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A PROGRAM EVALUATION OF THE MULTI-TIERED SYSTEM OF SUPPORTS (MTSS) AND ITS ROLE IN SUPPORTING STUDENTS' READING AND MATH PERFORMANCE DURING THE COVID-19 PANDEMIC

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by

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DEDICATION

This dissertation is dedicated to my family, who has supported me through this journey. To my children Kenzington and Isaac, I thank you for your patience and understanding. To my parents and close friends that continue to support my educational endeavors and encourage me to strive for greatness. To my current school district, who has supported me through the process, and the teachers and leaders that inspire me to keep fighting the good fight of putting students first.

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ABSTRACT

The purpose of this causal-comparative study was to employ a quantitative research study to measure the degree of impact the COVID-19 pandemic had on students' academic performance and determine the extent to which the MTSS program served to counter the impact of the pandemic on students' reading and math performance. This study analyzed pre-existing STAR Reading and STAR Math data collected from 7th-grade students at one Midwest public middle utilizing the September (Fall) and December (Winter) scores. The data sets were compared to determine the students' reading and math performance trend in the three years preceding the COVID-19 pandemic (Year 1, Year 2, and Year 3) to measure the degree of impact during the year of the pandemic (Year 4) and the year that followed (Year 5). Further, differences between subgroups (i.e., gender, ethnicity, SPED status, EL status and 504 status) were examined. This study was unique in that the data were broken down into tiers of instruction that coincide with the MTSS framework to measure the growth of students receiving Tier 1, Tier 2, or Tier 3 instruction.

This study found that although most students remained above benchmark, in Year 4 and Year 5, there was an observed downward shift in mean scores. In addition, more students were identified as needing Tier 2 or Tier 3 supports and interventions over the span of the identified years. This research can help fill a void in the existing research by focusing on MTSS at the secondary level and the effects of the COVID-19 pandemic on academic achievement. This research study can guide future initiatives and inform best practices for MTSS implementation.
Keywords: Multi-Tiered System of Supports (MTSS), Response to Intervention (RTI), PBIS, Renaissance STAR, COVID-19 pandemic, Academic Achievement

CHAPTER 1: INTRODUCTION

The novel coronavirus pandemic (COVID-19) had far-reaching impacts throughout the world (Wyse, 2020). Within the context of K-12 education, teachers, parents, and students faced new challenges as schools were closed and education transitioned to a home environment which included distance learning. Schools across the nation and state, including the middle school in this study, were closed from March 13, 2020, through the end of the school year, May 2020. Teachers' approaches to instruction and assessment varied, as did the level of student engagement exhibited during distance learning. The American Psychological Association (2021) reported that "while some teachers chose to reduce the amount of work given to their students and the amount of time spent learning, others felt they were drowning in the myriad of navigating the students' social, economic, and family-related factors" (p. 2). Stakeholders, -including parents, teachers, and administrators,- had been asking about the potential impact the COVID-19 pandemic placed on student learning and how educational institutions would find ways to identify and address the needs of all students. Even before the COVID-19 pandemic, stakeholders had voiced concerns regarding the education of students who had difficulty learning.

Brief Literature Review

Education and the COVID-19 pandemic

All students in an educational setting must have access to instruction within an evidence-based, scientifically researched core curriculum program (Shapiro, 2021). This instructional program is typically aligned with state standards with the intent to deliver high-quality reading and math content to foster skill development. Schools invest time, money, and personnel to ensure high-quality core programming, including staff professional development, to reach

successful levels of competency-based learning. Ideal academic conditions include response to the core program with elevated levels of formative and summative assessment measures, classroom management, strong student-teacher relationships, and adequate educational leadership. However, even with these positive factors, some students are not successful, and additional supports are necessary.

Before the pandemic, students in the K-12 setting who had significant and persistent academic difficulties were reported to achieve limited success in school and postsecondary opportunities (Office of Civil Rights, 2021). The Office of Civil Rights further noted that for many of these students, the typical core curriculum used in the general education setting was insufficient to address their educational needs and fully prepare them to be college or career-ready. This was also illustrated by findings from the United States Department of Education (2019), stating that 60% of middle and high school students scored below proficient in reading—meaning most of these students did not possess the essential reading skills necessary to pass content area classes at the secondary level. Allensworth and Easton (2005) developed an "on-track indicator" that correlated dropping out of high school with class failure; they found that failing even one semester's worth of class during a student's freshman year decreases the likelihood of graduating high school from 80% to 63%. Failing two semesters' worth of classes reduces the likelihood to 44%. Students who fail three semesters worth of classes will likely exit before graduation as they only have a 31% chance of graduating with a high school diploma.

Barclay and Doll (2001) reviewed several studies and concluded that students who dropped out of high school began showing signs of academic failure as early as the middle school years. The study found that risk factors for this population include being retained in previous grades, frequently changing schools, parents who were not actively involved and/or had

low expectations, and high rates of absenteeism. Barclay and Doll also found that students who were not engaged in school or had difficulty with interpersonal relationships tended to become dropouts.

The No Child Left Behind Act of 2001 (NCLB) intensified efforts across the country to eliminate such disparities in academic performance. NCLB required schools and districts to break down test scores by racial and ethnic subgroup as well as including economically disadvantaged, disability, and limited English proficiency. Schools could no longer afford to ignore the achievement of these students. Reauthorized in 2004, the Individuals with Disabilities Education Act (IDEA) and NCLB efforts led to early intervening services that were funded with up to 15% of IDEA's funds. Early intervening services ensure that a struggling student receives tiered supports within the general education classroom before an assessment for special education referral is considered. To honor state and federal mandates as well as the mission of the public school system, schools needed to develop programs to ensure all students were prepared with the skills and knowledge necessary to succeed academically in today's global economy. This impetus is reflected in the Every Student Succeeds Act (ESSA) (2015), signed by President Obama, which offered a commitment to equal opportunities for all students.

One early intervening services framework that school leaders implemented to help students succeed was Response to Intervention (RTI). The intent of RTI was to provide interventions prior to the point of students dropping out of high school or the referral of students to Special Education. RTI emerged from the reauthorization of IDEA (2004) and NCLB, but the roots are embedded within the history of learning disabilities and other sources of influence. In the early years of RTI, schools focused on the academic (reading and writing) components of RTI. After its success, traction was made to support behavior through the framework of Positive

Behavior Intervention Supports (PBIS). Teachers often saw them as two different entities, focusing on academics or behavior, but not necessarily both. RTI and PBIS eventually evolved into a Multi-Tiered System of Supports as the two frameworks started to merge as early as 2007 (Sandomierski et al., 2007).

Through the use of RTI, the goal for schools was to identify students falling below grade level early on and provide specific evidence-based interventions to help them close the learning gap. The RTI framework was developed from prior initiatives that focused on tiered models of intervention (Deno & Mirkin, 1977; Bergan, 1977); findings of the National Reading Panel (2000); use of a three-tiered model in reading research (Haager et al., 2009); the No Child Left Behind Act of 2001; the Individuals with Disabilities Education Improvement Act (2004); the findings of overrepresentation of minority children in special education (Donovan & Cross, 2002); a changing relationship between general and special education; and access to academic monitoring tools (Addison & Wagner, 2011). These key initiatives provided a framework in which RTI was conceptualized.

Many of the main components of RTI (universal screening, evidence-based interventions, tiered instruction, progress monitoring) are evident in MTSS. Still, the focus with MTSS is on ensuring a quality core, or Tier 1 instruction with a highly qualified teacher using a systems approach.

Orla (2013) stated:

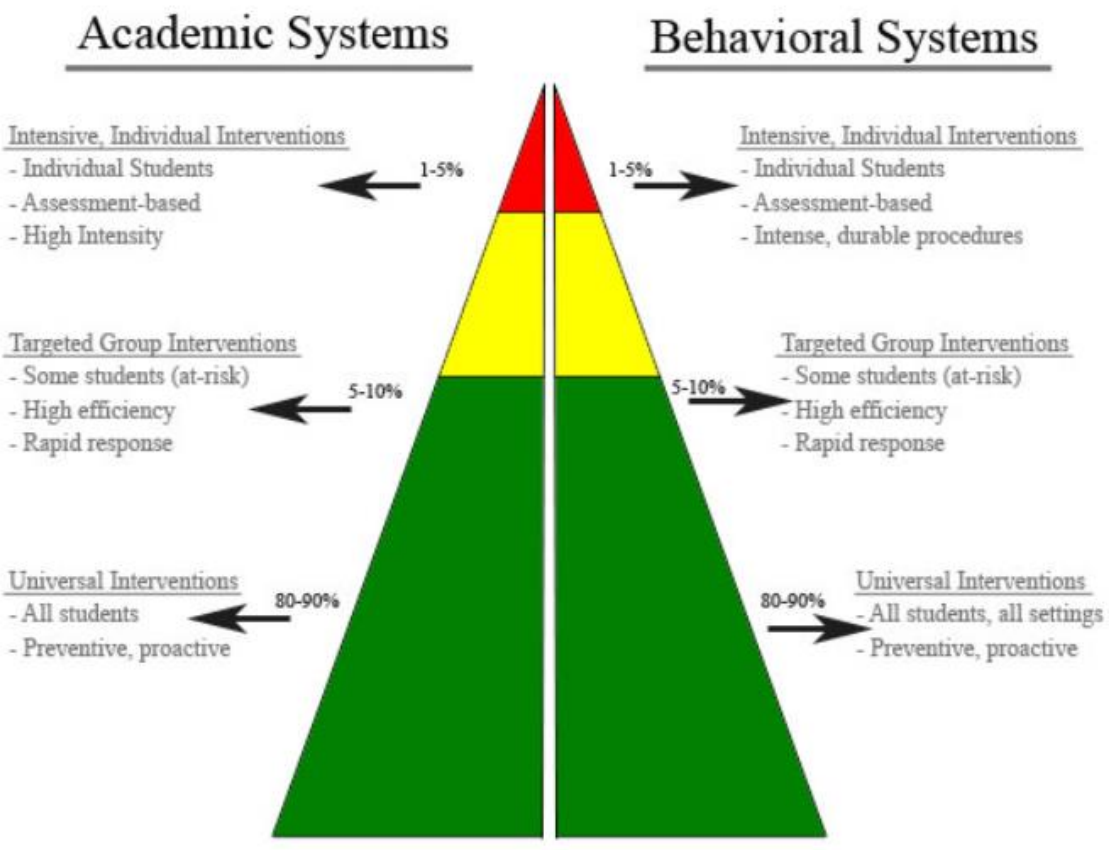
> Multi-Tiered System of Supports (MTSS) leverages the principles of RTI and PBIS [Positive Behavior Intervention and Supports] and further integrates a continuum of system-wide resources, strategies, structures, and practices to offer a comprehensive and responsive framework for systematically addressing barriers to student learning. MTSS

> offers the potential to create systemic change, which results in improved academic and social outcomes for all learners (p. 2).

Gamm et al. (2021) described in their work that there are many iterations of MTSS (See Fig.1) however, the core framework is based on the premise that three levels of increasingly intense instruction and frequent instructional or behavioral interventions are provided to students based on students' performance data, which reflect the level of success of the intervention. Tier 1, or the primary level, focuses on core or universal instructions and supports; Tier 2, or the secondary level, focuses on targeted, supplemental interventions and support; and Tier 3, or the tertiary level, focuses on intensive interventions and supports (Gamm et al., 2012).

Figure 1

Integration of Academic and Social Behavior Three-Tiered Continuum of Behavior Support



Note. Reprinted From "School-Wide Positive Behavior Support and Response to Intervention," RTI Action Network. Original Source Sugai, G. (June 23, 2001). School climate and discipline: School-wide positive behavior support. Keynote presentation to and paper for the National Summit on Shared Implementation of IDEA. Washington, DC. (http://www.rtinetwork.org/learn/behavior-supports/schoolwidebehavior)

Early intervening services provided in the framework of MTSS carry apparent benefits in the primary grades as students are still acquiring basic academic skills. However, some students enter the secondary grades (6-12) and still performing below grade-level in math and/or reading. Consequently, researchers have shifted their focus to implement the MTSS framework at the secondary level, with more studies occurring at the middle level (grades 6-8) (Dufrene et al., 2010; Fuchs et al., 2010; King et al., 2012; Solis et al., 2014). Within the past ten years, research has demonstrated the benefits of increased intensity regarding instruction and intervention for older students offered through an MTSS framework (Duffy, 2007).

Typically, MTSS has been a mainstay of elementary education as the importance of basic academic skills, such as reading, are essential for all students. These skills are particularly important for secondary students as they comprise the tools needed to learn more complex content. Friedman (2010) noted the importance of school districts to make adequate attempts to recover the student academically.

MTSS has replaced the one-size-fits-all education common of the late twentieth century with an emphasis on the individual. As diversity continues to increase in the student population of the United States (e.g., mental health, language, culture, race, socio-economic status, disability), the emphasis on each student's unique experience is much needed. Understanding and utilizing MTSS in school districts will help better address the racial, socioeconomic, cultural,

language, and individual differences found in classrooms today.

The Impact of MTSS

MTSS is a framework that many schools use to provide targeted support to struggling students. Processes such as universal screening data-driven supports and interventions allow schools to intervene early so students can catch up with their peers. The National Implementation of Response to Intervention (RTI) Research Summary (Hoover et al., 2008) investigated the level of emphasis of current and projected state-wide efforts for implementing RTI from the perspectives of state department directors in all 50 states, including the District of Columbia noting that, “An 86% response rate was obtained, and every state indicated some emphasis on RTI either in current practice or in development" (p. 1). Hoover continued by describing statewide training efforts were “underway in 90% of the states primarily emphasizing an overview of RTI, progress monitoring, and the use of data-driven decision-making” (p. 1).

The Report of the National Reading Panel: Teaching Children to Read featured 38 studies on leveled phonics instruction in which 66% were conducted in the United States, 24% were conducted in Canada, and 10% were conducted across the United Kingdom, Australia, and New Zealand (Wilcox et al., 2013). The theory behind MTSS for struggling learners is researched internationally and tiered intervention is used as a general education initiative. From this, it is clear that “MTSS is viewed as an effective system by both researchers and policymakers. However, the reported successes are not equally distributed across grade levels, specifically, as grade levels increase, MTSS implementation instances decrease” (Mortrud, 2017, p. 5).

MTSS in Study’s School District

The School District where this study was conducted systematically implemented MTSS

for almost a decade. Part of this initiative was driven by the ongoing significant enrollment growth in the community. The City's public website reported that in 2021 the population had increased by 49.25% in just ten years, growing from 25,830 to 38,654 people. This increase in population directly ties to school enrollment rates and growth opportunities. However, it also added a strain on the fastest-growing school district in the State, as it increased by 400-600 students each academic year (2021). The official enrollment in the School District for the 2021-2022 school year was 12,245 students. This reflects a much greater number than expected, with a single year increase of 639 students, and a cumulative increase of 2,258 students in the four years prior. The School District's website also noted that between 2000 and 2010, the district completed 16 projects that included additions, renovations, and the construction of numerous new buildings. From 2010 to 2021, a new school opened almost every year. At the time of this study, the district encompassed one early-learning center, fourteen elementary schools, three middle schools, and four high schools.

The School District's (2020) MTSS mission states on their website that, "All staff will utilize a continuous improvement process for improving the achievement and behavioral success of ALL children using research and or evidence-based practices in a Multi-Tiered System of Support" (para 1). The MTSS vision, also located on their website (2020), states, "We believe that all students' needs must be met in a timely, proactive manner" (para 2). MTSS provides all students with the best opportunities to succeed by focusing on high-quality instruction and interventions matched to student needs. To support and ensure compliance and fidelity in implementing MTSS, the School District employs an MTSS Instructional Coach at each of their secondary buildings. This role is focused on four primary responsibilities: student testing and placement, support for MTSS Interventionists, logistics and data, and developing and

maintaining MTSS in each building.

At the middle level, MTSS includes core instruction (Tier 1), supplemental curriculum and/or supports (Tier 2), and a supplemental curriculum (Tier 3) based on set criteria (See Appendix A and B). The framework provides a guideline for the intensity of the instruction or intervention based on student academic performance data. The type of research-based interventions used should be selected to best fit a student's needs. For example, the What Works Clearinghouse (WWC) is used by educators as it provides reviews of existing research on different programs, products, practices, and policies in education with the goal of "providing educators with the information they need to make evidence-based decisions" (WWC, 2021, p. 1).

The State's Multi-Tiered System of Supports (2021) network has identified essential components of MTSS to include 1) assessment, 2) data-based decision making, 3) multi-tier instruction, 4) infrastructure and support mechanisms, and 5) fidelity and evaluation (2021). Additionally, data are used to allocate resources to improve student learning and support staff in implementing effective practices.

According to the United Nations Educational, Scientific and Cultural Organization (UNESCO), "The COVID-19 pandemic brought learning to a screeching halt worldwide, creating the most severe global education disruption in history" (para 1). When the Study's School District resumed instruction in the Fall of 2020, students had the opportunity to participate in hybrid learning or virtual academy. Students in hybrid learning were evenly split alphabetically and either attended school on-site Monday and Tuesday or Thursday and Friday. The remainder of the school week was dedicated to distance learning. When students were on-site, they were required to wear face masks, and other mitigation strategies were in place that included scheduled hand washing and social distancing in hallways, classrooms, and at lunch. By

February of 2021, all students were allowed to be on-site while mitigation strategies continued through the end of the school year.

