier@nl.edu; 847-947-5017; or the NLU's Institutional Research Review Board: Dr. Shaunti Knauth, NLU IRRB Chair, shaunti.knauth@nl.edu, 312.261.3526, National Louis University IRRB Board, 122 South Michigan Avenue, Chicago, IL 60603.

Thank you for your participation.
Please click on this link to signify your acceptance of this informed consent and to take the survey: www. Xxx.xxx

_____	Tammy Dery_____
Participant Name (Please Print)	Researcher Name (Please Print)
_____ _____	_____ _____
Participant Signature Date	Researcher Signature Date

Appendix E

Informed Consent: Adult Participant Interview

My name is Tammy Dery, and I am a doctoral student at National Louis University, Tampa, Florida. I am asking for your consent to voluntarily participate in my dissertation project. The study is entitled: "Intensive Mathematics Program Impacts on Student Achievement in Middle School Mathematics." The purpose of the study is to analyze the Intensive Math program's quality and design, as well as, address the impact of the program to determine whether the intensive mathematics class impacts student mathematics achievement.

My project will address the process of implementation of the grade 6 intensive mathematics program. I will use the data I collect to understand the process and changes that may possibly need to be made regarding intensive math in the district. I would like to survey you in regards to your thoughts on the implementation of the grade 6 intensive math program at your school.

You may participate in this study by signing this consent form indicating that you understand the purpose of the interviews and agree to participate in one 30-minute interview, with possibly up to 4 email exchanges in order clarify any questions I may have regarding your interview data. I will audio tape and transcribe the interviews. All information collected in the interviews reflects your experience and opinion regarding the grade 6 intensive math program.

Your participation is voluntary, and you may discontinue your participation at any time with absolutely no negative effects. I will keep the identity of the school and all participants confidential, as it will not be attached to the data and I will use pseudonyms for all participants. Only I will have access to all of the interview tapes and transcripts, and field notes, which I will keep in a locked cabinet at my home or on a password protected hard drive for up to 5 years after the completion of this study, at which time I will shred all interview transcripts, tapes, and notes. Participation in this study does not involve any physical or emotional risk beyond that of everyday life. While you are likely to not have any direct benefit from being in this research study, taking part in this study may contribute to our better understanding of the implementation process of the grade 6 intensive mathematics program at your school or district and what changes, if any, need to be made.

While the results of this study may be published or otherwise reported to scientific bodies, your identity will in no way be revealed. You may request a copy of this completed study by contacting me at trush1@my.nl.edu.

In the event you have questions or require additional information, you may contact me at email address: trush1@my.nl.edu If you have any concerns or questions before or during participation that you feel I have not addressed, you may contact my dissertation chair, Dr. Carol. Burg, cburg@nl.edu ; or EDL Program Chair, Dr. Stuart Carrier, scarrier@nl.edu; 847-947-5017; or the National-Louis Institutional Research Review Board: Dr. Shaunti Knauth, NLU IRRB Chair, shaunti.knauth@nl.edu, 312.261.3526, National Louis University IRRB Board, 122 South Michigan Avenue, Chicago, IL 60603.

Thank you for your participation.

