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Implementation of a Tier II Math Intervention Program

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Capstone Project: A School Improvement Plan

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Abstract

The impact of COVID-19 has been detrimental to student success. School closings reduced learning for all students but especially for primary students who missed critical foundational skills. Tier II math interventions within the MTSS framework show evidence of growth for students of all ages and needs. This research-based approach is a logical response to combatting the damage caused by the pandemic. Several successful research studies on mathematics intervention will provide promise of replication in other schools. This school improvement plan will outline actions toward implementing Tier II math interventions in a rural Iowa elementary school.

Keywords: intervention, Tier II, mathematics, COVID-19, MTSS

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Learning mathematics is a critical component of a child's education world-wide. It is extremely necessary for students to acquire skills such as number sense and reasoning for daily functioning and career opportunities. Despite the importance, learning, practicing, and applying math concepts does not come as simply for every student. Of Iowa's, 301,776 students enrolled in public schools, only 65.21% of students are proficient in math grade level benchmarks (Iowa Department of Education, 2021). In the most recent affairs, the COVID-19 pandemic and school closures have contributed to significant learning loss. In a study conducted by Kufeld et al. (2020), students ended the shorted 2019-2020 school year with only 37-50% of their typical math growth in a normal year. On the higher end, students on average only received half of the mathematics instruction that they were supposed to which is an alarming measure for math performance, especially students who missed critical foundational skills in primary grades. The problem is, now, more than ever, elementary students need support in mathematics to close achievement gaps. Quality interventions are an integral part of seamlessly mending historical and current lack of mathematics performance in Iowa school districts. Cardinal Elementary School in Eldon, Iowa is a specific context that has seen the impact of COVID-19 on math performance among other factors such as socio-economic status, parental support, math anxiety, educational opportunities etc.

The purpose of this school improvement plan is to implement a Tier II Math Intervention program for kindergarten through fourth grade students at Cardinal Elementary School. Through this program, students would meet with an interventionist for 20-30 minutes a day in a small group to work on specific math skills. It is my goal to show through research that a Tier II intervention program would be beneficial to students who need more support in mathematics than their general education classroom can provide but may not need as much of an intensive approach such as in a special education setting. Additionally, it is my hope to not only highlight the benefits but outline the logistical aspects for implementation and resources needed for ease in executing.

All research identified in the literature review was obtained from DeWitt Library at Northwestern College in Orange City, Iowa. Twenty sources were picked on the criterion of being scholarly, peer

reviewed articles published within the past 10 years for currency and relevance to educational settings today. Tier II Math intervention studies in a variety of formats and grade levels were a priority in selection of literature. The research was used to evaluate and compare intervention programs with my current context and gather results for effectiveness and tools for implementation.

Findings from the research will show that Tier II interventions are critical in the growth of mathematics performance and confidence of at-risk students due to the targeted approach of rebuilding and reviewing foundational skills that students need in order to be successful in grade level concepts. The research will also show that Tier II interventions can be implemented and replicated in any school despite the learning environment or needs of the students because there are multiple formats and modes for providing this type of small group instruction. Finally, numerous studies will prove how high achievement of students enrolled in Tier II interventions is most probable when interventions are consistent and continually assessed by teachers and administrators after implementation.

The literature review is organized thematically with four key areas of focus. The first section will highlight intervention approaches from multiple grade levels including primary, intermediate, middle, and high school to show benefits and sustainability. The following section will house information on different intervention formats, specifically concrete interventions versus technology approaches. The next section will gather insight from parents, teachers, and students on Tier II interventions and their impact. The final section will show the success of Tier II interventions with students who have specific needs that limit their math abilities.

Review of the Literature

The following review of literature is categorized under four major subheadings: Tier II Intervention Across Grade Levels, Intervention Format and Approaches, Parent, Teacher and Student Perspectives, and Impact of Interventions on Students with High Needs. Under each subheading, current intervention research studies will be presented. These studies will provide background knowledge about Tier II interventions and show the impact they provide. To begin,

research will introduce that all students in need benefit from targeted instructional support and interventions are not limited to a particular grade level or group of students.

Tier II Intervention Across Grade Levels

Several studies have been completed in multiple grade levels that prove the effectiveness and impact of Tier II interventions on at risk students. Due to COVID-19, the most threatened by learning loss are students in primary grades. In a study by Wyse et al. (2020), Standardized Test for the Assessment of Reading (STAR) results and math norm assessments from 16.7 million students were gathered to investigate what impact COVID-19 school closures had on student learning. Test scores showed that all students performed lower than an average year but more specifically, the students in the lowest grade levels decreased the most due to missing critical foundational skills. To accommodate for these most vulnerable students, schools must provide Tier II interventions to review and reteach essential skills for primary students to flourish in future grades.

A successfully implemented intervention for young learners is outlined in study by Clarke et al. (2016). Twenty-nine kindergarten classrooms were assigned to a treatment or control group to investigate growth on the Test of Early Mathematics Ability (TEMA). Students in the treatment group received instruction from a curriculum called ROOTS three times a week in addition to their whole group instruction. Topics covered included counting, number operations, base ten, and place value. The results revealed that students who received Tier II intervention made more growth on their TEMA scores than those in the control group that only received Tier I instruction. The growth of the students participating in the treatment group indicates how necessary Tier II interventions are for primary grades and is a well-researched response to COVID-19 school closures.