Throughout the COVID-19 pandemic, teachers and administrators continued learning and providing supports for students at all educational levels. President Biden's Executive Order 14000 stated, "although the pandemic's effects will be studied for many years to come, we know from early studies that for many students, the educational gaps that existed before the pandemic—in access, opportunities, achievement, and outcomes—are widening" (2021, p. ii). These disparities must be addressed.

Statement of the Problem

When the entire world faced unprecedented times due to the COVID-19 pandemic, educational stakeholders turned to research, health officials, and experts in the field to determine the steps necessary to move forward with education. Bradbury (2021) stated, "To understand fully where we are currently and the direction we are heading educationally, one should understand how we arrived at our current educational state of affairs" (p. 2). When schools across the United States, including the Study's School District, resumed instruction in the Fall of 2020, there was a need to think about providing even more resources to help students catch up and prioritize learning targets due to the dramatic losses in learning from school closures and the inequitable learning opportunity distance learning caused. McKinsey and Company (2021) suggest that as schools build back from the pandemic, they should recommit to providing an excellent education to every child that includes engaging high-quality grade-level curriculum and instruction delivered by diverse and effective educators in every classroom, supported by assessments that inform instruction (McKinsey & Company, 2021).

Wyse (2020) stated in their research surrounding the impact of the COVID-19 pandemic on students that one may expect lower performance when students started school in 2020 and a potential need for support and intervention to leverage decision-making frameworks such as MTSS more than ever to identify needs and target instruction where it matters most. Schools were faced with the task of identifying essential learning targets and what skills students would absolutely need to successfully complete the current school year and maximize the time available. With COVID-19 pandemic learning losses projected to be steeper than a typical "summer slide," school districts had to think about who was most deeply impacted and how educators could address the needs of those students.

Theoretical Framework

The purpose of this study was to conduct a program evaluation of MTSS and its ability to support students' reading and math performance during the COVID-19 pandemic. An objectives-based model was used to provide a longitudinal evaluative perspective to determine the role MTSS played in supporting students during the complex times of the COVID-19 pandemic. The outcomes of this evaluation provided the means by which a plan for potential changes could be made along with ensuring ongoing improvement. Tyler (1949) viewed evaluation as the process of determining the extent to which a program's objectives are achieved. The Tyler Model of evaluation focused on the objectives or the goals of the project. Tyler (1949) indicated that the evaluation needs to focus on the degree to which the objectives are met. Program goals and objectives are critical in his model of program evaluation. When using this model and discussing the findings, district leaders have evidence to support their decisions to continue the implementation of MTSS, and to discuss any potential areas for improvement or discontinue the intervention.

Spaulding described a program as "a set of specific activities designed for an intended purpose" (p. 5) and further explains that "program evaluation examines programs to determine their worth and to make recommendations for programmatic refinement and success" (p. 5). MTSS fits this definition as a framework with the intended purpose of program improvement. In this study, the researcher provided information regarding the efficacy of MTSS implementation that will prove helpful for decision-making.

This study is also grounded in the *Leadership in Times of Crisis Framework for Assessment* (Boin et al., 2013). This framework defined crisis management as "the sum of activities aimed at minimizing the impact of a crisis" (p. 81). In this framework, "impact is measured in terms of damage to people, critical infrastructure, and public institutions" (p. 81). The authors asserted that effective management protects the lives of those affected by the crisis, protects the infrastructure, and restores the community's trust in public institutions. To accurately determine the impact that the COVID-19 pandemic had on students' academic performance, schools must measure the most critical areas impacted by the school closure crisis triggered by the pandemic. This impact can be measured by Standardized Test for the Assessment of Reading (STAR) performance on STAR Reading and STAR Math because "Renaissance STAR scores represent how students performed on tests compared with the performance of a nationally representative sample of students, called the norms group" (Renaissance, 2021).

Boin and collaborators' framework is composed of ten executive crisis tasks to be assessed: 1) Early Recognition (i.e., what is the threat that has emerged and who is affected), 2) Sensemaking (i.e., scope and effect of the threat), 3) Making Critical Decisions, 4) Orchestrating Critical and Horizontal Coordination, 5) Coupling and Decoupling, 6) Meaning Making, 7)

Communication 8) Rendering Accountability, 9) Learning, and 10) Enhancing Resilience.

This study provided recommendations to the MTSS program implementation and confirmed the way in which the MTSS operated to support students and maintain progress throughout the pandemic. This study conducted a program evaluation of the school's MTSS to determine to what extent it helped 7th-grade students in reading and math.

Purpose of the Study

The purpose of this causal-comparative research was twofold, to measure the degree of impact the COVID-19 pandemic had on students' academic performance and determine the extent to which the MTSS program served to counter the impact of the pandemic on students' reading and math performance. The research also provides practitioners with information on what components of MTSS to focus on. In the ten years before the COVID-19 pandemic, the MTSS framework was fully utilized in the School District, implementing evidence-based reading and math interventions at the Tier 1, 2, and 3 levels.

According to Jackson (2008), the United States educational system is faced with a twofold challenge: conquering the problem of an unrelenting lack of achievement and "preparing students for work and civic roles in a globalized environment, where success increasingly requires the ability to complete, connect, and cooperate in the international scale" (p. 58). Swanson (2009) noted that graduation rates within the United States have failed to reach a level that would elevate the country to a competitive level in a global economy. To counter this, MTSS programming must align with current research surrounding best practice for middle-level education, echoing many of the sentiments expressed in the landmark position paper *This We Believe; Keys to Educating Young Adolescents* published by the National Middle School Association in 2010. Schools that are implementing MTSS with fidelity find the most success

when they "clearly define, teach, and reinforce expectations; make data-based decisions to monitor intervention implementation and student response; differentiate levels of support in response to student need; and establish systems to sustain implementation" (Freeman, 2015, p. 1). This study adds evidence of MTSS's effectiveness and give school districts the quality assurance to continue implementing this model along with adding to the current body of research on MTSS implementation and effectiveness in secondary schools.

This study analyzed pre-existing reading and math STAR data collected from 7th-grade students at one public middle school for three years before the pandemic, the 2020-21 school year, and then the 2021-22 school year utilizing the September to December (F) scores. The data sets were compared to determine the students' reading and math performance trend in the three years preceding the COVID-19 pandemic to measure the degree of impact during the year of the pandemic and the year that followed.

The impact of the COVID-19 pandemic on academic performance may vary widely across school districts. For many at-risk students, learning losses have only continued to compound due to the disruption caused by the pandemic and the need to implement hybrid and distance learning instruction. The impact the pandemic had on student achievement will be studied for many years to come. The researcher's goal was to determine the effectiveness of the use of MTSS to counter the impact of the pandemic on 7th-grade students' reading and math academic progress.

Research Questions and Hypotheses

Primary and secondary research questions for this study were asked to conduct a program evaluation to determine the role that the MTSS played in countering the impact of COVID-19 on reading and math.

Primary Research Questions:

1. To what extent is the MTSS achieving the objectives for which it was implemented?
2. How effective was the MTSS framework to counter the impact of the COVID-19 pandemic on 7th-grade students' academic performance in reading and math?

Secondary Research Questions:

3. What is the academic impact of the COVID-19 pandemic on 7th-grade students' STAR Reading scores accounting for demographic variables?
4. What is the academic impact of the COVID-19 pandemic on 7th-grade students' STAR Math scores accounting for demographic variables?

For purposes of this study, the researcher sought to test the following null hypothesis:

> The 2020-21 (COVID-19 pandemic) aggregate mean scores of Tiers 1, 2, and 3 students as measured by STAR reading and math test scores will be equivalent across the 2017-18, 2018-19, and 2019-20 academic years.

In consideration of the null hypothesis, the alternative hypothesis is:

> The 2020-21 (COVID-19 pandemic) aggregate mean scores of Tiers 1, 2, and 3 students as measured by STAR Reading and STAR Math test scores will not be equivalent across the 2017-18, 2018-19, and 2019-20 academic years.

Definition of Variables

This quantitative study compared 7th-grade STAR Reading and STAR Math data between Tier 1, Tier 2, and Tier 3 students across five years. Read 180 and Trans Math were the predictor variables and represented the implementation of the MTSS, while STAR Reading and STAR Math scores were the outcome variables. The following are the variables of study: Predictor Variable A: Multi-Tiered System of Supports (MTSS). The impact of this variable will be

measured longitudinally (i.e., 2017-18, 2018-19, 2019-20, 2020-21, and 2021-22). Predictor Variable B: COVID-19 pandemic. The impact of this variable will be measured longitudinally (i.e., 2020-21 and 2021-22). Outcome Variable C: 7th-grade STAR Reading scores. Outcome Variable D: 7th-grade STAR Math scores.

The School District's MTSS Reading Pathway (See Table 1, under Outcome Variable C) included three levels of placement: Intensive, Strategic, and Benchmark. All students were initially screened using STAR and students with STAR scores below the 40th percentile were subsequently given the Houghton Mifflin Harcourt Reading Inventory, an additional reading screener that produces a students' Lexile, to determine the most appropriate pathway for the student's academic improvement. If the student was proficient (above the 40th PR), the student remained receiving core instruction. The School District's MTSS Math Pathway (See Table 2) also included three levels of placement: Intensive, Strategic, and Benchmark. All students were initially screened using STAR and those with scores below the 40th percentile were administered the easyCBM®, an additional math screener that produces a students' percentile rank, to determine appropriate placement for the student.

Predictor Variable A: Multi-Tiered System of Supports

- Constitutive Definition: A High-quality instruction and interventions matched to student need, monitoring progress frequently to make decisions about changes in instruction or goals. Data are used to allocate resources to improve student learning and support staff implementation of effective practices (NDMTSS, 2021).
- Operational Definition: The school where this study took place is a MTSS school, implementing this framework with 100% fidelity. The data being analyzed

will be broken down into three tiers of support: Tier 1, Tier 2, and Tier 3 for both reading and math. The MTSS Instructional Coach conducted the assessments, gathered the scores, and placed students into the appropriate tier of instruction that matched their needs.

Predictor Variable B: COVID-19 Pandemic

- Constitutive Definition: A disease caused by the SARS-CoV-2 virus for which infected people will experience mild to moderate respiratory illness (World Health Organization, 2021). The COVID-19 pandemic triggered a global shutdown, which included one of the most severe school closure crises in the history of the modern world (UNESCO, 2021).
- Operational Definition: A severe global education disruption for which school closures and changes in instruction occurred (UNESCO, 2021). The following timeline descriptions were modified from the State's website to represent the school for which this study took place more closely:
    - March 2020: The State reported its first case of COVID-19.
    - March 15, 2020: The State's Governor announced K-12 schools would be closed for a week from March 16-20 as a cautionary measure.
    - March 19, 2020: The State's Governor extended the closure of schools through April 1 and asked schools to implement alternative learning plans and shifted to distance/remote learning.
    - May 11, 2020: Schools were informed they could re-open for optional summer programs beginning June 1.

- Fall, 2020: School resumed with Centers for Disease Control and Prevention (CDC) safety precautions (Study's School District instituted hybrid learning).
- February 2021: All secondary students were on-site in Study's School District, continuing CDC safety precautions.

Outcome Variable C: STAR Reading Score

- Constitutive Definition: STAR Reading tests are designed for students in grades K-12 for progress monitoring; the test consists of 34 multiple choice items which generally take fewer than 30 minutes for students to complete. The test is computer-adaptive so as the student takes the assessment, the assessment selects items based on the student's responses. If the student answers the item correctly, the assessment increases the difficulty level on the next item. If the student answers incorrectly, the assessment lowers the difficulty level of the next item. By continually adjusting the difficulty of an item to what the student has shown they can or cannot do, the assessment is tailored to accurately measure each student's level of achievement (Renaissance, 2021).
- Operational Definition: Five years of 7th-grade reading MTSS data will be provided to the author by the school district where this study was conducted (i.e., 2017-2018; 2018-2019; 2019-2020; 2020-2021; 2021-2022).

Table 1

School District's Middle-Level Reading Pathway

MTSS Category	Data	Course
Intensive/Alternate Core *Tier 3*	Below 40th percentile on STAR and a Pre-Decoder on Phonics Inventory	System 44 and targeted interventions (2 class periods)

Strategic/Core Plus *Tier 2*	Below the 40th percentile on STAR and below Proficient on Reading Inventory	Core Language (1 period) AND Read 180/System 44 blended classroom (1 period)
Benchmark/Core *Tier 1*	Between the 40th and 75th percentile on STAR	Core Language (1 period)

Outcome Variable D: STAR Math Score

- Constitutive Definition: STAR Math tests are designed for students in grades 1-12 for progress monitoring; the test consists of 34 multiple choice items that generally take 20 minutes to complete. The test is computer-adaptive so as the student takes the assessment, the assessment selects items based on the student's responses. If the student answers the item correctly, the assessment increases the difficulty level on the next item. If the student answers incorrectly, the assessment lowers the difficulty level of the next item. By continually adjusting the difficulty of an item to what the student has shown they can or cannot do, the assessment is tailored to accurately measure each student's level of achievement (Renaissance, 2021).
- Operational Definition: Five years of 7th-grade math MTSS data will be provided to the author by the school district where this study was conducted (i.e., 2017-2018; 2018-2019; 2019-2020; 2020-2021; 2021-2022).

Table 2

School District's Middle-Level Math Pathway

MTSS Category	Data	Course
Intensive/Alternate Core *Tier 3*	Below 40th percentile on STAR AND below the 20th percentile on easyCBM	TransMath I, II, or III or connecting Math Concepts
Strategic/Core Plus *Tier 2*	Below 40th percentile on STAR and between 20th-39th percentile on easyCBM	Core Math with classroom support

Benchmark (Core) *Tier 1*	Between the 40th and 75th percentile on STAR	Core Math

Significance of the Study

The results of this study contributed to the understanding of MTSS' effectiveness and its ability to combat the academic implications of the COVID-19 pandemic. This study served as a model for other schools planning to implement MTSS as a framework for supporting students that struggle academically. The body of research regarding MTSS primarily focuses on primary grade levels, creating a gap in better understanding the role of MTSS at the secondary level. Although research on the impact of the COVID-19 pandemic on students' academic performance has just begun and the most urgent needs are accounted for, studies can continue, noting ongoing effects of COVID-19.

This research is of particular interest to the author professionally and the author's employer to evaluate the effectiveness of MTSS, especially due to the impact of the COVID-19 pandemic. The author works collaboratively with other MTSS coaches and spent a significant amount of time and effort ensuring MTSS classes were taught with fidelity, assessments were conducted, and data were analyzed to ensure students were making adequate progress. The focus on MTSS in the School District dedicated time, resources, and budgetary dollars to help all students graduate and become college, career, and future-ready. The School District's strategic plan included a goal specifically stating, "All students will be empowered to continuously develop, improve, and connect 21st Century Skills and academic proficiency in all content areas" (2021, p. 3). A key indicator listed for this goal is Renaissance STAR data. There is a critical need to better understand the impact of MTSS on student achievement. To help determine if MTSS is valuable, findings from this study contribute to the existing body of research associated

with MTSS and serve as a solid evaluative framework for school administrators in the wake of the COVID-19 pandemic.

Research Ethics

Permission and IRB Approval

This study was approved through the Institutional Review Board (IRB) of Minnesota State University Moorhead (MSUM). This approval was completed before accessing existing data and successfully met the requirements to ensure the ethical conduct of research involving human subjects was met (Mills & Gay, 2019). Likewise, authorization to conduct this study was granted from the school district where the research project occurred (see Appendix 3). Appropriate administrators at the school district office and middle school were informed of the study and granted authorization and access to the district's STAR database.

Informed Consent

The protection of human subjects participating in the research was assured. The researcher used secondary data analysis of existing data. The researcher did not receive a database with the names of students but rather a unique ID was provided to protect each students' confidentiality.

Limitations and Delimitations of the Study

This research was conducted within a Midwestern public middle school and is not generalizable to other contexts. The findings of this research were most relevant to this school and schools with similar demographics. Another limitation related to the changing enrollment with rapid growth occurring within the school district. The use of existing, historical data is also an identified limitation. Delimitations of this study relate to the grade level of participants (i.e.,

only 7th-grade students), their tier status (i.e., 1, 2, and 3), the scope of the data utilized (i.e., past five years), and the academic areas evaluated (i.e., reading and math).

Conclusions

As educational institutions grapple with the aftermath of the COVID-19 pandemic, MTSS appeared to be a viable framework to begin the transition to an outcome-oriented response. MTSS, when implemented with fidelity, is designed to have a significant impact on academics and promote student success. In this study, the researcher attempted to determine the impact the pandemic had on 7th-grade students' academic performance in reading and math based on STAR scores. The conclusions drawn from this study were intended to assist educators and administrators in the degree to which the Multi-Tiered System of Supports addressed academic deficiencies from the COVID-19 pandemic. Chapter 2 will include a literature review of educational history, the history and components of MTSS, STAR Reading and Math, Reading and math instruction, and the COVID-19 pandemic's academic effect on schools.

CHAPTER 2: LITERATURE REVIEW

The impact of the coronavirus disease (COVID-19) pandemic's impact on our lives will be studied for years to come. It presented a period of unprecedented challenges for schools in the United States, as thousands of school buildings across the country were closed for in-person learning from March of 2020 through the end of the school year to slow the spread of the global pandemic (Minkos & Gelbar, 2020). According to Education Week (2020), school closures resulted in an unparalleled disruption to academic instruction for at least 124,000 public and private schools and 55.1 million students nationwide. As schools reopened in the Fall of 2020, many states were still uncertain if or how the virus would continue to spread, which left complex challenges to overcome. School systems made continual adjustments to support students during this unusual time.