_____
Name (Please Print)

_____ _____
Signature Date

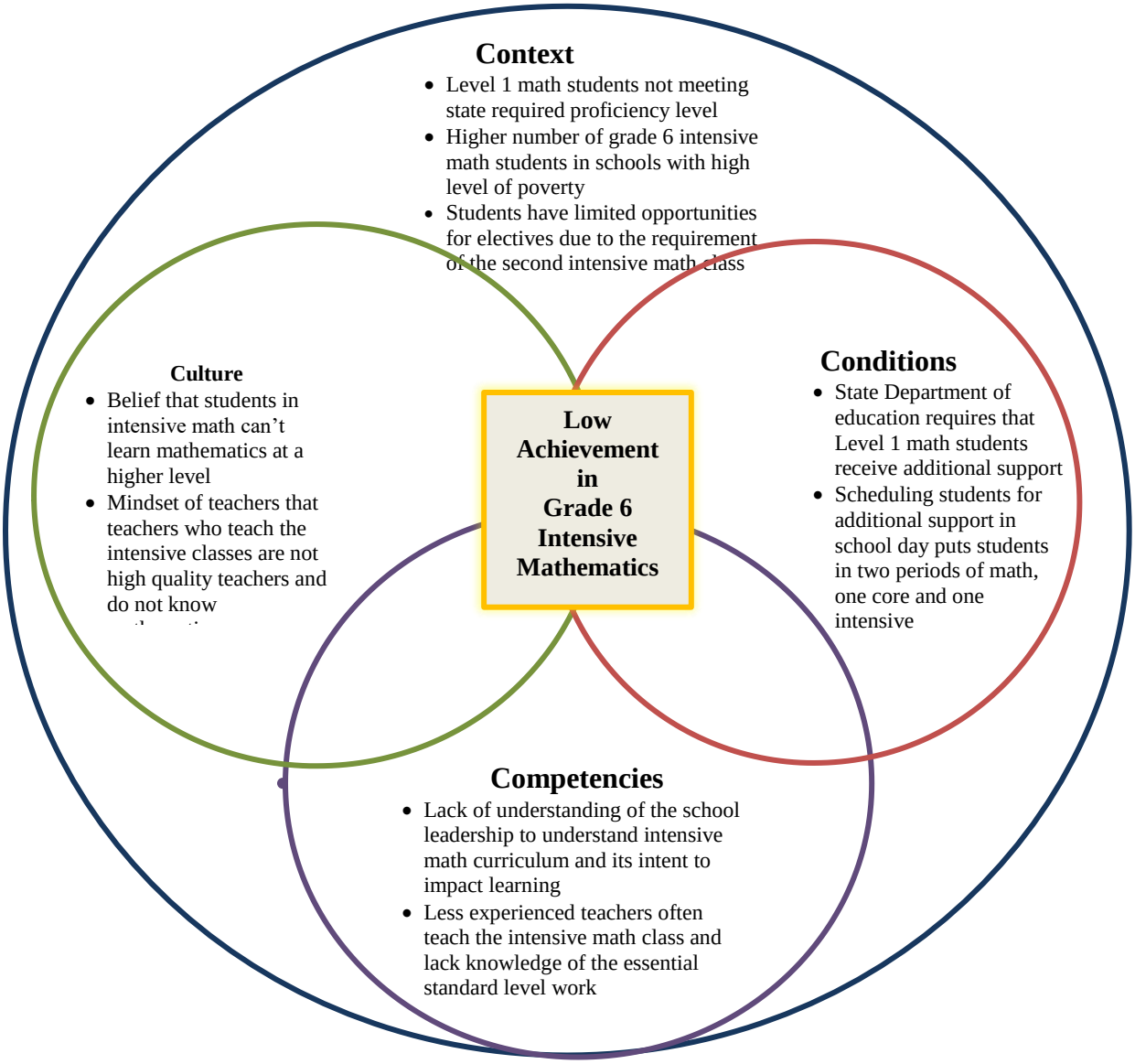
Researcher Name (Please Print)