Similarly, students in intermediate grades are experiencing benefits to being involved in Tier II intervention groups. Nine persistently at-risk second grade students participated in a study by Dennis (2015). This study focused on the impact of Tier II interventions of students' inadequate responses to their core mathematics programs and their sustainability of concepts learned during the intervention. After instruction of twenty minutes a day, four days a week, the majority of students grew in their math performance and sustained their abilities. Dennis (2015) reveals through this study that Tier II interventions not only provide growth but the impact they make an overtime in the retention of skills.

Another study conducted by Pool et al. (2013) investigated the impact of Tier II interventions on ten third grade students after a screener was completed and showed they needed extra support. The students were split into small groups and received instruction from the VMath curriculum for thirty minutes, four days a week. Data collected through workbooks and progress monitoring was reviewed by a data team to determine when students have mastered enough skills to be exited from the program. The team determined that all students were making growth using VMath and several were able to exit the program depending on how fast they grew. More students were able to fill their spots as they exited. This study is another example of how Tier II interventions influence growth, but additionally how fluid tiered intervention can be as students make progress.

As students exit elementary school and enter middle and high school, Tier II interventions continue to be instrumental for students but not solely for their academics. A mixed-method study by Diagiacomo and Chen (2016) of thirty 7th and 8th grade students investigated how self-regulation during Tier II interventions impact math achievement. In the 45 minute intervention sessions, students were asked to assess their confidence before completing

math problems and after they completed them. Researchers taught them self-regulation strategies to apply while completing math problems and a self-reflection was completed at the end. Findings revealed that self-regulation strategies paired with intervention helped students perform better in mathematics concepts and they had more confidence in themselves to complete the problems. As image and self-perception becomes important to young teenagers, Diagiacomo and Chen (2016) display how Tier II interventions support them in this nonacademic area as well.

Comparable findings were uncovered in a study by Brisson et al. (2017). The goal was to determine the short term and sustained effects of intervention on a student's math achievement, competence beliefs, and effort. Over nineteen hundred 9th graders were split into treatment and control groups. The treatment group received intervention sessions where the focus was on future math opportunities, attitudes about math, and quotes from other students of their confidence in math. Students had to compare these scenarios to their own life and their own math abilities. By the end of the intervention, students reported or displayed growth or self-efficacy in the areas of homework, effort, achievement, and overall mathematics competency. This study again not only sheds light on the academic benefits of intervention but how it is meeting student's mental and emotional needs as well.

Each of these studies show that no matter the age or grade level of the child, that Tier II interventions are critical and should be accessible to every student at any point in their educational career. This research proves that Tier II interventions ensure sustainability of grade level concepts overtime. In addition, academic success and emotional intelligence begins to flourish. Intervention ensures primary students a strong foundation, intermediate students retention of skills, and middle and high school students the confidence in mathematics that they need to succeed.

Intervention Format and Approaches

Knowing that Tier II interventions are important in any grade level, the next critical component is determining the best format for addressing the needs of students. There are multiple researched based approaches to begin a Tier II program. The most traditional approaches often implemented into schools are concrete strategies delivered by interventionists. One example of a concrete approach is derived from a study executed by Burns et al. (2015). The researchers addressed how a conceptual understanding and procedural fluency intervention effect students in early elementary. Two first grade students and one third grade students struggling with addition and multiplication were identified as being below the twenty fifth percentile on the Measurement of Academic Progress (MAP) assessment. For twenty minutes a day, four days a week, students participated in an intervention that was implemented through math activities in a game-like format. After four weeks of intervention, all three students increased in addition and multiplication fact fluency. Burns et al. (2015) exhibit through their study that conceptual understanding and procedural fluency is a successful approach in addressing the deficiencies in addition and multiplication fluency.

Another concrete intervention was designed by Kingsdorf and Krawec (2016) that investigated the use of exemplars and a self-monitoring checklist to complete word problems accurately with ten 3rd graders. During intervention teachers used modeling and guided practice with word problems. Students also were able to use a self-monitoring checklist created by teachers that listed problem solving steps to assist students. After assessments were given guided by district curriculum, the majority of students made growth and seventy percent of student no longer needed the checklist after intervention. Kingsdorf and Krawec (2016), show that teacher modeling and

student checklists are also effective concrete strategies in addition to conceptual and procedural frameworks in supporting student's math needs.

In contrast, some studies on technology interventions have been conducted but do warrant the same effectiveness as concrete interventions. Valle-Lisboa et al. (2016) studied four hundred and fifty-four 1st grade students that participated in a tablet-based intervention in Uruguay. All activities and assessments were delivered through a tablet in a game format for five weeks. Each of the 1st graders made growth although, students with a higher socioeconomic status made more growth than those with a lower socioeconomic status. Valle-Lisboa et al. (2016) sheds light on the effectiveness of tablet-based interventions but also more specifically, a group of students that may benefit more from this format. With this information, teachers and school professionals can use it as guidance in implementation depending on their demographics.

Another tablet-based study was completed by Lee and Choi (2020). Researchers wanted to determine the effectiveness of a tablet-based intervention on early numeracy skills. Thirty primary students in the treatment group used an app daily for one period and had the option of playing nine different numeracy skill games. After forty-six days of the intervention, students in the treatment and control group took a post assessment that was compared to a pretest. Larger gains were made by students who used the app, specifically determining which numbers are more or less, and addition and subtraction. Lee and Choi (2020) reinforce the effectiveness of tablet-based interventions with their research, especially with primary students and foundational skills.