Both short- and long-term effects of the pandemic are complex, multifaceted, and particularly significant for the most disadvantaged. As schools move forward, it is essential for educational leaders to provide appropriate levels of support for students in need. For this study, the researcher examined the Multi-Tiered System of Supports (MTSS) at a public middle school in a Midwest state before, during, and after the COVID-19 pandemic and its impact on student reading and math achievement. Due to the Individuals with Disabilities Education Improvement Act of 2004, MTSS has become a prevalent monitoring feature within many schools (Bineham et al., 2014; Rowe et al., 2014). In addition, state, and local Regional Education Associations, have led efforts that offer school districts support in the implementation of school improvement measures, especially MTSS.

The following review of the literature evaluates the effectiveness of MTSS at the middle level and how this framework can be used to overcome the academic disparities brought on even

more drastically in the wake of the COVID-19 pandemic. MTSS, Response to Intervention (RTI), or School-Wide Positive Behavior Interventions and Supports (SWPBIS), are models often used interchangeably. They all prescribe core instruction for all students in Tier 1, targeted interventions of at-risk students in Tier 2, and intensive and individualized interventions for at-risk students in Tier 3. The specifics of these models are explained in more detail later in this chapter. MTSS helped set the purpose of this study, which was to examine the impact of the MTSS on students' reading and math academic progress during the COVID-19 pandemic.

History of Educational Reform

Since the 1960s, scholars have studied the effects of education, though interestingly, the 1960s were marked by a belief that school made slight difference in student achievement (Marzano et al., 2001). The Equality of Educational Opportunity (Coleman, 1966), commonly referred to as the Coleman Report, upheld this belief stating that the quality of schooling accounted for only 10% of the variance in student achievement. According to this report, the strongest predictors of student achievement were teacher quality and the educational backgrounds and aspirations of other students in school (Coleman et al., 1966).

Public Law 94-142 "guaranteed a free appropriate public education (FAPE) to each child with a disability in every state and locality across the country" (U.S. Department of Education, 1975, para 1). This law had a dramatic, positive impact on millions of children with disabilities in every state across the nation. The four purposes of the law articulated a compelling national mission to improve access to education for children with disabilities by urging schools to (a) improve how children with disabilities were identified and educated, (b) evaluating the success of these efforts, and (c) providing due process protections for children and families. The law authorized financial incentives to support states and localities to comply with Public Law 94-

142.

In 1981, the National Commission of Excellence in Education was formed to examine the quality of education in the United States. The commission's formation led to the creation of a report entitled A Nation at Risk (National Commission of Excellence in Education, 1983). The report focused specifically on assessing the quality of teaching and learning in public and private schools and comparing schools in the United States with other advanced nations. The study highlighted the disparity between college admission requirements and student achievement in school, which indicated what were the problems that had to be overcome in order to make the nation's educational system more successful. The report stated that the poor quality of instruction in American classrooms posed a threat to the nation's security. Further, it said schools were failing and student achievement in the United States was well behind other countries. A Nation at Risk (1983) "supposed that longer school days and school years, more rigorous coursework and graduation requirements, and more capable educators were needed" (p. 17). This caused a catalyst for an increased role of the federal government in public education and resulted in the many educational initiatives that are seen today such as the No Child Left Behind Act (NCLB) signed by President George W. Bush in 2002, the NCLB Act which:

> ramped up testing requirements; mandated annual assessments in reading and mathematics in grades 3-8 and once in high school; called for reporting student results separately by race, ethnicity, and other key demographic groups; and required schools to demonstrate adequate yearly progress (AYP) on state tests overall and for each subgroup of students. If schools could not demonstrate AYP, they faced interventions followed by increasingly severe sanctions (para 3).

Since the introduction of NCLB, public school organizations experienced rapid changes

in response to the demands that all students achieve high standards. The act incorporated four significant points: (1) increasing academic accountability for states, school districts, and schools, (2) providing more choice to parents and students, (3) providing more flexibility in the use of federal funding, and (4) an emphasis on using more research-based educational programs and practices (Hoy & Hoy, 2006). The legislation ushered in an era where school leadership was driven by data and instructional practices were based on evidence (Hoy & Hoy, 2006).

Public Law 94-142 (1975) referenced above became known as the Individuals with Disabilities Education Act (IDEA) when reauthorized in 2004. IDEA established a new requirement calling for a "summary of academic and functional performance" to be given to every student who exits special education by graduating with a regular diploma or exceeding the age for special education under state law (para 2). In this reauthorization, there was a call for early intervention for students, greater accountability, and improved educational outcomes, which raised the standards for instructors who teach special education classes. A significant additional change required states to demand that local school districts shift up to 15% of their special education funds toward general education if it were determined that a disproportionate number of students from minority groups were placed in special education for reasons other than disability.

The shift toward accountability policies for schools over the past three decades—first introduced at the state level and then made national under the NCLB Act, signed into law in 2002—has been an essential part of the school reform efforts. Under NCLB, test scores and graduation rates improved, especially for children who had experienced low achievement. President Obama signed the Every Student Succeeds Act (ESSA) in 2002, which replaced NCLB. ESSA includes provisions that will "help ensure success for students and schools" (U.S.

Department of Education, 2015, para 4). ESSA most notably holds schools accountable for how students learn and achieve and is aimed to provide an equal opportunity for all students.

NCLB and IDEA provided a solid footing from which MTSS evolved. School reform continues to be at the heart of the debate on educational policy in the United States. While some reformers believe administration or staff are to blame for underperforming schools, others assert that schools lack proper communication and support between staff and community, thus difficulty implementing effective action plans (Borba, 2003). In 2009, the Obama Administration adopted the state incentive grants program, later known as Race to the Top (RTT). The United States Department of Education (2009) program description of RTT asked states to advance reforms around four specific areas: (1) adopting standards and assessments that prepare students to succeed in college and the workplace and to compete in the global economy; (2) building data systems that measure student growth and success, and inform teachers and principals about how they can improve instruction; (3) recruiting, developing, rewarding, and retaining effective teachers and principals, especially where they are needed most; and (4) turning around our lowest-achieving schools.

Changes were made in the hopes of improving upon the work started through NCLB. Within ESSA, more freedom was granted to states to tailor their education policies to the students and unique circumstances they face. Beginning in the 2017-2018 school year, ESSA required states to design state-wide accountability systems for implementation. ESSA (2015) required state accountability systems to annually measure five indicators that assess progress toward the state's long-term educational goals, with a particular focus on the following student subgroups: children from minorities, children with disabilities, and children classified as English Language Learners. The U.S. Department of Education (2015) outlined several indicators—

academic achievement measured in an annual assessment, an additional academic measure such as student growth and graduation rates for secondary schools, and an additional academic indicator for presecondary schools—are related to academics and are holdovers from NCLB. Additionally, the plan included a new requirement for the state-wide system, holding them accountable for improving English language proficiency of English language learners.

According to the law and the rules proposed by the Department of Education, schools must exhibit particular features to qualify. Indicators that lead toward qualification may include student or educator engagement measures, student access to and completion of advanced coursework or postsecondary readiness, school climate, and safety, or any other indicator under a broad banner of school quality and student success. An indicator that captures the values of school quality or student success must be evidence-based, be systematically measurable and meaningfully differentiate between schools, and relate to improvements in student achievement and high school graduation (Gotfried, 2019). Gotfried further described the requirement of meaningful differentiation between schools and allowing states to identify which schools should be targeted for support or intervention (i.e., the lowest-performing schools).

Under ESSA (2015), assessment data were collected, and schools were pressured and strained to make adequate yearly progress (AYP) via the common core state standards. ESSA reinforced these ideas, requiring a more comprehensive assessment of school performance and a less prescriptive, local approach to school support. This approach of using multiple measures of school performance in accountability systems is a result of policymakers, and the public they serve, recognition that schools should be held accountable for more than just increased test scores, in addition to more traditional measures such as test scores and graduation rates. The requirements for meeting the graduation standards established by the NCLB, ESSA, and state-

level initiatives, left educators searching for innovative ways of thinking about change in the public education system.

Risk Factors and Academic Challenges

The Office for Civil Rights (OCR) of the U.S. Department of Education (2021) has a "responsibility for enforcing laws enacted by Congress that guarantee all students access to educational opportunities free from discrimination based on race, color, national origin, sex, disability, and age (para 4)." OCR does this by providing information to students, families, and the national community about the right to equal educational opportunity, investigating allegations of discrimination and responding to violations of the laws, and collecting and analyzing civil rights data about students' experiences in our nation's schools. Its commitment to equity maintains a fair and just system for our nation's students. Yet, Wise (2008) noted that in the United States, more than 1.2 million students drop out of school every year, which is roughly 7,000 students each school day. While the dropout problem is a complex issue and is influenced by many variables, including the individual, familial, social, economic, and school policy, Rumberger (2006) has shown that many of these variables are already evident by the time a student reaches middle school. The National Center for Education Statistics (NCES) found that in "2019 there were 2.0 million status dropouts between the ages of 16 and 24, and the overall status dropout rate was 5.1 percent" (para 1).

As students transition from elementary school to middle school and then middle school to high school, they may struggle for various reasons. This can make determining supports that will positively impact a student difficult, as each student is unique (Horwitz & Snipes, 2008). For some, they may not be ready academically for the rigor of the high school curriculum. Lee et al. (2007) have shown that barely 30% of rising freshmen can read at grade level. Other students

may struggle with the socio-emotional issues that the transition from a middle school to a larger high school bring. To support students in overcoming risk factors, challenges, inequities, data-driven systematic frameworks of support, such as RTI or MTSS, play a crucial role.

Risk Factors

A longitudinal study by Green and Scott (1995) followed students over four years, beginning in eighth grade. They found that those students who had two or more of the National Center for Education Statistics risk factors were eight times more likely to drop out of high school than peers with no risk factors. These risk factors included "living in single-parent families, having a family income of less than $15,000, having an older sibling who has dropped out, having parents who did not finish high school, having limited proficiency in English, or living at home without adult supervision more than three hours a day" (p. 3). Green and Scott also suggested that students with two or more risk factors were more likely to "test poorly in reading, math, and science, more likely to become a teenage parent, more likely to have used illicit drugs, more likely to become involved in gang activity, and more likely to be suspended or expelled from school" (p. 3).

Barclay and Doll (2001) reviewed several studies and concluded that students who have dropped out of high school began showing signs of academic failure as early as the middle school years. The study found that additional risk factors included being retained in previous grades, frequently changing schools, parents who were not actively involved and /or had low expectations, and high absenteeism rates. A 2006 qualitative study entitled "The Silent Epidemic: Perspectives of High School Dropouts" reported five main factors for why students drop out of high school. These include boring classes, increased absenteeism, spending time with friends who were not interested in school, an abundance of freedom and very few rules, and

failing grades.

Dundas (2021) described how the MTSS framework minimizes disproportionality and over-representation of particular groups of students placed in Special Education. Although there is still an ongoing debate about how disproportionality should be calculated and whether or not disproportionate Special Education placement is a necessary by-product of particular groups of students requiring more support, it is essential to recognize that a student learning disability designation is intended for students who have neuropsychological differences that interfere with an ability to learn in traditional ways (Dundas, 2021). In the reauthorization of IDEA (2004), the Department of Education helped ensure a more systematic, data-driven approach for identifying students and supports school districts in adopting an MTSS framework. Schools should continue to monitor their sub-group data to ensure equity and ensure all students receive the supports schools put in place instead of leading towards Special Education.

History of Multi-Tiered System of Supports

MTSS is defined as:

> An evidence-based model of education that employs data-based problem-solving techniques to integrate academic and behavioral instruction and intervention. This integrated instruction and intervention system is provided to students in varying levels of intensities-or tiers based on student needs. This needs-driven decision-making model seeks to ensure that district resources reach the appropriate students (and schools) at suitable levels of quality and concentration to accelerate the performance of ALL students. (Gamm et al., 2012, p. 4)

MTSS originates from research and practice surrounding RTI and PBIS. RTI came to the forefront of educational reform with its inclusion in IDEA (2004). Amendments added to IDEA

(2006) solidified the use of research-based intervention and analysis by a multi-disciplinary team as an alternative to the discrepancy model to identify specific learning disabilities (SLD). Although the primary goal of RTI is to improve academic and behavioral outcomes for all students, it was brought into policy with a secondary purpose of identification for special education (Fletcher & Vaughn, 2009). The intent behind RTI is not that it is generated out of or by special education, but that it is a general education initiative. Even so, special education has benefited from the introduction of RTI into the federal legislation through identification and inclusion (Hauerwas et al., 2013; Sailor & McCart, 2014).

Much of the early research and practice regarding RTI occurred in reading at the primary level (Bemboom & McMaster, 2013; Fagella-Luby & Wardwell, 2011; Fuchs et al., 2010; King et al., 2012). Scholin and Burns (2012) conducted a meta-analysis specifically on reading fluency intervention outcomes and upon their first electronic search, 4,452 studies were identified. The data eventually narrowed to 18 studies that examined 31 different reading interventions. These data illustrated that the structure in which RTI evolved had a firm root in reading interventions, although it is now used in other content areas including mathematics.

The basic structure of RTI follows a three-tiered model for intervention that is best understood as a set of processes and not a single model (Fletcher & Vaughn, 2009). Traditionally, the tiered approach to intervention also includes assessment and progress monitoring of students who do not possess grade-level skills, thus receiving tiered interventions that may eventually result in a referral to special education (Batsche et al., 2006), depending on their individual response to the intervention.

Tier 1 Intervention and Universal Screening

At the Tier 1 level, all students receive core instruction and undergo universal screening

to identify and determine the necessity for early interventions and evaluate the efficacy of the "core/universal" curriculum and system-wide supports. This approach promotes the use of preventive strategies, increases the robustness of the core/universal curriculum, and helps determine the need for more immediate attention towards more intensive academic and behavioral supports. All students in the general education classroom are in this tier. Teachers use instruction that is proven to work. Universal screening is traditionally administered to all students three times a year (i.e., Fall, Winter, Spring) and serve as a first step in helping identify students in need of additional support (North Dakota Multi-Tiered System of Supports (NDMTSS), 2021).

In addition, information about student strengths may be determined through the universal screening tool. This is valuable for the broader population of students, typically 75% to 85% (Dowdy et al., 2015; Harn et al., 2015). System-level tools help contribute to decision-making that is based on data collected with all students in the population. Universal screening is utilized to determine a student's capacity to acquire curriculum standards as intended for the overall general population of students, whether academic, behavioral, or social-emotional. The results of universal screening drive Tier 1 instruction and interventions for all students (Regan et al., 2015). Tier 1 is intended to provide high-quality research-based core instruction toward the effort of students being routinely monitored via progress monitoring assessments (Preston et al., 2016). If a student is not making adequate academic growth in Tier 1, progress monitoring, planning, and problem-solving are used to identify research-based interventions that will positively impact student achievement. This progress monitoring of student achievement is used to assess the intervention being used for effectiveness before deciding to modify the intervention and/or tier of support (Preston et al., 2016). For example, a new plan may require modification of Tier 1

supports, such as more time or frequency, or a determination that Tier 2 and/or Tier 3 supports are needed, in addition to what is provided at Tier 1 on a universal basis.

Tier 2 Intervention and Progress Monitoring

Tier 2 intervention is applied as a secondary level of support, targeting strategic interventions most often used with 10% to 15% of all the students (Harn et al., 2015; Utley & Obiakor, 2015). Tier 2 interventions should be affordable, efficient to carry out, readily accessible, and should not require individualization to meet student needs and is supplemental to Tier 1 instruction. It is imperative that teachers use progress monitoring for Tier 2 students. Safer and Fleischman (2005) described progress monitoring as a practice that helps teachers use student performance data to continually evaluate the effectiveness of their teaching and make more informed instructional decisions. Fuchs and Fuchs (2002) analyzed research on student progress monitoring that concluded, "When teachers use systematic progress monitoring to track their student's progress, they are better able to identify students in need of additional or different forms of instruction, they design more robust instructional programs, and their students achieve better (p. 1). Data-based decision-making teams monitor student performance data and progress monitoring to ensure students are making adequate progress or make appropriate changes to their goals and intervention plans.

Successful Tier 2 interventions should have an increased intensity beyond core instruction for the learner and match their skill deficit. The frequency and the amount of time varies. Some learners may spend 30 minutes per day, three days per week with a particular intervention focused on their goal and some may spend five. In secondary buildings, the duration may be dictated by the learner's course schedule. If the learner isn't making progress, they may stay in Tier 2 or move to Tier 3.

Tier 3 Intervention

At the Tier 3 level, interventions are applied as a tertiary level of supports targeting intensive interventions most often provided for only 5% to 10% of all the students in a school population (Harn et al., 2015) or 1% to 3% per other cited studies (Utley & Obiakor, 2015). Intensive Tier 3 interventions should be layered on top of core instruction and should be individualized, evidence-based, include progress monitoring, teaming, and evaluation for progress, and implemented with fidelity (Harn et al., 2015; Utley & Obiakor, 2015). Tier 3 instruction should have an increased intensity in the amount of time and duration spent weekly with trained interventionists.

Components of a Multi-Tiered System of Supports

MTSS is designed for schools to provide the appropriate level of instruction and intervention to students in academic and behavioral areas (Gamm et al., 2012). According to Gamm et al., the MTSS framework is based on a continuum of evidence-based interventions and instruction with increasing intensity among the three tiers to meet the needs of diverse students.