_____ _____
Researcher Signature Date

Tammy Dery

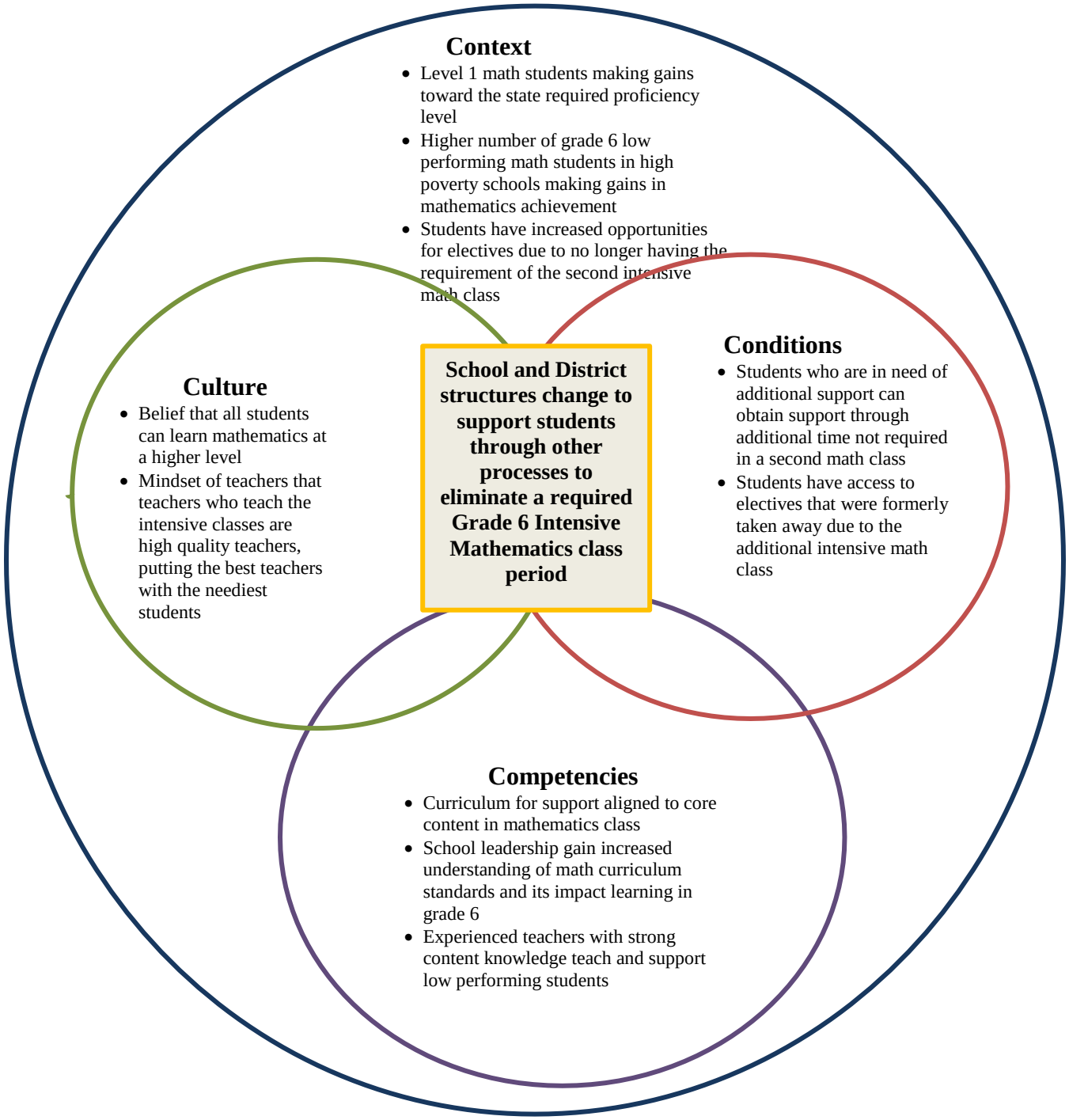
Appendix F

Baseline AS IS 4 C's Analysis for an Evaluation of Intensive Mathematics Program Impacts on Student Achievement in Middle School Mathematics



Appendix G

Vision TO BE 4 C's Analysis for an Evaluation of Intensive Mathematics Program Impacts on Student Achievement



Appendix H

Strategies and Action Chart: Focus Areas Associated with the 4C's

Focus Area: Student Supports		
Goal: Ensure student needs are met through understanding of mathematical mindset and individualized learning plans	Strategies: Evaluate teacher understanding of mathematical mindset Conduct a review of resources to use in mathematics learning and mindset training Identify schools that use individualized learning plans	Actions: Develop and use a survey to collect data on where teaches are in understanding mathematical mindset Develop and conduct a professional development opportunity for teachers Create a system wide plan to allow the use of individualized learning plans in flexible scheduled time for mathematics support
Focus Area: Time & Teacher Allocations		
Goal: Ensure students are scheduled in a support time that meets their needs with high quality teachers	Strategies: Identify current scheduling of students for remediation in schools Analyze school schedules to determine time in the school day for remediation support time Have schools identify high performing teachers in mathematics that could be scheduled to teach or support struggling math learners	Actions: Create a data base of current school options for remediation including intensive math classes and other options Use school schedules to develop flexible scheduling options for each school Investigate options to provide additional incentives for high performing teachers to support struggling students during flexible scheduling time for remediation

Focus Area: Curriculum Alignment		
Goal: Ensure that students have access to content aligned to the core curriculum with scaffolds for support	Strategies: Analyze current curriculum used with struggling learners Analyze current curriculum in core mathematics classrooms	Actions: Create an alignment for the curriculum that crosswalks core curriculum to scaffolded skills at the standard level Develop professional development for teachers to support scaffolding curriculum within the core classroom
Focus Area: Leadership Support		
Goal: Ensure district and school leadership have an understanding of mathematical mindset, student learning needs, scheduling and curriculum expectations	Strategies: Identify school leaders needs to support mathematics Implement a plan for long term professional development Develop a community and stakeholder message to address mathematics instructional shifts	Actions: Create and conduct a survey to determine school leader understanding and needs to support mathematics Develop a professional development plan to include mindset, learning needs, scheduling and curriculum expectations Create a mathematics message to be shared with the community to focus on high level curriculum and system changes with a timeline for sharing the message