In addition to concrete and technology formats for administering intervention, at home interventions have also proven to be effective. Sonnenschein et al. (2016) used the board games Chutes and Ladders and Candy Land in the homes of eighty-four preschool students and their parents. The purpose was to gauge the use of these games in improving counting and number

operations. Post test data was compared to pretest data to determine that despite not all interventions were consistent in the homes of students, there was an increase in counting and numerical identification. Although nontraditional, Sonnenshein et al. (2016) exemplifies that interventions can be extended to the homes of students through simple board games that many families may already have access to.

Despite the various effective approaches and formats to intervention, whether that be concrete, virtual, or at-home, determining the right one for a school's particular environment or needs is imperative. One way to determine effective interventions is through Brief Experimental Analysis (BEA). McKevett and Codding (2021) studied the BEA method in determining math interventions. Using fifteen different studies involving sixty-three students across the United States that used the BEA method to identify interventions, two-thirds of the studies showed that the BEA method was a quality method for schools to determine what works for their students and what does not. Using a brief experimental approach, Mckevett and Codding (2021) prove that it helps schools narrow down the right procedure for their students.

Large amounts of research have displayed that no matter the format or approach to intervention, that it has shown great benefits for students. With several options to choose from, schools can determine the format or approach that works best for their environment. Whether traditional, virtual, or an at home intervention, students are being supported on their level due to the versatility Tier II interventions provide. Additionally, schools can implement interventions quickly with the well-researched BEA method to maximize the impact.

Teacher, Student, and Parent Perspectives

Not only do the quantitative studies presented show the advantage of implementing Tier II interventions, teachers, parents, and student perspectives mirror the effectiveness of interventions

drawn from the data points. In a study by Hardy and Hemmeter (2019), social validity was gathered from the teacher about an intervention that took place with two preschool students on the effects of modeling and prompting in learning early math skills. A survey administered to the teacher indicated that she believed early math skills are important and essential. In addition, she noted that the intervention is something she could implement within her own classroom or in small groups due to the age-appropriate procedure and skills targeted. Hardy and Hemmeter (2019) not only highlight her beliefs about why math interventions are important but mention the ease that many Tier II interventions provide for teachers to implement into their own daily routines.

Other teachers celebrate Tier II interventions, but for differing reasons. A study of two-hundred and fifty-three 1st grade students by Strand et al. (2017), gathered the impact of a math intervention curriculum called Fusion on the achievement of at-risk students. After implementation of Fusion for eight months, teachers noted their opinions about the intervention. Teachers liked the intervention format and described it as detailed and clear. They also disclosed how much student motivation grew throughout the lessons. Strand et al. (2017) exemplifies through this research that teachers like the structure that many intervention curriculums provide and students become enthusiastic about their learning in this type of setting.

Teachers, students, and parents also hold preferences on the format in which interventions are administered. Musti-rao and Plati (2015) studied the influence of two different math fluency interventions, one concrete and one via technology. Researchers found that both methods were useful but more gains were made by students who used an iPad for the intervention. Surveyed teachers, parents, and students preferred the iPad over the traditional method because of the ability to manipulate math facts directly, less writing, and a mobile way of learning. Musti-rao and Plati

(2015) again, emphasizes the student motivation through the mode of engaging with the intervention and provides a bridge between school and home learning for teachers and parents.

Teacher beliefs about intervention are also important in terms of deciding the fidelity and intensity of the intervention. Research by DeFouw et al. (2019) surveyed and coded similarities between sixty-six math intervention studies. Findings indicated that often teachers put their own inflections on curriculum, and it is important for teachers track the intensity and fidelity of what they are teaching. As a result, direct observations and continual assessment of a program are necessary to ensure fidelity and intensity. DeFouw et al. (2019) assist in drawing conclusions that teacher perspective on intervention matters in regard to the effort and time given to the curriculum and their students.

The probability of student success is much higher when the leaders of the intervention, students, and their parents fully support and are invested in the program. Tier II interventions are proven to be effective but can make more of an impact in the lives of students when teacher, parent, and student perspectives are taken into consideration. Schools can use these individuals for support in implementation because they are directly involved in the interventions. With their reliable opinions, schools can make informed decisions about the right interventions.

Impact of Interventions on Students with High Needs

Tier II interventions are designed for students who need more support than their general education curriculum can provide. Students need these interventions for a variety of reasons, but the majority of students have a specific need that limits them from having the same educational opportunities or experiences as their peers. One example of this are students who are English Language Learners (ELL). Luevano and Collins (2020) studied how culturally appropriate interventions effect English Language Learners. Four 2nd grade Latino students participated in

intervention twice a week where modeling, comprehension, and vocabulary was embedded. As a result, student scores increased weekly on probes and on their post assessment. Luevano and Collins (2020) show promise of the impact that culturally relevant interventions can make on ELL students in our schools.

Similar findings are evident in Tier II interventions involving students with Austim Spectrum Disorder (ASD). King et al. (2016) gathered and compared studies of interventions across the United States involving students with ASD. Twenty-eight students were involved, all having some form of autism. After visual analysis of each study, most students exhibited large gains due to the interventions provided. Despite the large spectrum of autism, these students with varying needs are receptive to interventions and grow in their math performance.