The three tiers of intervention in an MTSS framework do not prescribe specific programs or describe a particular group of students. Still, these provide information on the level of intensity and time needed for a particular skill to best support a student (Gamm et al., 2012). Tier 1 includes universal screening and supports, Tier 2 includes strategic screening and supports, and Tier 3 includes intensive and individualized screening and supports along with core curriculum (Dufrene et al., 2010; Gamm et al., 2012; Morrison et al., 2014). In basic terms, Tier 1 is the core curriculum, Tier 2 is the core curriculum with additional support, and Tier 3 is a small group or individualized curriculum. In schools that have not implemented MTSS, significant changes in the professional practice of teachers, administrators, and support staff are required to maximize

effectiveness (Morrison et al., 2014).

The tiered model of MTSS is frequently characterized in the literature as one of two types: standard protocol or problem-solving. The standard protocol approach (Fuchs et al., 2003) emphasized standardized (often scripted) interventions used for a standard amount of time with teachers frequently monitoring for treatment fidelity of implementation (Gresham, 2007). The problem-solving model (Marston et al., 2003) involves collaborative efforts on several school community members to identify and implement optimal instructional interventions for each student who appears to be at-risk for learning difficulties. The student's response to such interventions determines intervention plans in an iterative manner.

MTSS can be implemented as either a problem-solving protocol or a standard protocol. The problem-solving model begins by identifying the problem and determining its cause. From that point, a plan is developed to address the problem, and then the plan is implemented and evaluated for effectiveness. Burns (2008) recommended collecting five to seven data points to determine the effectiveness of the intervention. These data points will help determine "if the intervention is working or if a more focused, targeted intervention is needed" (Burns, 2008). School districts have used the problem-solving model for more than two decades and it utilizes a process by which educators work through for each tier. A school-based team of professionals works together at each tier for each student of concern, one student at a time. Utilizing a team for selecting interventions and making decisions allows for brainstorming and flexibility throughout the problem-solving approach. A student can receive instruction aligned more closely with each of their individual or specific academic needs.

The second MTSS model is called the standard protocol. This model uses one validated intervention selected by the school to improve the academic skills of its struggling students. The

IRIS Center noted that "because a single, consistent intervention is used, it is easier to ensure accurate implementation or fidelity" (2021, p. 1). Secondary buildings find this model easier to implement because they can schedule students into the intervention through their class period schedule. For the purposes of this research, the MTSS framework will be referred to in terms of a standard protocol.

Although these two approaches, problem-solving or standard protocol, are sometimes described as vastly different, they have several elements in common. In practice, many schools and districts combine or blend aspects of the two approaches to fit their needs. "Most RTI models described in the literature combine the two approaches…and probably function optimally when integrated into one three-tiered service delivery system" (Jimerson et al., 2007, p. 4).

Five essential components of a successful MTSS framework should be included when implementing a problem-solving approach, standard protocol, or a balance of both (NDMTSS, 2021). These include assessment, data-based decision making, instruction, infrastructure, and support, and finally, fidelity and evaluation.

1. Assessment

Assessment is the process of collecting, reviewing, and using the information to make educational decisions about student learning (NDMTSS, 2021). The intended use of the results determines the type of information collected. Professionals at NDMTSS (2021) state that screening, progress monitoring, and other supporting assessments are used to inform data-based decision-making. Within the framework of MTSS, there are four purposes for assessments. The first is universal screening, where all students are assessed to determine which students may need additional supports. The second is diagnostic assessment, which identifies skill deficits and informs instructional matches at all tiers. The third is progress monitoring, which entails frequent

assessment to determine whether students are making adequate progress towards the specific preset goals. The fourth is outcome assessment which measures the performance of the educational system. This is often an external assessment such as the North Dakota State Assessment (NDSA) or the American College Test (ACT). The Center on Response to Intervention (2020) provides a dynamic chart that rates the technical rigor and includes information about the efficiency of implementing various progress monitoring tools.

2. Data-Based Decision Making

The second essential MTSS component is data-based decision-making. A guide developed by the professionals at NDMTSS highlight the importance of using student achievement data to support instructional decision-making by stating that data-based decision making "optimizes the use of data for purposes of informing individual student instruction, identifying strengths and weaknesses in a classroom, and illuminating trends and gaps across a school district" (NDMTSS, 2021, para 2). To accomplish this, the creation of an ongoing team and a process that begins with identified questions and established protocols to evaluate and inform decisions and actions at the student, classroom, grade level, school, and system levels is required. Basic steps in the process include gathering accurate and reliable data, correctly interpreting and validating data, using data to make meaningful instructional changes for students, establishing and managing increasingly intensive tiers of support, and evaluating the process at all tiers to ensure the system is working.

3. Multi-Tier Instruction

Multi-Tier Instruction is an essential component through which educators efficiently differentiate instruction for all students. The professionals at NDMTSS (2022) describe the MTSS as incorporating increasing intensities of instruction and assessments that offer specific,

research-based interventions that are matched to student needs driven by data. This process was described above when the three tiers were presented in detail.

4. Infrastructure and Support Mechanisms

Implementation of a MTSS requires appropriate school infrastructure and support mechanisms. By ensuring the proper infrastructure and supports, schools can make sure they have the knowledge, resources, and organizational structures to begin implementation, implement MTSS with fidelity and ultimately sustain implementation (NDMTSS, 2021). Elements of this component include school-based professional development, a focus on prevention, leadership involvement, schedules that allow for adequate time in programming, interventions, and teaming, adequately allocated resources, communications with families, and an evaluation plan to monitor short- and long-term goals.

5. Fidelity and Evaluation

Fidelity and evaluation are the last components of a successful MTSS model. Buffum (2008) described fidelity as the degree of exactness with which something is implemented or conducted. Evaluation measures the effectiveness of individual resources and practices and happens across multiple points within the MTSS framework. Schools across the state work with state and national trainers to strengthen their MTSS efforts. The professionals at NDMTSS report on their professional development page that training participation to date includes 78 school districts (15 new); 157 schools (26 new), 6 Special Education units (1 new), and 5 Career and Tech centers (NDMTSS, 2022). A plethora of learning opportunities are offered through the local associations that match the diverse needs of their participants for the effective implementation of MTSS.

MTSS in Study's School District

The North Dakota Department of Public Instruction (NDDPI) considers MTSS a framework that provides all students with the best opportunities to succeed academically and behaviorally in school. By matching high-quality instruction and intervention to student needs with frequent progress monitoring, resources are allocated to improve student learning. The professionals at NDDPI coordinate their efforts with Regional Education Associations in the state to provide high-quality programs and service schools with professional development, technology support, data systems support, school improvement support, and curriculum enrichment in each of their regions of the state. North Dakota's Multi-Tier System of Supports was initially funded by the North Dakota Department of Public Instruction, Office of Special Education, and Early Intervention Services through a State Personnel Development Grant from the U.S. Department of Education through the Office of Special Education Programs. Local cooperatives and the ND Department of Public Instruction have continued to sustain their programming to meet state and federal guidelines and mandates for continuous improvement.

The School District in this study implements MTSS for students in kindergarten through twelfth grade. The School District implements MTSS as a framework aimed at improving learning for all students by providing instruction and interventions matched to the needs of each student. The School District is a state-approved demonstration site for MTSS, which allows schools from across the state to visit and have conversations with MTSS leaders in the district.

The School District's MTSS program is coordinated by their District's Support and Wellness Facilitator. Each of their secondary buildings has an MTSS Instructional Coach to support and ensure compliance and fidelity in its implementation. This role focuses on student testing and placement, support for MTSS Interventionists, logistics and data, and developing and

maintaining MTSS in their building. MTSS coaches coordinate professional learning communities that extend across the district to facilitate the use of common assessments, a scope and sequence and maintain fidelity of MTSS systems. MTSS Instructional Coach collaborates with teachers, counselors, and administrators along with school district personnel and other secondary MTSS Instructional Coaches. Their contract includes additional days for registration testing, new teacher training, and end-of-year logistics.

At the researcher's school, MTSS placement decisions for the following school year begin with the Winter Universal Screener, STAR Reading, and STAR Math. The MTSS Coach meets with the appropriate teachers to discuss students that fall below the 40th percentile to see if a secondary screener is most appropriate. Before secondary screeners occur, the MTSS Coach informs families. Once the secondary screeners are conducted, the MTSS Coach analyzes the data and submits all students that will need Reading and Math interventions to the principal for scheduling. This is conducted before staffing and budgeting meetings so that schools can ensure these decisions are made based on student needs. The MTSS Coach is responsible for ensuring data-based MTSS decisions occur for incoming 6th graders along with exiting 8th graders. All new students to the District at the secondary level are screened with STAR Reading and STAR Math before a schedule is created for them.

Screening and Progress Monitoring

STAR Assessments

Renaissance Learning was founded in 1984 beginning with Accelerated Reader and quickly grew into the company it is today featuring unique products including STAR Reading and STAR Math that monitor student progress. To date, "Renaissance STAR Assessments have been approved by 25 states for use as part of 45 approved lists as a sole assessment solution"

(Renaissance, 2021, para 1). More than 34,000 schools and districts in all 50 states rely on STAR Assessments each day for the data they need to maximize student growth and success. The National Center on Response to Intervention (2021) stated that "STAR assessments are highly rated for screening and progress monitoring" (para 1). Assessments are computer-adaptive tests that measure student achievement based on students' responses. If the student answers the item correctly, the assessment increases the difficulty level of the next item. If the student answers incorrectly, the assessment lowers the difficulty level of the next item. By continually adjusting the difficulty of a test question the student shows what they know and what they do not know. Each test is tailored to accurately measure the student's level of achievement. STAR assessments contain a large item bank to allow multiple administrations without the risk of item overexposure.

The STAR Reading test is designed for students in grades K-12. The Enterprise version, which was used for this study, consists of 34 questions. The test generally takes less than 30 minutes for the student to complete the assessment. If a student has not taken a STAR Reading test in the past 180 days, the student will see practice questions before the actual test starts. If a student answers seven practice questions without getting three correct, the practice session ends, and the test will not start for that student. With STAR tests, many students can test at one time with one proctor which makes it more sustainable over time in secondary schools.

The STAR Math test is designed for students in grades 1-12. The Enterprise version, which was used for this study, consists of 34 questions. The test generally takes approximately 20 minutes for the student to complete the assessment. If a student has not taken a STAR Math test in the past 180 days, the student will see three practice questions before the actual test begins. If the student does not answer two of the three practice questions correctly, the student

will be given another set of three practice questions. Once the student answers two of those three practice questions correctly, the test will begin. If the student does not answer two of those three practice questions correctly, the practice session ends, and the test will not begin for that student.

Screening and Progress Monitoring in Study's School District

There are three universal testing windows in which STAR testing occurs. The MTSS Instructional coach determines the dates for their building and communicates those with the English Language Arts Teachers, Math teachers, and Special Services. Teachers administer testing in their classrooms following outlined protocols to ensure the most optimal testing environment for their learners. Once a majority of the testing is completed, the MTSS Coach conducts makeup testing and begins to input the data into spreadsheets to analyze. The pathways for placement pull percentile ranks to determine if additional screening should take place and determine appropriate interventions. The School District considers those below the 20th percentile as urgent intervention (Tier 3), between the 20th and 40th some risk (Tier 2), and those above the 40th percentile as no risk (Tier 1).

COVID-19 Pandemic Around the World

Even as schools were busy utilizing the framework of MTSS to help students in need of academic supports, March 2020 became an unprecedented era in education due to the outbreak of the Coronavirus also known as COVID-19. Professionals at Avera Health (2021) defined a pandemic as a worldwide epidemic, or even a vast area, crossing international boundaries and affecting many people. COVID-19 was declared a pandemic in March 2020 by the World Health Organization (WHO).

The CDC (2022) described people with COVID-19 had a wide range of symptoms reported ranging from mild symptoms to severe illness. These symptoms appeared 2-14 days

after exposure to the virus. Symptoms included fever or chills, cough, shortness of breath or difficulty breathing, fatigue, muscle or body aches, headache, the new loss of taste or smell, sore throat, congestion or runny nose, nausea or vomiting, diarrhea. Older adults and those with underlying medical conditions are identified to have a higher risk of complications from the COVID-19 illness. Hospital systems had to adjust to new everyday norms and were pushed to the brink while the global economy experienced tough times and hardships.

The world became a different place as the coronavirus disease brought countries, including the United States, to a standstill. The COVID-19 pandemic significantly changed how most people lived and worked. Many professionals worked from home and balanced work while supporting their students academically at home. With little to no training, teachers began teaching from home through virtual platforms.

Schools across the United States were shut down to help prevent the spread of COVID-19. The CDC shared that limiting close face-to-face contact with others was the best way to reduce the spread of the virus. Additionally, social distancing was at the forefront, which meant keeping a safe distance of space between yourself and others who are not from your household. The CDC (2020) also released ways to reduce the spread of COVID-19, including wearing cloth face coverings, avoiding touching your face with unwashed hands, and frequently washing your hands with soap and water for at least 20 seconds.

In 2020, COVID-19 spread across the globe awaiting a vaccine that became a reality in 2021 in hopes of ending the pandemic with its distribution. The rollout began in January of 2021 when the FDA approved Moderna, Pfizer, and Johnson & Johnson to have their doses administered for individuals aged 18 to 55. Pfizer was approved for teens aged 12-17 in the summer of 2021 and children 5-11 by the Fall. The significance of this was particularly

important as children were considered the most important vector for the spread of the virus.

The COVID-19 Pandemic in Study's School District

On Friday, March 13, 2020, schools in the study's state were open, and business was as usual. Fast forward only two days later, and the Governor delivered the news that all schools in the state would be shut down to help prevent the spread of this deadly virus (NDDoH, 2020). State leaders, local superintendents, and teachers across the nation were left not knowing when schools would return and what instruction would look like. starting Monday, March 15, 2020, districts across the state began putting together a plan for remote learning, including the school district identified in this study.

By March 23, 2020, the Governor approved a distance learning plan and remote instruction began. Students met with their classes with online access through virtual learning platforms. Advantages for the School District's secondary schools included a one-to-one initiative with Apple iPads which meant all learners had access to their own device for online instruction, Schoology had already been utilized as their learning management system, and Microsoft Teams was more widely leveraged as a mode for which students and teachers interacted for synchronous learning to occur. Disadvantages included minimal time and training needed to implement distance learning effectively. Teachers, students, and parents had a steep learning curve to overcome in a short amount of time for which learning suffered.

Other supports were initiated for student support including distribution centers for meals, devices, and instructional learning packets. Individualized Education Plan (IEP) meetings, staff meetings, and family communication became virtual while the learning curve for teachers, students, and parents became part of their everyday lives. Most schools in the United States remained closed to in-person learning for the remainder of the 2020-21 school year. While the

country continued to grapple with the unknowns, local school districts drafted more policies and plans for the 2020-21 school year, including mask-wearing, social distancing, hand hygiene, and hybrid learning (a balance of knowledge while away from and at school).

When the 2020-21 school year began for the School District, learning cohorts were leveraged to minimize the number of students in the school for social distancing and as a way to better conduct contact tracing. Students were either in school Monday and Tuesday or Thursday and Friday for which distance learning occurred the other three days of the week. This resulted in teachers and learners once again pivoting to another mode of instruction: hybrid learning. It became apparent that some students were engaging on distance learning days while others did not. The amount of rigor was lessened as well as expectations. For secondary students, instruction resumed on-site 4 days a week in February of 2021 and back up to 5 days a week in March of 2021 following strict safety protocols throughout the remainder of the school year. In the Fall of 2022, all students were on-site five days a week with a typical instructional style.

COVID-19 Pandemic and Academic Achievement

Throughout the COVID-19 pandemic, many schools found new ways to continue learning with the help of teachers, staff, administrators, instructional leaders, and families. In his Executive Order Opening and Continuing Operation of Schools and Early Childhood Education Providers (2021), President Biden expressed the commitment to be made for our students across the United States. Throughout the COVID-19 pandemic, many students participated in multiple learning modes including distance learning, hybrid learning, synchronous learning, and asynchronous learning. Teachers, staff, administrators, and instructional leaders, along with their families were forced to quickly acclimate to these with little to no preparation.

Even in these trying times, students, families, educators, staff, and administrators in many

school districts are working to rebuild educational opportunities for all students. On January 21, 2021, President Biden's Executive Order (2021) stated that "we have a rare moment as a country to take stock and to begin the hard work of building our schools back better and stronger-with the resolve necessary to ensure that our nation's schools are defined not by disparities but by equity and opportunity for all students" (p. ii). His report, which offered a series of snapshots from mid-March 2020, when many schools shifted abruptly to remote learning, to mid-April 2021, made eleven observations regarding how widely and inequitably the pandemic has impacted America's students during this time.

For over a year, many students had to learn in front of screens at home and other settings, affected by illness, loss, and economic hardship stemming from the global pandemic (McElrath, 2020). Even when schools implemented plans, the basic needs of many students were left unmet. As students suffered throughout the pandemic, so too did their learning. Kuhfield (2020) stated, "in the fall of 2020, according to some assessments, many students appeared to have made gains from the previous year, though in most cases, significantly smaller ones than in prior year-over-year comparisons—including a five to ten percentile point drop in math achievement" (p. 12). Kuhfield continued to state that "this and other early reports suggest that trends vary by district, with math skills generally slipping more than in reading. Data at the state and district level also painted a picture that students had made academic gains by 2020, but in amounts that were smaller than in previous years and uneven across subjects" (p. 12). Another study by McKinsey and Company (2020) reported that "by the end of the 2020-21 school year, students were on average five months behind in math and four months behind in reading (p.6)."

COVID-19 Pandemic and Academic Achievement in Study's School

On October 11, 2021, the State's School Superintendent delivered an official press

release to share testing data from the COVID-19 pandemic. The results offer evidence regarding how the COVID-19 pandemic affected student learning in the state for English Language Arts and Mathematics. She described the decline as "significant," with many challenges ahead for educators. Below is a summary of the overall results.