Although unfair, many learning opportunities are defined by a student's socioeconomic status (SES) or by the amount of education their parents have had. This leads to a lack of foundational skills and a cause for intervention. In a study investigating the effects of a child's SES in learning math, Bachman et al. (2015), drew correlations between income and the education of a child's mother to determine their opportunities of learning math. Findings revealed that maternal education was a larger factor in a child's math abilities than their income. Consequently, interventions are necessary to provide learning opportunities for students that their parents may not have had.

In contrast, socioeconomic status may not directly relate to a child's math opportunities however, it does increase the risk of developing math anxiety. Tomasetto et al. (2021) studied the effects of math anxiety on learning early math concepts. Over 200 students in Italy and the United Kingdom were given four math concepts. Researchers identified that math anxiety contributed to the lack of learning in two of the four concepts. A socioeconomic deprivation index was matched

to the high levels of math anxiety. Tomasetto et al. (2021) reveals that Tier II interventions are a way to support students with a low socioeconomic status that are likely to develop math anxieties not only academically but in boosting their confidence and self-regulation skills.

Overall, Tier II interventions are vital to a child's education especially if they have a high need culturally, biologically, or socially. All schools have the opportunity to implement Tier II interventions with multiple approaches available that can be regularly assessed by invested teachers. Meeting students where they are at, despite their life circumstance, is the purpose of interventions and a responsibility of schools in order to set students up for success. No matter a child's needs, interventions show a promising result for growth due to targeted approaches tailored to the skills necessary for a student to thrive in their general classroom.

School Profile

Cardinal Elementary School sits on rural ground in the southeastern community of Eldon, Iowa. The school enrolls 523 preschool through 4th grade students of five towns: Agency, Batavia, Bladensburg, Eldon, and Selma (Cardinal Community School District, n.d.). In addition, many students from Ottumwa choose to attend Cardinal Community School District increasing the open enrollment 54.9% since 2010 (Cardinal Community School District, n.d.). In the fall of 2022, the school is transitioning to a four-day school week in order to retain and attract teachers. Currently, there are about forty teachers on staff at the elementary and a variety of support staff that aid students (Iowa Department of Education, 2021).

Demographically, 87.6% of students are Caucasian with the remaining 12.4% of students from other groups including African American, Hispanic, Hawaiian, and Multi-Racial (Iowa Department of Education, 2021). Of these students, 15.4% of them have an Individualized Education Plan (IEP) (Iowa Department of Education, 2021). The average daily attendance of

students is higher than the state average at 95.3% (Iowa Department of Education, 2021). Lastly, over half of students are considered having a low socioeconomic status (Iowa Department of Education, 2021).

Low socioeconomic status often limits parental involvement and support within the school as many of them are working more than one job, undesirable shifts, or have other mental or behavioral health concerns. Parents who are involved typically volunteer to coach youth sports such as volleyball, baseball, and basketball or work book fair shifts during conferences. Despite low involvement in volunteering, parents are engaged in school connections through a variety of formats. General education teachers are required to send newsletter home weekly to parents via paper form and through email. Often teachers choose to also post news and classroom information on a Facebook group made specifically for their classroom. These newsletters consist of learning targets for the week, upcoming events or special days, contact information, and spelling words to practice or homework. Newsletters keep parents informed about learning and important information relevant to their child. Parents also have the opportunity to engage in their child's school work that is submitted through SeeSaw. Commenting or liking their child's work provides motivation and support from home. SeeSaw allows parents to see their child's learning in action and have a quality home to school connection.

The vision of Cardinal Elementary is to "develop a responsible and productive learning environment to meet tomorrow's challenges today" and the mission is to "foster an enriching environment and channel energies of students to achieve their fullest potential" (Cardinal Community School District, n.d.). The vision and mission are best supported through Positive Behavior Intervention and Supports (PBIS) and a Multi-tiered System of Support (MTSS). Three key expectations in a PBIS matrix help students succeed behaviorally and ultimately provide them

a quality learning environment. Students are expected to be respectful, responsible, and safe in all areas of the building. Examples may include walking quietly in the hallway, having all materials prepared for learning, or using playground equipment correctly. Students exhibiting these behaviors may receive a "comet card" which can be turned in to the office for a chance to win prizes each week. Student enjoy receiving small trinkets, t-shirts, or speedway and laser tag tickets. "Comet cards" are motivating to students and assist in sustaining a respectful, responsible, and safe environment for all students.

Academically, the first tier of MTSS provides equal access to grade level topics that are aligned with the Iowa Common Core State Standards. In the general education setting, students engage in the Benchmark Advance literacy curriculum with embedded social studies standards, Everyday Mathematics 4 math curriculum, and science FOSS kits. Teachers use standards-based grading to determine if students are meeting expectations, progressing toward expectations, or need reinforcement. These grades are determined by formal and informal curricular assessments for each unit. Progress reports are completed four times per year and are accompanied with a parent-teacher conference twice per year. All students are also provided a daily thirty-minute whole class intervention using a research-based curriculum of choice depending on the classroom needs.

Outside of a child's homeroom classroom, students take an aReading test from FastBridge to determine their reading proficiency and need for Tier II reading interventions. This test is completed three times per year in the fall, winter, and spring. Each grade level has an expected score to determine if a student is proficient, at risk, or persistently at risk if they have had two or more repeated low scores. Students who are at risk or persistently at risk are paired with an interventionist and receive instruction for thirty minutes a day. Students are lead through a targeted

literacy curriculum called 95% Group. Topics covered include fluency, comprehension, phonics, phonemic awareness, etc. There is currently no assessment given to determine math proficiency or and Tier II interventions available for math within the school.

Students who need more than targeted intervention can receive intensive instruction in reading and math through Tier III interventions. These interventions are provided by special education teachers and are guided by goals that are reviewed annually. 95% Group is also used in special education to target literacy needs. There is no specific math curriculum used in the special education department however, the Tier I curriculum, Everyday Mathematics, is used as a guide. Tier I and Tier III are the only areas where students receive mathematics support.

In addition to curriculum assessments and aReading, third and fourth grade students take the Iowa Statewide Assessment of Student Progress (ISASP) each spring. In terms of participation in assessment, 99.37% of students took the state assessment or another form of alternative assessment (Iowa Department of Education, n.d.). According to the Iowa Department of Education (n.d.), Cardinal Elementary has 56.77% of students proficient in English Language Arts and 68.39% of students proficient in Math. Overall, the school's performance is categorized as acceptable and Every Student Succeeds Act (ESSA) support is not needed (Iowa Department of Education, n.d.).

Professional development for teachers in the area of reflective teaching has been implemented in order to improve teaching and ultimately increase school performance. Teachers have access to a program called Edthena. Edthena allows educators to record themselves teaching and share their video with other teachers if they choose. PLC members or coaches can comment and provide feedback for their colleagues to better support them. Administrators do not use this as an evaluation tool, it is solely to help teachers become better. There is not data to prove that this

strategy is working as it was only implemented within the last year, however, reflection is a proven strategy to aid in growth, so results are promising.

From a teacher's perspective, Cardinal Elementary is a quality place to work in terms of the culture and environment. I feel supported by colleagues and administration personally and professionally. A rigorous curriculum is adopted, and high expectations are set for students. Students receive accommodations to meet their needs and give them access to a quality education. Despite all the positive attributes to Cardinal Elementary, there is more work to be done in the support provided to students who do not meet grade level standards, especially in math in the Tier II category.

Needs Assessment

As I presented in my Review of Literature, there are multiple benefits to Tier II math interventions that apply to Cardinal Elementary School's learning environment and needs of the students. According to the Iowa Department of Education (n.d.), a Multi-tiered System of Support (MTSS) is described as an "every-education decision-making framework of evidence-based practices in instruction and assessment that addresses the needs of all students". The phrase of importance in this quote is that MTSS is intended to address the needs of *all* students. At Cardinal Elementary, if Tier II math interventions are not implemented, we are not providing proper supports and are failing a group of students who would benefit from small group math instruction. Full implementation of MTSS is critical in addressing the needs of every student.

Additionally, by not providing proper interventions in a child's current setting, we are also limiting their learning opportunities and preparation for life after they end their educational career. In discussing MTSS, the Iowa Department of Education (n.d.) states, "Those supports [interventions] are provided in both small group and individual settings and are monitored to

ensure they support all learners demonstrate proficiency in the Iowa Core standards and leave school ready for life". As stated previously, the mission of our school is to help students reach their fullest potential in life. Tier II interventions are a positive step forward to providing students the support they need now and into the future.

District data will provide more than just observations but evidence, that Tier II math interventions are necessary in our school. Math performance, special education numbers, and a low socioeconomic population will highlight numerical gaps in the MTSS framework. In addition, the absence of certain data points will display more alarming discoveries. This analysis of data is a critical component of how our school must assess our ability to meet the needs of every learner.

Data Analysis

Based on reports from the Iowa Statewide Assessment of Student Progress (ISASP), the average scale score on the mathematics test was 68.39% out of 100 (see Appendix A) (Iowa Department of Education, 2021). This mathematics performance is three percentage points higher than the state average, which is a strength of the students assessed. However, the data tells me that there is still a significant room for growth. Specifically, there is opportunity for improvement of over 30 percentage points.

Other than ISASP data, there is no way to gauge math growth or deficiencies within the school because of the lack of a universal screener for mathematics. The only mathematics testing requirement exists within the curriculum and tests scores are not shared among grade levels. The absence of proper results is problematic and a weakness in identifying interventions because as a school, we do not know our overall math performance. Due to these circumstances, we cannot properly assess who needs interventions which continues to leave students without Tier II supports. A sensible approach would be to continue using FastBridge as we do for literacy for screening.

The aMath assessment would provide telling data to begin placing the over 30% of non-proficient students in intervention groups.

Another significant statistic is the number of students in special education within our school. According to the Iowa Department of Education (2021), 15.4% of students have in IEP at Cardinal Elementary (see Appendix B). This is a high percentage compared to the typical recommendation within Tier III interventions of less than 5% (Iowa City Community School District, n.d.). For students to qualify for special education, the school has a Student Assistance Team (SAT Team) to determine interventions and supports. The large percent of students in special education tells me that a strength of this team recognizing the support students need and giving them access. However, determining the correct tier for students to enroll in for support must be addressed.

Although not all students within this percentage have an IEP for math, it brings into question how many of the students in Tier III math interventions could have been supported in Tier II math interventions if they were available. Without Tier II interventions, students struggling in Tier I have no other opportunities for remediation besides going straight to special education. In some severe cases, moving to Tier III intensive instruction is necessary but for others, only a targeted Tier II approach would be the logical step toward addressing their math needs instead of enrolling them in special education.