Table 3

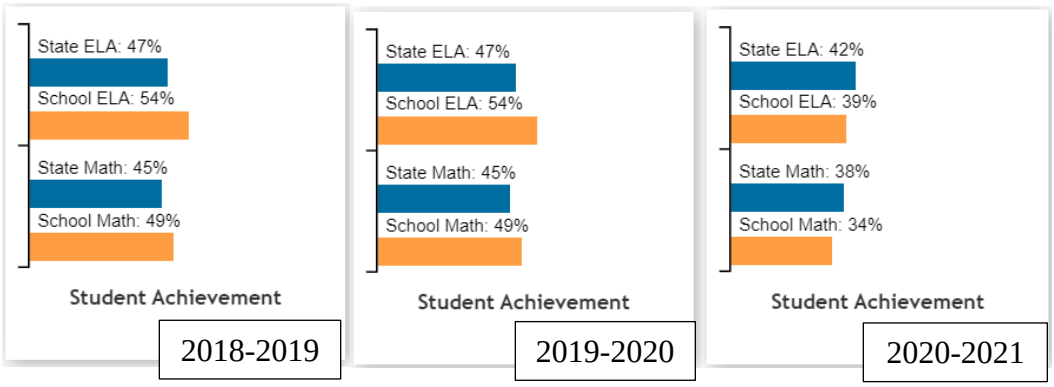
Student Achievement Percentages in North Dakota State Assessment English/Language Arts and Mathematics Grades 3-8 and 10

Subject/Year	Novice	Partially Proficient	Proficient	Advanced
English Spring 2019	26 percent	26 percent	33 percent	24 percent
English Spring 2021	31 percent	26 percent	30 percent	12 percent
Increase / Decrease	+5 percent	Unchanged	-3 percent	-2 percent
Math Spring 2019	24 percent	32 percent	34 percent	11 percent
Math Spring 2021	28 percent	34 percent	29 percent	9 percent
Math Spring 2019	+4 percent	+2 percent	-5 percent	-2 percent

The State's Insights database presented the following academic progress reports which compares the study school's ELA and Math performance to the state. Before the pandemic, the school was performing higher than the state average but was performing below the state average in the Fall of 2020.

Table 4

Academic Progress of Study's School Average versus State Average



Note. Original Source ND Insights: Academic Progress (https://insights.nd.gov/Education/School/StateAssessment/StudentAchievement/0900652582)

The NAEP 2021 report card that assesses 13- and 9-year-olds' reading and math scores reported scores of 13-year-old students fell between 2012 and 2020— "the first time in the almost 50-year history of the National Assessment of Educational Progress (NAEP) long-term trend (LTT) assessment—according to results released by the National Center for Education Statistics (NCES)" (para 1). Lower performing students declined at an even greater degree. The report noted that for mathematics scores of the lower-performing students (students at the 10th and 25th percentile) declined among students from both age groups from the previous assessment in 2012. Scores also declined for the 13-year-olds in mathematics for students that scored at the 50th percentile. Higher-performing students (at the 75th and 90th percentiles) did not change. Reading scores declined for both the lowest-performing 9-year-olds and 13-year-olds at the 10th percentile which was the only percentile group with significant change between 2012 and 2020.

Experts working at Renaissance STAR, the company that created the assessments in this study, found that nationwide Winter data from 2020 indicated that students may have recovered some of the ground they lost during trying times of the pandemic in reading and math. Still, Renaissance found that "the average reading and math performance of students remain[ed] behind pre-pandemic expectations" by Winter 2021, "with math achievement still more impacted than reading" (2021). Students' gains were not spread evenly across groups. In Renaissance's estimation, late elementary and early middle school students were still "about 8-11 weeks behind midyear expectations" (p. 5) in math by last Winter, with middle schoolers "about 6-10 weeks behind expectations" in reading (Renaissance, 2021, p. 5).

At the researcher's school, 7th grade students' STAR Reading and STAR Math scores

were analyzed over the identified years. These students attend 4 core classes that include English Language Arts, Mathematics, Social Studies, and Science. They also attend 2 encore classes that they choose. The scheduled day also includes an advisory time and 30 minutes of "What I Need" for additional supports that vary across teams and grade levels. During distance learning in the Spring 2020, these students met with their core and alternate core teachers daily for approximately 30 minutes each. Work was posted on their learning management system, Schoology, and students and/or teachers could schedule extra support through Microsoft Teams. For those that needed supplemental reading intervention (Read 180), they were only required to do about half of what was typically expected of them in a week and no direct instruction was conducted.

During Hybrid learning in the Fall and Winter of 2020, all direct instruction for students occurred when students were on-site for learning. On off-site days, students conducted their work using Schoology. Schools struggled to hold students accountable for requirements on distance learning days.

Theoretical Framework

There are a variety of program evaluation models in education that have been used to measure the impact of a program on student achievement. Tyler, one of the leaders in program evaluation, viewed evaluation as the process of determining the extent to which the program objectives are attained to determine success. He believed that traditional educational program evaluation did not focus on individuals but instead focused on providing overall information about the educational attainments of large groups of learners (Tyler, 1967).

The purpose of this proposal was to evaluate the MTSS for 7th-grade students at one Midwestern middle school to determine the impact the COVID-19 pandemic had on student

achievement for reading and math according to STAR assessments. An objectives-based evaluation model was used to provide timely evaluative information and inform decision-making. The objectives-based approach identifies the proposed program's objectives and determines if, or to what extent, these objectives have been met, which ties directly to the research questions. This study will use existing longitudinal data to measure the extent to which MTSS has met the program objectives.

The objectives model stresses the use of setting goals and objectives that are logical, scientifically acceptable, and adoptable by evaluators (Tyler, 1949). This model of program evaluation provided insight regarding the efficacy of the MTSS framework regarding student achievement. In following Tyler's model, the objective is focused specifically on the impact of the MTSS framework before, during, and after the COVID-19 pandemic as a means of identifying which students need additional support and ensuring interventions in a timely manner.

Schools are required to provide research-based activities and programs to assist with student learning and overall success. For school district leaders, it is important to be able to discuss the findings supported by evidence. Although the school district being examined implemented MTSS before the pandemic, its solid foundation provided the district the opportunity to continue implementing MTSS with fidelity and make appropriate changes as needed, all the while using STAR assessment data to monitor the objective. The following figure highlights the school's objective:

Figure 2

Correlation of Tyler & Boin's Theory & MTSS

This study is also grounded in Boin's (2013) Leadership in Times of Crisis Framework for Assessment. The framework is composed of ten executive crisis tasks to be assessed: 1) Early Recognition (i.e., what is the threat that has emerged and who is affected), 2) Sensemaking (i.e., scope and effect of the threat), 3) Making Critical Decisions, 4) Orchestrating Critical and Horizontal Coordination, 5) Coupling and Decoupling, 6) Meaning Making, 7) Communication 8) Rendering Accountability, 9) Learning, and 10) Enhancing Resilience. This study will only focus on the first three tasks that Boin outlines. This framework defines crisis management as "the sum of activities aimed at minimizing the impact of a crisis" (p. 81). In this framework, "impact is measured in terms of damage to people, critical infrastructure, and public institutions" (p. 81). The authors asserted that effective management protects the lives of those affected by the crisis, protects the infrastructure, and restores the community's trust in public institutions. The

research conducted by Boin (2013) states that a "shared recognition that a threat has emerged requires immediate attention" (Boin, p. 82). MTSS serves as a proactive response to meeting students' unique academic needs. Given the crisis of the COVID-19 pandemic, the need for an immediate response including the extent of the damage that the system was experiencing in terms of student performance as a result of the pandemic reigns even more true.

To accurately determine the impact that the COVID-19 pandemic had on students' academic performance, schools must measure the most critical areas impacted by the school closure crisis triggered by the pandemic. Leaders must triage the needs of the educational system and determine what are the most urgent needs. In this study, the MTSS Coach must analyze the data to determine the needs and communicate this to leadership for effective data-based decisions regarding staffing, student placement, and budgeting. This impact can be measured by Standardized Test for the Assessment of Reading (STAR) performance on STAR Reading and STAR Math because "Renaissance STAR scores represent how students performed on tests compared with the performance of a nationally representative sample of students, called the norms group" (Renaissance, 2021, p. 1).

Research Questions and Hypotheses

Primary and secondary research questions for this study were asked to conduct a program evaluation to determine the role that the MTSS played in countering the impact of COVID-19 on reading and math.

Primary Research Questions:

1. To what extent is the MTSS achieving the objectives for which it was implemented?
2. How effective was the MTSS framework to counter the impact of the COVID-19 pandemic on 7th-grade students' academic performance in reading and math?

Secondary Research Questions:

3. What is the academic impact of the COVID-19 pandemic on 7th-grade students' STAR Reading scores accounting for demographic variables?
4. What is the academic impact of the COVID-19 pandemic on 7th-grade students' STAR Math scores accounting for demographic variables?

For purposes of this study, the researcher sought to test the following null hypothesis:

> The 2020-21 (COVID-19 pandemic) aggregate mean scores of Tiers 1, 2, and 3 students as measured by STAR reading and math test scores will be equivalent across the 2017-18, 2018-19, and 2019-20 academic years.

In consideration of the null hypothesis, the alternative hypothesis is:

> The 2020-21 (COVID-19 pandemic) aggregate mean scores of Tiers 1, 2, and 3 students as by STAR Reading and STAR Math test scores will not be equivalent across the 2017-18, 2018-19, and 2019-20.

Conclusions

The COVID-19 pandemic is having a tragic impact on individuals, families, and communities that deepened the divides in educational opportunities across our nation's learning spaces. Although the effects of the pandemic will be studied for many years to come, educational decision-makers must consider the academic implications for our schools. These opportunity gaps will only continue to widen for some students unless school systems provide the necessary supports.

This chapter focused on the importance of implementing a Multi-Tiered System of Supports in schools to comply with local and national mandates and lessen the learning loss associated with the COVID-19 pandemic. With an increased emphasis on using well-researched

programs and improving academic success, schools should consider using a framework, such as MTSS, that helps all students. MTSS is designed to provide the appropriate level of instruction and intervention to students in academic and behavioral areas (Gamm et al., 2012) and has proven to be a successful framework during the pandemic academically for at-risk students. It encompasses a three-tiered model to positively impact student learning and support. By conducting a quantitative research study, the secondary longitudinal data will allow the researcher to explore the role played by the MTSS during the critical times of the pandemic.

This study added to a limited body of literature surrounding the COVID-19 pandemic and student achievement and potentially allows further research to better prepare for and respond to an abrupt change of supports due to the COVID-19 pandemic. By utilizing a program evaluation framework modeled from the work of Tyler (1949), data were analyzed to gauge the potential impact of the MTSS on student achievement during the COVID-19 pandemic. The next chapter will review the methodology chosen to analyze the data. The chapter will also describe the data that will be analyzed, the study sample and participants, and the setting for the research to be conducted.

CHAPTER 3: RESEARCH METHODS

The COVID-19 pandemic created unprecedented times for educational stakeholders as they turned to research, health officials, and experts in the field to determine the steps necessary to move forward with providing a positive experience for their learners. Conducted at a public middle school in a Midwestern state, this causal-comparative research was twofold, to measure the degree of impact the COVID-19 pandemic had on students' academic performance and determine the extent to which the Multi-Tiered System of Supports (MTSS) program served to counter the impact of the pandemic on students' reading and math performance.

This chapter addresses the research design being proposed and includes both the internal and external threats to validity for transparency and measures in place to counter the threats when possible. This chapter will also describe the study's setting, participants, and sampling as it is designed and include an explanation of the instrumentation, a proposal for data collection and analysis, along with a table of alignment that details how the research questions are addressed in this research design.

Research Questions

Research questions for this study examined the academic impact of the COVID-19 pandemic on the Multi-Tiered System of Supports as measured by STAR Reading and STAR Math.

Primary Research Questions:

1. To what extent is the MTSS achieving the objectives for which it was implemented?
2. How effective was the MTSS framework to counter the impact of the COVID-19 pandemic on 7th-grade students' academic performance in reading and math?

Secondary Research Questions:

3. What is the academic impact of the COVID-19 pandemic on 7th-grade students' STAR Reading scores accounting for demographic variables?
4. What is the academic impact of the COVID-19 pandemic on 7th-grade students' STAR Math scores accounting for demographic variables?

Hypotheses

For purposes of this study, the researcher sought to test the following null hypothesis:

> The 2020-21 (COVID-19 pandemic) aggregate mean scores of Tiers 1, 2, and 3 students as measured by STAR reading and math test scores will be equivalent across the 2017-18, 2018-19, and 2019-20 academic years.

In consideration of the null hypothesis, the alternative hypothesis is:

> The 2020-21 (COVID-19 pandemic) aggregate mean scores of Tiers 1, 2, and 3 students as by STAR Reading and STAR Math test scores will not be equivalent across the 2017-18, 2018-19, and 2019-20.

Research Design

This quantitative research study utilized a positivistic paradigm to approach the social phenomenon of interest and analysis of data. The researcher used a causal-comparative design to analyze the impact of the pandemic on the STAR Reading and STAR Math scores and the role to MTSS. According to Briggs (2012), the positivist paradigm "[accept] that facts can be collected about the world; language allows us to represent those facts unproblematically; and it is possible to develop correct methods for understanding educational processes, relations, and institutions" (p. 16). The causal-comparative research design is a non-experimental model that attempted to identify any differences and the cause of those differences between groups that already exist

(Fraenkel et al., 2018).

This quantitative study compared 7th-grade STAR Reading and STAR Math data between Tier 1, Tier 2, and Tier 3 students across five years. Read 180 and Trans Math were the predictor variables and represented the implementation of the MTSS, while STAR Reading and STAR Math scores were the outcome variables. The following are the variables of study: Predictor Variable A: Multi-Tiered System of Supports (MTSS). The impact of this variable will be measured longitudinally (i.e., 2017-18, 2018-19, 2019-20, 2020-21, and 2021-22). Predictor Variable B: COVID-19 pandemic. The impact of this variable will be measured longitudinally (i.e., 2020-21 and 2021-22). Outcome Variable C: 7th-grade STAR Reading scores. Outcome Variable D: 7th-grade STAR Math scores.

STAR Reading tests are designed for students in grades K-12 for progress monitoring; the test consists of 34 multiple choice items which focus on foundational skills, reading literature, informational text, and language. STAR Math tests are designed for students in grades 1-12 for progress monitoring; the test consists of 34 multiple choice items that focus on counting, operations, algebraic thinking, ratios, and reasoning.

Threats to Internal Validity of Causal-Comparative Research Designs

The threats to internal validity will be taken into account to increase the credibility of the causal relationship this study seeks to find. There is a lack of control over the internal threats to validity as the outcome variables STAR Reading and STAR Math are secondary data and the researcher did not conduct the testing nor controlled the environment at the time of this study.

The existing internal threats include the following:

- Mortality-Some students elected to learn in a virtual setting and did not participate in the 2020-21 STAR tests. Additionally, due to increased attendance factors from

COVID-19 quarantine guidelines and our transient population, some students will not have five years' worth of data to compare. To counter this threat, the researcher will only include data for students that participated in all testing windows.

- Location-The location is limited to one middle school, creating an internal threat as there are many factors that make each middle school unique. Due to the nature of the study the researcher sought a team for which all tiers of intervention were implemented with fidelity.
- Instrumentation-There are multiple testing administrators of the STAR Reading and STAR Math tests in this study. To counter this threat, the testing conditions were expected to be standardized (i.e., MTSS implementation with fidelity). The testing administrators are given testing directions and a script to read before the tests along a guide to facilitate a positive testing environment.

Threats to External Validity

This study has minimal threats to external validity to be noted. The biggest external threat is mortality, limiting the extent to which the findings can be generalized to other situations, people, settings, and measures (Fraenkel et al., 2018).

- Sampling- The possible threat to external validity is limited to the size of the sample. The researcher included data from all possible students that have data corresponding to all years of interest for this study using convenience sampling.

Feasibility

For this study, the researcher was granted access from the Secondary Assistant Superintendent and was required to prove documentation of IRB approval. The secondary data

(Appendix E) was collected by the district's data analyst which included STAR Reading and STAR Math results for the years 2017-2022 and any or all demographic data from participants (e.g., gender, SES, ethnicity).

Setting

At the time of this study, five elementary schools fed into this middle school. The school population in grades six through eight was 1,150 students with enrollment groups including 70% White; 19% Black; 4% Asian American; 5% Hispanic; 3% Native American; and 1% Native Hawaiian or Pacific Islander. The school was classified as a non-Title 1 school. The student population included 27% low income, 7% English Learner, and 11% received Special Education Services through their Individualized Education Plan (IEP) due to an identified disability.

This school is part of the fastest growing district in the state at a time when other schools are consolidating or closing. Growth in this community is contributed to an economic expansion in the state, tied to strong agricultural prices and an oil boom in the western part of the state (Kaul, 2019). Turley (2021) noted that the latest census reported the city in which this study took place grew nearly 50% over the last ten years. The framework of MTSS, student data, and data-based decision-making were already in place within all schools in the study school's district before the research began.

Participants

The participants of this study included all seventh-grade students at the identified middle school. Participants in this study represented all three tiers of instruction for Reading and Math based on their assessment data as well as staff recommendations. The STAR Reading and STAR Math longitudinal data were included for the identified years.