In order to narrow down which students need Tier II instruction versus Tier III instruction and address this weakness in the SAT Team process, a universal screener such as aMath is needed like I mentioned previously. The scores from this screener would provide data that shows which students are proficient, at risk, or persistently at risk. Likely, students categorized as “at risk” would need Tier II supports and those “persistently at risk” may need a more intensive approach

in Tier III. Although not the sole factor in determining what tier would be best for students, it could be a better guide for the SAT Team in their decision making.

Other than math performance and special education numbers, socioeconomic status is another impactful statistic at our school. At Cardinal Elementary, 55.1% of students come from a family with a low socioeconomic status (see Appendix C) (Iowa Department of Education, 2021). Based on this high percentage, the district provides weekend meals, before and after school care, and counseling which is a strength in supporting these students and their families. However, with the knowledge that a low socio-economic status typically limits a child's opportunities for learning mathematics and contributes significantly to producing math anxieties as I presented in my review of literature, there is a pressing need for Tier II interventions in addition to the other supports provided.

In addition to a universal screener, it would be important for general education teachers to track student performance on in class math assessments. This process not only show strengths and areas for growth of all students but allows teachers to see trends especially among students with a low socioeconomic status. In addition, the data supports planning of math lessons knowing which students may need more support that they will not get at home or provide explanation for why they are anxious during math time. General education teachers can better address math needs in the classroom and share data with interventionists or the SAT Team to identify the correct tier for every student. As the percentage of low socioeconomic status students nears 60% of the school population, the data tells me that full implementation of MTSS is crucial. Without inclusion of Tier II math interventions, it weakens our ability to address the needs of students correctly.

Action Plan

In order to implement Tier II interventions at Cardinal Elementary, there are several action steps that must take place. To begin, quality intervention teachers internally or externally should be hired. Staff members should have a strong understanding of MTSS, especially Tier II interventions, and a mathematics endorsement is preferred. In addition, these individuals should be committed to teaching with fidelity to aid in the success of the program. Interviews will be conducted by the principal an instructional coach.

With hired staff, a research-based curriculum must be determined. As presented in my literature review, there are multiple modes and formats to teaching Tier II math interventions. Both concrete and virtual options have been proven to be effective like the self-monitoring checklists studied by Kingsdorf and Krawec (2016) or a tablet-based intervention conducted by Lee and Choi (2020). Deciding which method based on the needs of students will be a pivotal step in the action plan. The best way to determine the correct intervention is by using the Brief Experimental Analysis (BEA) method by McKevett and Codding (2021). As discovered in my literature review, this method was effective for most schools and provided promptness in beginning interventions quickly. There will be a professional development for all staff providing math interventions on the curriculum of choice and opportunities to meet with a mathematics consultant as questions arise.

Next, using a universal screener will help school staff enroll students in interventions. The aMath assessment will reveal students who are considered “at risk” and not meeting grade level standards. These students will be enrolled in Tier II interventions beginning in the fall upon completion of the screener. Students will be paired with an interventionist and grouped together

based on skills. Parents will also be notified of the testing status and need for more targeted literacy instruction via mail.

Of the several research studies presented in the review of literature, the duration of most interventions ranged from 20-30 minutes a day, 3-4 times a week. Students will be pulled from their general education classroom and taught in a small group in another classroom within the school building. Students will not be removed from the classroom during core instruction time unless absolutely necessary. Within this time period, interventionist will teach from the assigned curriculum and regularly formally assess the progress of students. Student progress will also be shared with parents during fall conferences by the interventionist.

As instruction is occurring during the fall quarter, interventions will be regularly evaluated by an instructional coach and the building principal. Observations will ensure fidelity and intensity of instruction which DeFouw et al. (2019) emphasizes in his study of teacher impacts on intervention curriculum. In addition, teacher surveys will be administered to interventionists, similar to those presented by Musti-rao and Plati (2015) that gauged teacher perspective on concrete and virtual options. These surveys will gather teacher insight on the curriculum, routine, scheduling, and instruction methods. Opinions and preferences gleaned from surveys will aid in the future logistical planning of Tier II math interventions.

Progress of the program will be formally assessed using the group screening report from the aMath assessment to monitor growth from the fall to winter and winter to spring (see Appendix D) (FastBridge, n.d.). This data will tell interventionists, general education teachers, and administration if Tier II math interventions are assisting in the growth of students as students change literacy status from high risk or some risk to proficient. Data teams will meet in order to decide which students should exit the program and be monitored by their classroom teacher. In

addition, decisions will be made about students who should enter Tier II math interventions based on their test scores in the winter and spring. To exit and enter students, the team will use a student's score from the group screening report in combination with the data interpretation tool (see Appendix E) (FastBridge, n.d.). Parents will again be notified of their child's literacy status after each testing window and have a second conference in the spring with the interventionist.

Implementation of School Improvement Plan

In the subsequent subheadings, I will outline how Tier II interventions will be implemented into Cardinal Elementary. I will be presenting how the program will be assessed in order to reflect upon if the plan worked. Additionally, I will be addressing how success and failure of the program will be monitored. Finally, I will highlight some variables that could impede the success of the program.

Timeline, Resources, and Responsibilities

A timeline of implementation, resources needed, and those responsible for each step is an essential piece in effective execution of the Tier II math program. Table 1 below is a chart that organizes the logistical steps in the process in chronological order for viewing. Staff member(s) are assigned to each step with resources they will need to complete the action step by the specified due date.

Table 1

Implementation Plan

Action Steps	Due Date	Resources Needed	Responsibility Assignments
Hire Three Interventionist	March-April	Series of Interview Questions	Principal and instructional coach will

Action Steps	Due Date	Resources Needed	Responsibility Assignments
			facilitate interview with candidates
Use Brief Experimental Analysis (BEA) to determine a correct intervention for students within the school	March-April	Pool of students likely to need Tier II interventions nominated by general education teachers	Two current interventionist that will work with small groups of students three times a week for four weeks to determine which skills to target
Purchase Curriculum	May	Funding allocated for intervention needs	Curriculum Director and the interventionists who will decide on a curriculum to be purchased based on observations from the BEA
Professional Development Training on Curriculum	August	Curriculum books and manipulatives	AEA Mathematics Consultant will lead the professional development and be

Action Steps	Due Date	Resources Needed	Responsibility Assignments
			available for questions as needed
Administer Universal Screener	September	FastBridge aMath assessment	General education teachers will administer the screener in their classrooms
Review Data and Enroll Students	September	Assessment Data	Intervention data team will group students together based on skills
Parents Notified	September	Data forms	General education teachers will send a literacy status notification via mail based on assessment results
Begin Instruction	September	Curriculum Student Groups	Math interventionists will begin pulling students 3-4 days a week for 20-30 minutes a day

Action Steps	Due Date	Resources Needed	Responsibility Assignments
Conferences	October	Student progress reports	Interventionist will report progress to parents
Observations	September-December	Evaluation forms	Principal and instructional coach will observe interventionists in regard to fidelity and intensity
Surveys	December	Google Form	Interventionist will fill out a survey identifying their preferences and suggestions in implementing the program
Winter Screener	January	FastBridge aMath assessment	General education teachers will administer the screener in their classroom
Review Progress from Fall-Winter	January	Group Screening Report and Data Interpretation Tool	Intervention data team will decide which students to exit or enter

Action Steps	Due Date	Resources Needed	Responsibility Assignments
			Tier II math interventions
Parents Notified	January	Data forms	General education teachers will send a literacy status notification via mail based on assessment results
Resume Instruction of New Groups	January	Curriculum Student Groups	Math interventionists will begin pulling students 3-4 days a week for 20-30 minutes a day
Observations	January-March	Evaluation forms	Principal and instructional coach will observe interventionists in regard to fidelity and intensity
Spring Screener	March	FastBridge aMath assessment	General education teachers will administer

Action Steps	Due Date	Resources Needed	Responsibility Assignments
			the screener in their classroom
Review Progress from Winter-Spring	March	Group Screening Report and Data Interpretation Tool	Intervention data team will decide which students to exit or enter Tier II math interventions
Conferences	March	Student progress reports	Interventionist will report progress to parents
Resume Instruction of New Groups	March	Curriculum Student Groups	Math interventionists will begin pulling students 3-4 days a week for 20-30 minutes a day
Observations	March-May	Evaluation forms	Principal and instructional coach will observe interventionists in regard to fidelity and intensity

Action Steps	Due Date	Resources Needed	Responsibility Assignments
Reflection Meeting	May	Screener data from fall, winter, and spring	Principal, instructional coach, and interventionists will meet to discuss overall success of program based on data and areas for growth for next year

Monitoring Success and Failures

Success and failure of the program will be monitored a few different ways. As mentioned previously, the principal and an instructional coach will be doing evaluations during the instruction periods. Their feedback and observations will help interventionists ensure they are teaching with fidelity and with the correct intensity to make a large impact in the mathematics needs of students. Additionally, a teacher survey will be administered to interventionist at the end of the fall quarter to gather logistical preferences and support needed. Reviewing progress from fall to winter and winter to spring in data teams using the group screening report and the data interpretation tool will show areas of deficiencies and accomplishment. Finally, the end of the year reflection meeting will be a critical planning session for the next school year on what went well and what could be improved upon in terms for logistics, curriculum, instruction, student grouping, etc.

Barriers that Limit Success

Barriers that could impede the success of the plan include teacher inconsistencies. Often when interventionist must be absent, they are not first to get a substitute teacher over a general education classroom. In these instances, students in Tier II interventions are not getting the targeted instruction that they need. Few absences should not affect the program significantly, but regular and frequent lack of attendance may be of concern. In addition, improper commitment to the curriculum and large inflections are likely to make data inconsistent. Data from the research-based curriculum may not be replicated in our school's program if not followed faithfully by interventionists. If these concerns arise, they will be addressed through the evaluations conducted by the principal and instructional coach.

Conclusion

In this school improvement plan, I presented a pressing issue in Iowa schools today: Mathematics performance of students is lacking growth especially in recent years because of COVID-19. Public health was not the only element in jeopardy during the pandemic and the learning loss of our students is arguably one of the most detrimental, especially to our youngest learners. As our world continues to debate mask mandates and vaccination requirements, one definite issue remains. To close pressing achievement gaps, elementary students need more support in mathematics. In my opinion and founded by research, the best way to solve this problem is by having high quality MTSS frameworks that include Tier II mathematics intervention.