Sampling Procedures

This study used existing secondary longitudinal data from the Renaissance STAR Reading and STAR Math assessments. The STAR Reading assessment is administered to all students over a three-week window. The STAR Math assessment is administered to all students by their math teacher over a three-week window. Teachers are encouraged to have a 100% completion rate of their students. The MTSS Coach sends reminders of which students don't have assessment results complete during each assessment window. Convenience sampling which Fraenkel et al. (2019) describes as "a group of individuals who (conveniently) are available for study" was used in this study (p. 99). The researcher utilized seventh-grade students that represented all tiers of reading and math instruction.

Instrumentation

This study analyzed secondary existing data collected with the Renaissance STAR Reading and STAR Math assessments. STAR was utilized in the school district as a universal assessment to ensure students are maintaining grade level expectations, as well as a tool used to identify students in need of more academic support. The STAR Reading (Appendix F) test is administered by Reading and English teachers who receive testing directions and a script to read to the students before the test begins. The STAR Reading test is designed for students in grades K-12. The Enterprise version, which was used for this study, consists of 34 questions. It generally takes less than 30 minutes for the student to complete the assessment. The STAR Math (Appendix G) test is administered by math teachers who receive testing directions and a script to read to the students before the test begins. The STAR Math test is designed for students in grades 1-12. The Enterprise version, which was used for this study, consists of 34 questions. It generally takes approximately 20 minutes for the student to complete the assessment.

Renaissance STAR Reading and STAR Math tests are computer-adaptive, which means they adjust to each student's answers and are norm-referenced. The National Center for Education Evaluation and Regional Assistance (2007) stated, "Criterion relationships vary across grade and outcome, but there is evidence that in some circumstances the coefficients are quite large. The average coefficients (mid-.60s) are modest for Math and higher for Reading (.70–.90). However, these are coefficients of concurrent validity, not predictive validity" (p. 9).

Systematically, MTSS Instructional Coaches looked at the percentile rank of each student' assessment results and then utilized the school district's established pathways (or guidelines) to determine if additional testing should occur which determined the appropriate tier of intervention for each student. Percentile rank (PR) scores were used to compare a child's test performance with that of other students nationally in the same grade. For example, a score of 29 PR (percentile rank), means a student's skills are greater than 29% of students nationally in the same grade level. Additionally, it is essential to note that teacher recommendations are considered before students are exited or entered into a different tier of instruction. National percentile ranks are used to determine academic performance positioning.

The School District's MTSS Reading Pathway (see Appendix 1) included three levels of placement: Intensive (Tier 3), Strategic (Tier 2), and Benchmark (Tier 1). All students are screened using STAR Reading, and students whose scores were below the 40th percentile were administered the Houghton Mifflin Reading Inventory for placement:

- *Intensive*-Below the 20th percentile on STAR Reading and Pre-Decoder, Beginning Decoder, or Developing Decoder on Houghton Mifflin Phonics Inventory: Enrolled in System 44 (2 periods)

- *Strategic*-Below the 40th percentile on STAR Reading and below Proficient on the Houghton Mifflin Reading Inventory: Enrolled in Core Language (1 period) and Read 180 (1 period) based on placement test
- *Benchmark*-Between the 40th and 75th percentile on STAR Reading: Enrolled in Core Language (1 period)

The School District's MTSS Math Pathway (see Appendix 2) included three levels of placement: Intensive (Tier 3), Strategic (Tier 2), and Benchmark (Tier 1). All students are screened using STAR Math, and students whose scores were below the 40th percentile were administered the easyCBM for placement:

- *Intensive*-Below the 20th percentile on STAR Math and below the 20th percentile on easyCBM: Enrolled in TransMath I, II, III, or Connecting Math Concepts based on placement test. (1 period)
- *Strategic*-Below the 40th percentile on STAR Math and between the 20th-39th percentile on easyCBM: Enrolled in Core Math with additional classroom supported instruction. (1 period)
- *Benchmark*-Between the 40th and 75th percentile on STAR Math: Enrolled in Core Math. (1 period)

Data Collection

In the school district for which this study occurred, students take the STAR Reading and STAR Math test three times a year, which occur in the Fall, Winter, and Spring, to measure progress and ensure accountability. Once the testing concludes data can be accessed by teachers, administrators and shared with families. In the secondary buildings the MTSS coaches run reports within the Renaissance program to examine the performance of each student. STAR is

used as the School District's universal screener and determines if students need additional testing and essentially places some students into intervention courses.

For this study, the Fall and Winter benchmark were selected to allow for data consistency since STAR tests were not administered in Spring 2020 due to distance learning at the beginning of the COVID-19 pandemic. It is important to note that before the Fall 2020 benchmark testing, students hadn't been in school since March 13, 2020. Upon the start of the 2020-21 school year, students participated in hybrid learning as they attended school on-site two days a week and then distance learning the other three days of the week.

Table 5

Data Collection

Data Analysis

This causal-comparative study will utilize One-Way ANOVA for null hypothesis testing purposes and descriptive statistics to investigate whether the COVID-19 pandemic had an impact on STAR scores and whether or not MTSS in any way served to lessen the impact of the

pandemic on students' academic performance. One-way ANOVA explored the differences over the 5-years of longitudinal STAR Reading and STAR Math data (i.e., 2017-18, 2018-19, 2019-20, 2020-21, and 2021-22).

SPSS (Statistical Package for the Social Sciences) statistical analysis software served the purpose of data analysis. Given that One-Way ANOVA was utilized, the researcher first explored the data to determine whether the statistical assumptions to use One-Way ANOVA were met. Laerd Statistics (2018) defines these six assumptions as:

- Assumption #1: The dependent variable should be measured at the interval or ration level (i.e., they are continuous).
- Assumption #2: The independent variable should consist of two or more categorical, independent groups.
- Assumption #3: There should have independence of observations, which means that there is no relationship between the observations in each group or between the groups themselves
- Assumption #4: There should be no significant outliers.
- Assumption #5: The dependent variable should be approximately normally distributed for each category of the independent variable
- Assumption #6: There needs to be homogeneity of variances.

Research Questions and System Alignment

Table 7 provides a description of the alignment between the study Research Question(s) and the methods used in this study to ensure that all variables of study have been accounted for.

Table 6

Research Question(s) Alignment

Research Question (RQ)	Variables	Design	Instrument(s)	Validity & Reliability	Source
RQ 1 To what extent is the MTSS achieving the objectives for which it was implemented?	PV: R180 & TM OV: STAR Reading & STAR Math	Causal comparative	STAR Reading and STAR Math	Norm-Referenced	Renaissance
RQ 2 How effective was the MTSS framework to counter the impact of the COVID-19 pandemic on 7th-grade students' academic performance in reading and math?	PV: COVID-19 Pandemic OV: STAR Reading & STAR Math	Causal comparative	STAR Reading and STAR Math	Norm-Referenced	Renaissance
RQ 3 What is the academic impact of the COVID-19 pandemic on 7th-grade students' STAR Reading scores accounting for demographic variables?	OV: WFPS Reading Pathway PV: STAR Reading	Causal comparative	STAR Reading	Norm-Referenced	Renaissance
RQ 4 What is the academic impact of the COVID-19 pandemic on 7th-grade students' STAR Math scores accounting for demographic variables?	OV: WFPS Math Pathway PV: STAR Math	Causal comparative	STAR Math	Norm-Referenced	Renaissance

Table 7

Table Analysis

Research Question	Data Analysis
RQ 1 To what extent is the MTSS achieving the objectives for which it was implemented?	Measures of Central Tendency and Measures of Dispersion
RQ 2 How effective was the MTSS framework to counter the impact of the COVID-19 pandemic on 7th-grade students' academic performance in reading and math?	Measures of Central Tendency and Measures of Dispersion
RQ 3 What is the academic impact of the COVID-19 pandemic on 7th-grade students' STAR Reading scores accounting for demographic variables?	Measures of Central Tendency and Measures of Dispersion
RQ 4 What is the academic impact of the COVID-19 pandemic on 7th-grade students' STAR Math scores accounting for demographic variables?	Measures of Central Tendency and Measures of Dispersion
The 2020-21 (COVID-19 pandemic) aggregate mean scores of Tiers 1, 2, and 3 students as measured by STAR Reading and STAR Math test scores will be equivalent across the 2017-18, 2018-19, and 2019-20 academic years.	Measures of Central Tendency, Measures of Dispersion, One-Way ANOVA, and t-Test

Procedures

The researcher obtained permission from the secondary superintendent to authorize the use of pre-existing data. A Research Study Request was submitted to the School District's Administrator, signed by the school's principal, and was approved on September 24, 2020 (See Appendix C). Minnesota State University Moorhead IRB approval was granted to the researcher on September 25, 2020 (See Appendix D). STAR Reading and STAR Math data were obtained for the Fall to Winter benchmark growth for 2017-18, 2018-19, 2019-20, 2020-21, and 2021-22 school year. The data were broken down into tiers of instruction to represent the student growth percentile. The data were extracted through excel spreadsheets with names being removed to stay completely anonymous. The data were then filtered into tiers of instruction based on their assigned courses for reading and math in the 2020-21 school year.

Ethical Considerations

The well-being of participants was maintained due to the nature of the study design utilizing pre-existing data. The researcher did not engage any human subject for the purpose of conducting this study. Rather, pre-existing Renaissance STAR Reading and STAR Math data of 7th grade students at one middle school over the identified years were provided in the testing sample. No identifying information was utilized. To maintain complete student confidentiality, no identifying student information was given. No physical or mental harm was experienced by the participants.

Conclusions

This chapter described the research methods that were used in this study. Employing a causal-comparative quantitative explanatory approach to analyze longitudinal secondary data, this study explored the academic impact of the COVID-19 pandemic on Multi-Tiered System of

Supports as measured by STAR Reading and STAR Math assessment data. Data were collected from the 2017-18, 2018-19, 2019-20, 2020-2021, and 2021-22 school year to collect the growth rate from Fall to Winter in both reading and math utilizing Renaissance STAR Reading and STAR Math for seventh graders. Ethical considerations of the wellbeing of the participants were maintained by a blind study design in the use of random identifier tags attached to data. The next chapter will describe the results of this study.

CHAPTER 4: RESULTS

The COVID-19 pandemic presented a period of unprecedented challenges for schools in the United States. However, its impact on students' academic performance varied widely across school districts. For many at-risk students, learning losses were only compounded due to the disruption caused by the COVID-19 pandemic and the need to implement hybrid and distance learning instruction. Although the impact the pandemic had on student achievement will be studied for many years to come, this researcher's goal was to evaluate the MTSS for 7th-grade students at one Midwestern middle school to determine the impact the COVID-19 pandemic had on student achievement for reading and math according to STAR assessments. An objectives-based program evaluation model served as the study's theoretical framework.

This quantitative research study utilized a positivistic paradigm to approach the social phenomenon of interest and analysis of data. The researcher used a causal-comparative design to analyze the impact of the pandemic on the STAR Reading and STAR Math scores and the role to MTSS. The study utilized five years of pre-existing Renaissance STAR Reading and STAR Math data which included three years leading up to the COVID-19 pandemic and two years following its onset. The data were broken down into tiers of instruction in both reading and math and the measurement of the growth rate for each tier of instruction for the Fall to Winter benchmark (i.e., 2017-2018; 2018-2019; 2019-2020; 2020-2021; 2021-2022). Students who did not complete STAR testing in all testing windows were excluded from the data analysis. This study added to the current body of research on MTSS implementation and effectiveness in secondary schools.

Purpose of the Study

The purpose of this causal-comparative research was twofold, to measure the degree of impact the COVID-19 pandemic had on students' academic performance and determine the extent to which the MTSS program served to counter the impact of the pandemic on students' reading and math performance. This study analyzed pre-existing reading and math STAR data collected from 7th-grade students at one public middle school for three years before the pandemic, as well as the 2020-21 school year, and then the 2021-22 school year utilizing the September (Fall) and December (Winter) scores. The data sets were compared to determine the students' reading and math performance trend in the three years preceding the COVID-19 pandemic to measure the degree of impact during the year of the pandemic and the year that followed. Further, differences between subgroups (i.e., gender, ethnicity, SPED status, EL status and 504 status) were examined.

This chapter details the key findings of the research and is organized to address each of the four research questions independently. This chapter is organized by the research questions used to frame the study. Primary research questions focused on the MTSS framework in meeting its intended objectives and countering the impact of the COVID-19 pandemic. Secondary research questions focused on the impact of the COVID-19 pandemic on STAR Reading and STAR Math scores.

Primary Research Questions

1. To what extent is the MTSS achieving the objectives for which it was implemented?
2. How effective was the MTSS framework to counter the impact of the COVID-19 pandemic on 7th-grade students' academic performance in reading and math?

Secondary Research Questions

3. What is the academic impact of the COVID-19 pandemic on 7th-grade students' STAR Reading scores accounting for demographic variables?

4. What is the academic impact of the COVID-19 pandemic on 7th-grade students' STAR Math scores accounting for demographic variables?

Participants

Data on student academic achievement were pulled by the School District's data analyst directly from the Renaissance STAR database. Demographic and descriptive information about each student was pulled from Power School. The participants of this study included seventh-grade students over the course of five years at the identified middle school. The study utilized pre-existing Renaissance STAR Reading and STAR Math data for three years leading up to the COVID-19 pandemic and two years following its onset. Participants in this study represented all three tiers of instruction for Reading and Math. The STAR Reading and STAR Math longitudinal data were included for the identified years.

Seventh grade cohort sizes ranged in the upper 300s to lower 400s. The school experienced temporary relief of rapid growth when the school district opened a third middle school and boundary lines shifted to combat over-crowding at the study's middle school. Table 8 shows total enrollment numbers for each of the 7th grade cohorts over the study's identified years.

Table 8

Total Enrollment of Cohorts

Year	Total Enrollment
Year 1 (2017-2018)	364
Year 2 (2018-2019)	445

Year	Total Enrollment
Year 3 (2019-2020)	454
Year 4 (2020-2021)	379
Year 5 (2021-2022)	426

Table 9 shows the frequency and percentage of the entire sample which is a composition of all five years. Demographics broken down in this study included gender, ethnicity, Special Education status, English Learner status, individuals serviced through a 504, and students who received Reading or Math intervention services.

Table 9

Participants' Demographics Data Compilation from 2017-2022

	Frequency	Percentage
Gender		
Girl	1063	51.4
Boy	1005	48.6
Ethnicity		
African American	300	14.5
Asian	63	3
Caucasian	1585	76.6
Hispanic	69	3.3
Native American	50	2.4
Pacific Islander	1	.0
SPED	239	11.6
EL	69	3.3
Section 504	63	3
Reading Interventions		
Enrolled in Alternate Reading (T3)	16	.8
Enrolled in Reading Intervention (T2)	192	9.3
Math Interventions		
Enrolled in Alternate Math (T3)	124	6
Enrolled in Math Intervention	140	6.8

Research Question 1

To what extent did the MTSS achieving the objectives for which it was implemented?

In chapter 1, the researcher defined the objective of MTSS as providing high-quality instruction matched to students' needs (NDMTSS, 2021). The Benchmark for Tier 1 instruction and the point at which students are not in need of supplemental or intensive supports and interventions is at or above the 40th percentile (PR). Tables 10 and 11 provide a snapshot of the Renaissance STAR Reading and Math scores over the five years that include the Mean (*M*), Median (*ME*), and Standard Deviation (*SD*) of the Scaled Score (SS) and Percentile Rank (PR) for Fall and Winter.

Table 10 presents the STAR Reading scores of the entire sample. All but one mean score remains above the 40th percentile. In year 5, the winter mean scores drops to 39 PR. Table 12 presents the STAR Math scores of the entire sample. All mean scores remain above the 40th percentile. Math scores are higher overall compared to reading. Both tables show scores decreasing tendency every year with a bigger drop in year 3 to year 4. Fall to Winter scores should have increased, however, in two years they decreased for reading (Year 3 and Year 5) and math (Year 1 and Year 2).

Table 10

Renaissance STAR Reading Scores of Entire Sample

	Reading											
	Fall						Winter					
	SS			PR			SS			PR		
	M	*Me*	*SD*	*M*	*Me*	*SD*	*M*	*Me*	*SD*	*M*	*Me*	*SD*
Year 1 (17-18)	846	845	241	52	52	25	868	879	236	51	54	23
Year 2 (18-19)	826	823	257	49	50	26	863	853	257	50	50	25
Year 3 (19-20)	800	799	263	47	48	26	823	816	252	47	46	25

Year 4 (20-21)	759	730	228	43	41	24	785	773	232	43	41	24
Year 5 (21-22)	743	689	253	41	37	26	748	718	249	39	37	25

Table 11

Renaissance STAR Math Scores of Entire Sample

In Tables 12 to 15, One-Way ANOVAs and Post Hoc tests were ran using IBM SPSS

	Math											
	Fall						Winter					
		SS			PR			SS			PR	
	M	*Me*	*SD*	*M*	*Me*	*SD*	*M*	*Me*	*SD*	*M*	*Me*	*SD*
Year 1 (17-18)	786	807	86	59	66	26	794	812	89	58	65	26
Year 2 (18-19)	750	766	95	60	65	28	760	773	95	59	63	28
Year 3 (19-20	765	779	94	53	54	27	782	804	98	55	60	28
Year 4 (20-21)	733	738	90	43	40	26	760	780	96	48	51	27
Year 5 (21-22)	738	745	99	45	43	27	750	762	99	45	45	27

Statistical Software. These tests were conducted to determine if any differences were present between the first, second, third, fourth and fifth years of the study. Tests were run using a Bonferroni adjustment when analyzing for significance. In Table 12, there was not a significant effect of the mean Renaissance Reading PR scores on the Year at the $p<.05$ level across the 5 years F (4,1027) =8.901, p = <.001.

Table 12

ANOVA Reading

	Sum of Squares	*df*	Mean Square	*f*	Sig.
Between Groups	19804.335	4	4951.084	8.901	<.001
Within Groups	571288.778	1027	556.270		
Total	591093.112	1031			

Table 13 includes the Post Hoc STAR Reading data since a significant difference was presented in the ANOVA. Post hoc comparisons using the Bonferroni test indicated that the mean score for the STAR Reading in Years 1, 2 and 3 did not differ from year to year, however, years 4 and 5 did. Year 4 is different from years 1, 2, and 3. Year 5 is also different from years 1, 2, and 3. However, for years 4 and 5 the mean remained above the benchmark of 40th percentile rank.

Table 13

Post-Hoc STAR Reading

Year (I)	Year (J)	Mean Difference (I-J)	Std. Error	Sig.
1	2	-.501	2.384	1.000
	3	4.042	2.335	.838
	4	8.249	2.412	.007
	5	10.661*	2.379	<.001
2	1	.501	2.384	1.000
	3	4.543	2.256	.443
	4	8.750	2.336	.002
	5	11.163*	2.302	<.001
3	1	-4.042	2.335	.838

Year (I)	Year (J)	Mean Difference (I-J)	Std. Error	Sig.
	2	-4.543	2.256	.443
	4	4.207	2.286	.660
	5	6.620*	2.251	.033
4	1	-8.249*	2.412	.007
	2	-8.750*	2.336	.002
	3	-4.207	2.286	.660
	5	2.412	2.331	1.000
5	1	-10.661*	2.379	<.001
	2	-11.163*	2.302	<.001
	3	-6.620*	2.251	.033
	4	-2.412	2.331	1.000

In Table 14, there was not a significant effect of the mean Renaissance Math PR scores on the Year at the $p<.05$ level over the five years F (4, 947) =14.157, p = <.001.

Table 14

ANOVA Math

	Sum of Squares	*df*	Mean Square	*f*	Sig.
Between Groups	37681.021	4	9420.255	14.157	<.001
Within Groups	630149.070	947	665.416		
Total	667830.091	951			

Table 15 includes the Post Hoc STAR Math data since a significant difference was presented in the ANOVA. Post hoc comparisons using the Bonferroni test indicated that the

mean score for the STAR Math in years 1, 2, and 3 did not differ from year to year, however, years 4 and 5 did. Year 4 is different from years 1, 2, and 3. Year 5 is also different from years 1, 2, and 3. Along with reading, in years 4 and 5 the mean remained above the benchmark of 40th percentile rank.

Table 15

Post-Hoc STAR Math

Year (I)	Year (J)	Mean Difference (I-J)	Std. Error	Sig.
1	2	3.462	2.705	1.000
	3	2.554	2.660	1.000
	4	-.040	2.836	1.000
	5	16.412*	2.660	<.001
2	1	-3.462	2.705	1.000
	3	-.908	2.553	1.000
	4	-3.502	2.736	1.000
	5	12.951*	2.553	<.001
3	1	-2.554	2.660	1.000
	2	.908	2.553	1.000
	4	-2.594	2.692	1.000
	5	13.858*	2.505	<.001
4	1	.040	2.836	1.000
	2	3.502	2.736	1.000
	3	2.594	2.692	1.000
	5	16.452*	2.692	1.000
5	1	-16.412*	2.660	<.001
	2	12.951*	2.553	<.001

Year (I)	Year (J)	Mean Difference (I-J)	Std. Error	Sig.
	3	-13.858	2.505	<.001
	4	-16.452*	2.692	<.001

Research question one asked to what extent MTSS is achieving the objectives for which it was implemented. Even though there was a decrease in the reading and math score each year, it remained at or above the 40th PR. The mean score represents the entire sample. Based on this, the MTSS system supported the majority of students to remain at or above benchmark.

Research Question 2

How effective was the MTSS framework to counter the impact of the COVID-19 pandemic on 7th-grade students' academic performance in reading and math?

To examine the impact of the COVID-19 pandemic's impact on the MTSS the researcher examined data over a five-year period to determine the impact on each of the three tiers of instruction. Table 16 provides the Student Growth Percentile (SGP) change which is a norm-referenced quantification of individual student growth derived using quantile regression techniques. An SGP compares a student's growth to that of his/her/their academic peers nationwide (Renaissance, 2022). This is typically calculated from the beginning of the school year (Fall data point) to the end of the school year (Spring data point), so Year 3 does not have data due to the COVID-19 pandemic forcing distance learning and many schools including the school in this study to cancel STAR testing in the Spring of 2020. For Reading, in year 4 and year 5 there was a 7 PR dip below that of the 52 PR high. The scores drop between years two to four and then again in year 5. For Math, there was a 10 PR drop below the high of 56 PR. The scores increased from years two to four but then went down in year 5.

Table 16

Student Growth Percentile (SGP) Change-Reading and Math

	Reading Fall to Spring SGP PR			Math Fall to Spring SGP PR		
	M	*Me*	*SD*	*M*	*Me*	*SD*
Year 1 (2017-18)	50.17	50	28.91	56.12	60	28.57
Year 2 (2018-19)	50.80	52	27.71	42.57	41.5	27.45
Year 4 (2020-21)	45.44	43	27.65	51.75	55	29.02
Year 5 (2021-22)	42.82	37	29.39	46.58	43	29.64

In Table 17, it is observed that there was not a significant effect of the mean Renaissance Reading PR scores on Tier 1, Tier 2, or Tier 3. Significant differences in the mean scores were explored and disaggregated by tiers of instruction for reading to determine whether there were statistically significant differences. There was no statistical difference for reading across the five years.

Table 17

ANOVA STAR Reading by Tier of Instruction

Tier	Reading	Mean Percentile	Sum of Squares	*df*	Mean Square	*f*	Sig.
1	Between Groups		883.840	4	220.960	.973	.422
	Within Groups		137005.368	603	227.206		
	Total	63.05	137889.209	607			
2	Between Groups		52.798	4	13.200	.365	.833
	Within Groups		9325.171	258	36.144		
	Total	29.84	9377.970	262			
3	Between Groups		45.367	4	11.342	.316	.867
	Within Groups		5526.004	154	35.883		
	Total	11.27	5571.371	158			

In Table 18, there was a significant effect of the mean Renaissance Math PR scores on Tier 1 at the $p<.05$ level over the five years F (4, 661) =5.431, p = <.001]. There was not a significant effect of the mean Renaissance Math PR scores on Tier 2 nor Tier 3. This table suggests that students are shifting from Tier 1 to Tier 2 and Tier 3 over time.

Table 18

ANOVA STAR Math by Tier of Instruction

Tier	Math	Mean Percentile	Sum of Squares	*df*	Mean Square	*f*	Sig.
1	Between Groups		5322.367	4	1330.592	5.431	<.001
	Within Groups		161956.925	661	245.018		
	Total	69.08	167279.291	665			
2	Between Groups		8.476	4	2.119	.053	.995
	Within Groups		6187.109	154	40.176		
	Total	28.91	6195.585	158			
3	Between Groups		22.251	4	5.563	.216	.929
	Within Groups		3137.260	122	25.715		
	Total	10.54	3159.512	126			

Tables 19 through 23 provide the number and percentage of students that fall within each of the three MTSS tiers of instruction according to percentile rank. This percentile rank (PR) is a norm-referenced score that provides a measure of the student's ability compared to other students in the same grade nationally (Renaissance, 2022). The researcher used the Fall scores as it matched the placement criteria according to the MTSS Reading and Math pathways in Appendix A and B. The numbers of students above the 40th PR in reading and math scores continued to decrease across the five years which in turn increased students below the 40th PR

and therefore in need of supplemental and intensive supports and interventions at the Tier 2 or 3 level.

Table 19

Year 1: 2017-18 Percentile Rank for Reading and Math

	Fall 2017-2018			
	Reading (*n* of students)	Reading (% of students)	Math (*n* of students)	Math (% of students)
0-19 Percentile Rank (Tier 3)	48	14%	32	9%
20-39 Percentile Rank (Tier 2)	66	19%	60	17%
40+ Percentile Rank (Tier 1)	231	67%	254	74%

Table 20

Year 2: 2018-19 Percentile Rank for Reading and Math

	Fall 2018-2019			
	Reading (n of students)	Reading (% of students)	Math (n of students)	Math (% of students)
0-19 Percentile Rank (Tier 3)	64	15%	51	13%
20-39 Percentile Rank (Tier 2)	96	21%	53	13%
40+ Percentile Rank (Tier 1)	279	64%	302	74%

Table 21

Year 3: 2019-20 Percentile Rank for Reading and Math

	Fall 2019-2020			
	Reading (n of students)	Reading (% of students)	Math (n of students)	Math (% of students)
0-19 Percentile Rank (Tier 3)	88	20%	69	16%
20-39 Percentile Rank (Tier 2)	94	21%	82	18%
40+ Percentile	261	59%	294	66%

	Fall 2019-2020			
	Reading (n of students)	Reading (% of students)	Math (n of students)	Math (% of students)
Rank (Tier 1)				

Table 22

Year 4: 2020-21 Percentile Rank for Reading and Math

	Fall 2020-2021			
	Reading (n of students)	Reading (% of students)	Math (n of students)	Math (% of students)
0-19 Percentile Rank (Tier 3)	76	21%	80	23%
20-39 Percentile Rank (Tier 2)	88	25%	98	27%
40+ Percentile Rank (Tier 1)	195	54%	179	50%

Table 23

Year 5: 2021-22 Percentile Rank for Reading and Math

	Fall 2021-2022			
	Reading (n of students)	Reading (% of students)	Math (n of students)	Math (% of students)
0-19 Percentile Rank (Tier 3)	100	24%	93	22%
20-39 Percentile Rank (Tier 2)	124	31%	101	24%
40+ Percentile Rank (Tier 1)	186	45%	224	54%

Research question two asked how effective the MTSS framework was in countering the impact of the COVID-19 pandemic on 7th grade students' academic performance in reading and math. The data presented above confirmed that more students were shifting from Tier 1 to Tier 2 and 3 every year for the past five years. This means that the MTSS framework was not successful as the goal is to reduce the percentage of students in Tier 2 and 3.

Research Question 3

What is the academic impact of the COVID-19 pandemic on 7th-grade students' STAR Reading scores accounting for demographic variables?

STAR Reading tests are designed for students in grades K-12 as a universal assessment and/or progress monitoring. The test consists of 34 multiple choice items which focus on foundational skills, reading literature, informational text, and language. STAR Reading data were examined longitudinally for the identified years (i.e., 2017-18, 2018-19, 2019-20, 2020-21, and 2021-22). Table 24 through Table 26 display the studies longitudinal STAR Reading scores for Tier 1, Tier 2, Tier 3. These tables include the Mean (*M)*, Median (*Me)*, and Standard Deviation (*SD)* of both the Scaled Score and the Percentile Rank for Fall and Winter. These tables are followed by additional tables that breakdown the mean scores by Gender, Special Education Status, and Ethnicity. The researcher does not have data for the 2017-18 year in many tables because of the inability to track down the course titles in Power School.

Table 24 presents the Tier 1 STAR Reading scores over the identified years. The scores remained in the mid to high 40s to low to mid 50s with the expectation students would achieve above the 40th percentile.

Table 24

Tier 1 STAR Reading Scores by Year

Table 25 presents the Tier 2 STAR Reading scores. The scores of these are below the 20th PR when they would ideally be between the 20th -39th PR that constitute Tier 2 status within the MTSS framework. The scores also show little to no growth from Fall to Winter.

	Reading											
	Fall						Winter					
	SS			PR			SS			PR		
	M	*Me*	*SD*	*M*	*Me*	*SD*	*M*	*Me*	*SD*	*M*	*Me*	*SD*
Tier 1 17-18	847	844	241	52	52	25	868	879	236	51	54	23
Tier 1 18-19	874	863	236	54	55	24	909	896	233	55	56	23
Tier 1 19-20	843	830	239	51	51	25	862	857	232	50	51	23
Tier 1 20-21	798	785	216	47	46	23	829	828	213	47	47	22
Tier 1 21-22	794	754	233	46	43	24	798	776	227	44	42	23

Table 25

Tier 2 STAR Reading Scores by Year

Table 26 displays exceptionally low STAR Reading scores. In Year 2, the scores showed no change from Fall to Winter. Year 3 and Year 5 show a decrease from Fall to Winter.

	Tier 2 Reading											
	Fall						Winter					
	SS			PR			SS			PR		
	M	*Me*	*SD*	*M*	*Me*	*SD*	*M*	*Me*	*SD*	*M*	*Me*	*SD*
Year 1 17-18	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Year 2 18-19	426	431	109	9	6	8	473	450	120	11	7	11
Year 3 19-20	456	460	134	12	8	10	482	464	130	12	8	11
Year 4 20-21	526	519	136	18	15	13	520	514	150	16	12	12
Year 5 21-22	472	460	146	13	8	13	472	476	161	13	9	12

Table 26

Tier 3 STAR Reading Scores by Year

	Tier 3 Reading											
	Fall						Winter					
	SS			PR			SS			PR		
	M	*Me*	*SD*	*M*	*Me*	*SD*	*M*	*Me*	*SD*	*M*	*Me*	*SD*
Year 1 17-18	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Year 2 18-19	175	175	N/A	1	1	N/A	103	103	N/A	1	1	N/A
Year 3 19-20	228	192	214	4	1	7	215	215	N/A	1	1	N/A
Year 4 20-21	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Year 5 21-22	273	327	194	5	2	9	225	264	130	1	1	N/A

Table 27 includes the mean reading scores for Tier 2 Fall and Winter along with the change from Fall to Winter for each tier of students comparing girls (G) and boys (B). In the 2017-18 cohort there were 190 girls and 174 boys. In the 2018-19 cohort there were 212 girls and 233 boys. In the 2019-20 cohort there were 236 girls and 218 boys. In the 2020-21 cohort there were 212 girls and 167 boys. The 2021-22 cohort had equal distribution and included 213 girls and 213 boys. There was little to no difference when comparing by gender. Girls and boys were about even in their percentile rank, with all scores decreasing when compared year to year or Fall to Winter, the largest decrease noted during Year 5.

Table 27

Mean Reading Scores by Gender

Year	Gender	Tier1 Fall	Tier 1 Winter	Change	Tier 2 Fall	Tier 2 Winter	Change	Tier 3 Fall	Tier 3 Winter	Change
Year 1	G	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
(2017-18)	B	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Year 2	G	56	56	0	7	9	+2	N/A	N/A	N/A
(2018-19)	B	53	54	+1	9	11	+2	1	1	0
Year 3	G	53	51	-2	11	11	0	N/A	N/A	N/A
(2019-20)	B	49	50	+1	12	14	+2	4	1	-3
Year 4	G	48	47	-1	21	19	-2	N/A	N/A	N/A
(2020-21)	B	46	48	+2	14	13	-1	N/A	N/A	N/A
Year 5	G	47	45	-2	13	14	+1	3	2	-1
(2021-22)	B	44	43	-1	13	12	-1	6	1	-5

Table 28 includes the mean reading score for Fall and Winter along with the change from Fall to Winter for each tier of students comparing Special Education Students (Y) to Non-Special Education Students (N). The 2017-18 cohort included 15 SPED students, the 2018-19 cohort included 49 SPED students, the 2019-20 cohort included 52 SPED students, the 2020-21 cohort consisted of 40 SPED students and the 2021-22 cohort had the highest number of SPED students which was 57. Tier 2 students scores decreased from Fall to Winter in Year 4 and no change was made in Year 5. Only Special Education students were represented in Tier 3. These scores decreased from Fall to Winter.

Table 28

Mean Reading Scores by SPED Status

Year	SPED	Tier1 Fall	Tier 1 Winter	Change	Tier 2 Fall	Tier 2 Winter	Change	Tier 3 Fall	Tier 3 Winter	Change
Year 1	Y	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
(2017-18)	N	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Year 2	Y	35	45	+10	6	7	+1	1	1	0
(2018-19)	N	55	56	+1	10	13	+3	N/A	N/A	N/A
Year 3	Y	38	38	0	8	11	+3	4	1	-3
(2019-20)	N	52	51	-1	15	14	-1	N/A	N/A	N/A
Year 4	Y	34	36	+2	19	16	-3	N/A	N/A	N/A
(2020-21)	N	48	48	0	17	16	-1	N/A	N/A	N/A
Year 5	Y	38	38	0	10	10	0	9	1	-8

(2021-22)	N	46	44	-2	15	15	0	N/A	N/A	N/A

Table 29 includes the mean score for Fall and Winter along with the change from Fall to Winter for each tier of students comparing students' ethnicity. In the 2017-18 cohort there were 37 African American students, 8 Asian students, 293 Caucasian students, 17 Hispanic students and 9 Native American students. The 2018-19 cohort consisted of 48 African American students, 15 Asian students, 360 Caucasian students, 12 Hispanic students, and 10 Native American students. The 2019-20 Cohort included 63 African American students, 16 Asian students, 352 Caucasian students, 14 Hispanic students, and 9 Native American students. The 2020-21 cohort was comprised of 82 African American students, 12 Asian students, 260 Caucasian students, 13 Hispanic students, 11 Native American students, and 1 Pacific Islander student. The 2021-22 cohort is comprised of 70 African American students, 12 Asian students, 320 Caucasian students, 13 Hispanic students, and 11 Native American students.