In my review of literature, I presented research from other schools who successfully implemented math interventions. I outlined four major themes which include the benefits of intervention overtime, different approaches to math interventions, parent, student, and teacher perspectives, and how interventions strengthen students with special needs. The literature

provided evidence that no matter the grade level or approach, math interventions warrant growth. In addition, the research also identified that teacher, student, and parental views matter in regard to interventions and should be considered. Furthermore, Tier II interventions are critical for students with autism, English Language Learners, students with a low socioeconomic status, and those with math anxieties.

My school profile and needs assessment displayed how Tier II interventions fit into my current environment at Cardinal Elementary. Data regarding math performance, low socioeconomic status, and special education numbers identify the call for full implementation of MTSS by adding Tier II interventions. Moving forward, the data cannot be ignored if we are challenged to put the needs of students first. Tier II interventions have been successful in other schools and can be successful at Cardinal Elementary by following the action plan. Continual assessment and reflection of teaching, learning, and data will assure future achievements through Tier II interventions overtime.

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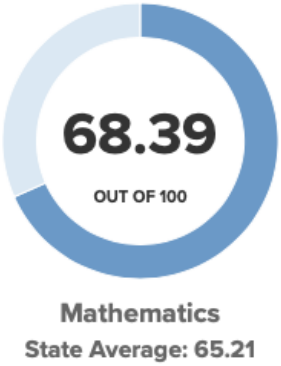
Appendix A

Mathematics Proficiency



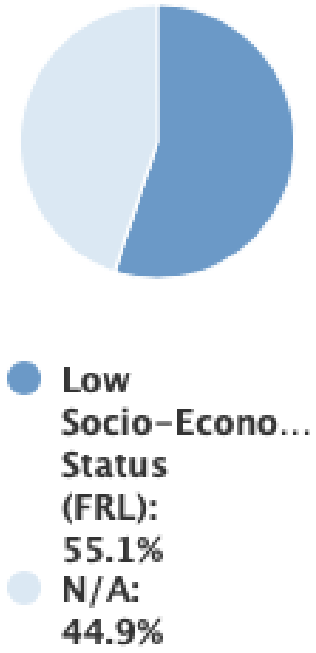
What percent of students are meeting proficiency achievement benchmarks? Students performing at the Proficient level demonstrate adequate competency over the knowledge, skills, and abilities that meet the requirements for their grade level associated with academic readiness for college and career in the subject area.

Appendix B

Percentage of Students Enrolled in Special Education

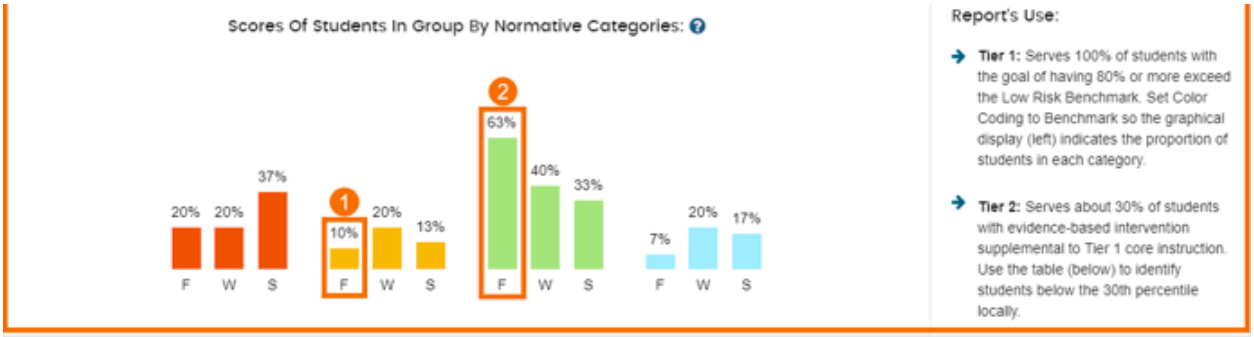
Appendix C

Percentage of Students with a Low Socio-Economic Status



Appendix D

Sample Group Screening Report



Student Name	Fall Score	Winter Score	Spring Score	Spring Percentile Rank: Group %ile	School %ile	District %ile	National %ile
Beaudry, AIDAN	502	523	509	21	19	19	12
CORDEIRO, Ezra	430	532	533	72	66	66	55
Farrar, Ricardo	515	477	449	3	4	4	1
Fox, Tavion	550	549	550	99	91	91	96
Hendrickson, Jaxon	504	508	522	48	47	47	29
Lechner, Cody	534	541	543	86	81	81	82
Makens, SERAPHINA	521	522	515	34	32	32	19
MILDON, Max	519	503	512	24	21	21	15
Mulheren, Kyle	534	551	544	93	85	85	85
Skiba, Tyler	507	533	515	31	30	30	18

Appendix E

Data Interpretation Tool

DATA INTERPRETATION TOOL: GROUP SCREENING REPORT

Use the questions on this Data Interpretation Tool as you examine the Group Screening Report. This is a valuable tool to use during team meetings to analyze data and identify next steps.

01. What do you notice about the data?

02. What percentage of students are meeting benchmarks?

03. What percentage of students are in the Some Risk or High Risk range?

04. Are there academic areas which need to be addressed universally across the school, the grade level, and/or the class? If yes, what are those needs?

DATA INTERPRETATION TOOL: GROUP SCREENING REPORT

05. Which students aren't meeting benchmark targets?

06. Which students may need acceleration?

07. What are the next steps to support our students as a result of these data?

08. Who do we need to collaborate with to take action towards these next steps?

09. Who else needs to be included in communication about these next steps?