In Year 3, Tier 2 Asian students made large gains from Fall to Winter (+10) with the consecutive year having a noticeable decrease in scores (-8). Also in Year 3, Tier 1 Native American Students had a notable improvement from Fall to Winter (+11). In Year 4, Hispanic students in Tier 1 experienced a substantial increase in mean scores (+26). In Year 5, Tier 2 Asian students returned to increasing their scores from Fall to Winter and made significant gains (+13). Asian students outperformed the other ethnicities in all five years.

Table 29

Mean Reading Scores by Ethnicity by Year

Year	Ethnicity	Tier1 Fall	Tier 1 Winter	Change	Tier 2 Fall	Tier 2 Winter	Change	Tier 3 Fall	Tier 3 Winter	Change
Year 1 (2017-18)	African American	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
	Asian	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
	Caucasian	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
	Hispanic	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
	Native American	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
	Pacific Islander	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Year 2 (2018-19)	African American	43	43	0	9	7	-2	N/A	N/A	N/A
	Asian	59	53	-6	N/A	N/A	N/A	N/A	N/A	N/A
	Caucasian	56	57	+1	9	12	+3	1	1	0
	Hispanic	47	48	+1	1	1	0	N/A	N/A	N/A
	Native American	45	43	-2	N/A	N/A	N/A	N/A	N/A	N/A
	Pacific Islander	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Year 3 (2019-20)	African American	40	39	-1	10	13	+3	1	1	0
	Asian	56	52	-4	18	28	+10	N/A	N/A	N/A
	Caucasian	53	52	-1	13	12	-1	N/A	N/A	N/A
	Hispanic	49	48	-1	7	14	+7	N/A	N/A	N/A
	Native American	35	46	+11	N/A	N/A	N/A	N/A	N/A	N/A
	Pacific Islander	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Year 4 (2020-21)	African American	41	37	-4	14	16	+2	N/A	N/A	N/A
	Asian	58	55	-3	16	8	-8	N/A	N/A	N/A
	Caucasian	69	66	-3	20	16	-4	N/A	N/A	N/A
	Hispanic	19	45	+26	22	21	-1	N/A	N/A	N/A

	Native American	39	41	+2	14	15	+1	N/A	N/A	N/A
	Pacific Islander	22	22	0	N/A	N/A	N/A	N/A	N/A	N/A
Year 5 (2021-22)	African American	36	33	-3	12	10	-2	1	1	0
	Asian	54	59	+5	27	40	+13	N/A	N/A	N/A
	Caucasian	47	45	-2	14	15	+1	8	2	-6
	Hispanic	41	41	0	2	4	+2	1	1	0
	Native American	38	39	+1	8	4	-4	3	1	-2
	Pacific Islander	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A

Research Question 3 asked what is the academic impact of the COVID-19 pandemic on 7th grade STAR Reading scores accounting for demographic variables? The researcher began with tables that presented the Tier's data at large and then provided a breakdown of the mean scores by Gender, Special Education Status, and Ethnicity. There were no significant differences between gender for STAR Reading. Tier 2 students receiving Special Education decreased from Fall to Winter in Year 4 and no change was made in Year 5. Only Special Education students were represented in Tier 3. These scores decreased from Fall to Winter. When the researcher examined STAR Reading based on ethnicity, they found that in Year 3, Tier 2 Asian students made large gains from Fall to Winter with the consecutive year having a noticeable decrease in scores. Also in Year 3, Tier 1 Native American Students had a notable improvement from Fall to Winter. In Year 4, Hispanic students in Tier 1 experienced a substantial increase in mean scores In Year 5, Tier 2 Asian students returned to increasing their scores from Fall to Winter and made significant gains. Asian students outperformed the other ethnicities in all five years.

Research Question 4

What is the academic impact of the COVID-19 pandemic on 7th-grade students' STAR Math scores accounting for demographic variables?

STAR Math tests are designed for students in grades 1-12 for progress monitoring; the test consists of 34 multiple choice items that focus on counting, operations, algebraic thinking, ratios, and reasoning. STAR Math data were examined longitudinally for the identified years (i.e., 2017-18, 2018-19, 2019-20, 2020-21, and 2021-22). Table 31, 32, and 33 displays the studies longitudinal STAR Math scores for Tier 1 and Tier 3. The following tables then break down the mean score for STAR Math by Gender, Special Education status, and Ethnicity. It was brought to the attention of the researcher that the study's school was not utilizing Power School to identify students in need of Tier 2 Math Intervention. It was up to the Tier 1 classroom teachers to provide supports and interventions for identified students within their classroom. Teachers were notified who needed additional intervention from the MTSS Instructional Coach based on the building's screening protocol. Therefore, Tier 2 math data was unable to be extracted for the researcher. The researcher does not have data for the 2017-18 year in many tables because of the inability to track down the course titles in Power School.

Table 30 presents the Tier 1 STAR Math scores over the identified years. Tier 1 Math scores are considerably higher than Tier 1 Reading scores. The mean scores range from high 40s to mid-60s in percentile rank. remain in the mid to high 40s to low to mid 50s. In years 1and 2 there is a decline (-1, -1) in scores from Fall to Winter, however, in years 3, 4 and 5 there is an increase in scores (+2, +6, +1).

Table 30

Tier 1 STAR Math Scores by Year

	Tier 1 Math											
	Fall						Winter					
	SS			PR			SS			PR		
	M	*Me*	*SD*	*M*	*Me*	*SD*	*M*	*Me*	*SD*	*M*	*Me*	*SD*
Year 1 17-18	786	807	86	59	66	26	794	812	89	58	65	26
Year 2 18-19	773	775	73	66	69	24	781	793	78	65	71	24
Year 3 19-20	785	792	77	58	60	25	801	819	85	60	68	25
Year 4 20-21	749	749	79	47	44	24	781	790	78	53	55	24
Year 21-22	755	762	87	49	48	25	769	774	84	50	49	25

Table 31 displays the studies longitudinal STAR Math scores for Tier 3. More students are serviced through Tier 3 Math Intervention than for Reading. Mean Math Scores are considerably higher than Reading Scores for Tier 3. In Year 2 and Year 3 students made growth from Fall to Winter (+3, +2). In Year 4, there was no change and in Year 5 the students decreased from Fall to Winter (-1).

Table 31

Tier 3 STAR Math Scores by Year

Table 32 includes the mean score of the Renaissance STAR Math score for Fall and

	Math											
	Fall						Winter					
	M	SS *Me*	*SD*	*M*	PR *Me*	*SD*	*M*	SS *Me*	*SD*	*M*	PR *Me*	*SD*
Tier 3 17-18	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Tier 3 18-19	586	592	60	12	11	9	616	635	63	15	16	12
Tier 3 19-20	613	623	90	14	11	12	644	649	70	16	14	12
Tier 3 20-21	593	574	57	9	6	7	602	601	59	9	7	7
Tier 3 21-22	599	593	78	11	7	10	602	604	75	10	7	10

Winter. In addition, the researcher included the change from Fall to Winter for each tier of students comparing girls (G) and boys (B). Boys outperformed girls on almost all comparisons. The greatest increase was by girls in year 4 when they increased by 8 from Fall to Winter. From year to year the mean scores decreased except for in Year 5 when girls scores increased in the Fall. In the 2017-18 cohort there were 190 girls and 174 boys. In the 2018-19 cohort there were 212 girls and 233 boys. In the 2019-20 cohort there were 236 girls and 218 boys. In the 2020-21 cohort there were 212 girls and 167 boys. The 2021-22 cohort had equal distribution and included 213 girls and 213 boys.

Table 32

Mean Math Scores by Gender by Year

Year	Gender	Tier1 Fall	Tier 1 Winter	Change	Tier 2 Fall	Tier 2 Winter	Change	Tier 3 Fall	Tier 3 Winter	Change
Year 1	G	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
(2017-18)	B	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Year 2	G	65	62	-3	N/A	N/A	N/A	10	14	+4
(2018-19)	B	68	68	0	N/A	N/A	N/A	15	17	+2
Year 3	G	58	60	+2	N/A	N/A	N/A	17	18	+1
(2019-20)	B	58	61	+3	N/A	N/A	N/A	12	15	+3

Year 4	G	43	51	+8	N/A	N/A	N/A	9	10	+1
(2020-21)	B	51	56	+5	N/A	N/A	N/A	11	7	-4
Year 5	G	48	47	-1	N/A	N/A	N/A	11	11	0
(2021-22)	B	50	52	+2	N/A	N/A	N/A	11	9	-2

Table 33 includes the Mean score for Fall and Winter along with the change from Fall to Winter for each tier of students comparing Special Education Students (Y) to Non-Special Education Students (N). The 2017-18 cohort included 15 SPED students, the 2018-19 cohort included 49 SPED students, the 2019-20 cohort included 52 SPED students, the 2020-21 cohort consisted of 40 SPED students and the 2021-22 cohort had the highest number of SPED students which was 57. Tier 3 Special Education Students outperformed non-special education students in Year 1 Winter when they scored 1 mean point higher. Significant changes included the 7-point rise from Fall to Winter in Year 4 for Non-Special Education students. In Year 5 Tier 1 Special Education Students took a 13 point drop from Fall to Winter.

Table 33

Mean Math Scores by Special Education Status by Year

Year	SPED	Tier1 Fall	Tier 1 Winter	Change	Tier 2 Fall	Tier 2 Winter	Change	Tier 3 Fall	Tier 3 Winter	Change
Year 1	Y	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
(2017-18)	N	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Year 2	Y	45	39	-6	N/A	N/A	N/A	10	16	+6
(2018-19)	N	67	66	-1	N/A	N/A	N/A	14	15	+1
Year 3	Y	37	40	+3	N/A	N/A	N/A	8	11	+3
(2019-20)	N	59	61	+2	N/A	N/A	N/A	19	21	+2
Year 4	Y	32	32	0	N/A	N/A	N/A	9	7	-2
(2020-21)	N	47	54	+7	N/A	N/A	N/A	10	11	+1
Year 5	Y	43	30	-13	N/A	N/A	N/A	9	8	-1
(2021-22)	N	49	51	+2	N/A	N/A	N/A	13	12	-1

Table 34 includes the mean score for Fall and Winter along with the change from Fall to Winter for each tier of students comparing Students' Ethnicity. In the 2017-18 cohort there were 37 African American students, 8 Asian students, 293 Caucasian students, 17 Hispanic students

and 9 Native American students. The 2018-19 cohort consisted of 48 African American students, 15 Asian students, 360 Caucasian students, 12 Hispanic students, and 10 Native American students. The 2019-20 Cohort included 63 African American students, 16 Asian students, 352 Caucasian students, 14 Hispanic students, and 9 Native American students. The 2020-21 cohort was comprised of 82 African American students, 12 Asian students, 260 Caucasian students, 13 Hispanic students, 11 Native American students, and 1 Pacific Islander student. The 2021-22 cohort is comprised of 70 African American students, 12 Asian students, 320 Caucasian students, 13 Hispanic students, and 11 Native American students.

Tier 3 Hispanic students mean math score decreased by 12 in Year 2 from Fall to Winter. Tier 3 Hispanic students increased by 18 in Year 3 from Fall to Winter. In Year 4 many ethnicities experienced a spike in scores from Fall to Winter which included Asian students (+7), Caucasian students (+6) and Hispanic students (+19). Unfortunately, Tier 1 Pacific Islander students experienced a significant decrease in Year 4 (-28).

Table 34

Mean Math Scores by Ethnicity by Year

Year	Ethnicity	Tier1 Fall	Tier 1 Winter	Change	Tier 2 Fall	Tier 2 Winter	Change	Tier 3 Fall	Tier 3 Winter	Change
Year 1 (2017-18)	African American	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
	Asian	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
	Caucasian	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
	Hispanic	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
	Native American	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
	Pacific Islander	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Year 2 (2018-19)	African American	49	52	+3	N/A	N/A	N/A	9	10	+1

	Asian	68	64	-4	N/A	N/A	N/A	N/A	N/A	N/A
	Caucasian	68	66	-2	N/A	N/A	N/A	14	18	+4
	Hispanic	55	58	+3	N/A	N/A	N/A	24	12	-12
	Native American	62	62	0	N/A	N/A	N/A	6	8	+2
	Pacific Islander	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Year 3 (2019-20)	African American	44	50	+6	N/A	N/A	N/A	18	17	-1
	Asian	79	73	-6	N/A	N/A	N/A	10	9	-9
	Caucasian	59	62	+3	N/A	N/A	N/A	12	15	+3
	Hispanic	39	42	+3	N/A	N/A	N/A	9	12	+3
	Native American	46	47	+1	N/A	N/A	N/A	19	37	+18
	Pacific Islander	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Year 4 (2020-21)	African American	37	40	+3	N/A	N/A	N/A	10	10	0
	Asian	71	78	+7	N/A	N/A	N/A	N/A	N/A	N/A
	Caucasian	49	55	+6	N/A	N/A	N/A	11	9	-2
	Hispanic	32	51	+19	N/A	N/A	N/A	3.5	7	+3.5
	Native American	49	47	-2	N/A	N/A	N/A	3	5	+2
	Pacific Islander	74	46	-28	N/A	N/A	N/A	N/A	N/A	N/A
Year 5 (2021-22)	African American	36	35	-1	N/A	N/A	N/A	12	10	-2
	Asian	64	70	+6	N/A	N/A	N/A	12	13	+1
	Caucasian	51	52	+1	N/A	N/A	N/A	7	10	+3
	Hispanic	37	41	+4	N/A	N/A	N/A	N/A	N/A	N/A
	Native American	51	49	-2	N/A	N/A	N/A	51	49	-2
	Pacific Islander	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A

Research Question 4 asked what is the academic impact of the COVID-19 pandemic on 7th-grade students' STAR Math scores accounting for demographic variables? The researcher began with tables that presented the Tier's data at large and then provided a breakdown of the mean scores by Gender, Special Education Status, and Ethnicity. For Gender, boys outperformed girls on almost all comparisons. Special Education students made the greatest increase in Year 4 and their greatest decrease in Year 5. Tier 3 Hispanic students mean math scores decreased in Year 2, however, the scores increased significantly in Year 3. In Year 4 many ethnicities experienced an uptick in scores from Fall to Winter.

Conclusions

This chapter presented statistical results of the analyzed data to answer each of the four research questions identified by the researcher. It is evident that although most students remained above benchmark, in year 4 and 5, there was an observed downward shift in mean scores. In addition, more students were identified as needing Tier 2 or Tier 3 supports and interventions over the span of the identified years. Boys outperformed girls on STAR Math and Asian students scored higher than all other ethnicities.

Over the five years of this study, the school experienced increase growth overall and it is also becoming more diverse. This presents a greater need to further develop the MTSS and make appropriate changes necessary to combat the decreasing effects presented in this study surrounding academic achievement. Chapter 5 details a summary of the results, interpretation of the findings and recommendations for practice. Chapter 5 also provides recommendations for further research related to this study.

CHAPTER 5: CONCLUSIONS AND RECOMMENDATIONS

Since the COVID-19 pandemic began in March 2020, educators, parents, and policymakers have been concerned about potential loss of learning associated with on-going disruptions to schooling. The purpose of this causal-comparative research was twofold, to measure the degree of impact the COVID-19 pandemic had on students' academic performance and determine the extent to which the Multi-Tiered System of Supports (MTSS) served to counter the impact of the pandemic on students' reading and math performance. The MTSS framework, "when implemented appropriately, provides a way for schools and districts to organize practices, data, and systems to promote early identification of student needs and alignment with effective supports" (Freeman et al., 2018, p. 102). Specifically, the researcher's goal was to determine the effectiveness of the implementation of the Multi-Tiered System of Supports (MTSS) to counter the impact of the pandemic on 7th-grade students' reading and math academic progress in a Mid-Western middle school. MTSS in schools could lessen the learning loss associated with the COVID-19 pandemic especially based on its premise of using well-researched programs and analysis of data to improve academic success.

The MTSS studied began its implementation almost a decade ago. Since that time, many changes have been made to the delivery of instruction and the overall components of the MTSS framework. Year 1 in this study was Year 5 of MTSS implementation at the study's school. The last 5 years' worth of data used in the study, were years 6-10 of MTSS at the study's school. One specific change that affected this study in data collection was the inconsistencies of the course offerings for Tier 2 and Tier 3 and how they named them in Power School. The data seemed to show growth in some areas for year 2 but the COVID-19 pandemic yielded a steep decline in scores and the school is continuing to experience its effects.

Summary of Study Methodology

Employing a causal-comparative quantitative approach to analyze longitudinal secondary data, this study explored the academic impact of the COVID-19 pandemic on Multi-Tiered System of Supports as measured by STAR Reading and STAR Math assessment data. Data were collected from the 2017-18, 2018-19, 2019-20, 2020-2021, and 2021-22 school year to collect the growth rate from Fall to Winter in both reading and math utilizing Renaissance STAR Reading and STAR Math for seventh graders.

SPSS (Statistical Package for the Social Sciences) statistical analysis software served the purpose of data analysis. Given that One-Way ANOVA was utilized, the researcher first explored the data to determine whether the statistical assumptions to use One-Way ANOVA were met. One-way ANOVA explored the differences over the 5-years of longitudinal STAR Reading and STAR Math data (i.e., 2017-18, 2018-19, 2019-20, 2020-21, and 2021-22). Further, the researcher examined the impact on Tier 1, Tier 2, and Tier 3 along with demographic criterion including gender, special education designation, and ethnicity. A summary of the findings, recommendations, and conclusions are detailed in this chapter.

Quantitative analysis of this study focused on four research questions. The first two research questions (RQ1) and (RQ2), served as primary research questions. They investigated the extent of MTSS achieving the objectives for which it was implemented over the 5 years and the effectiveness of the MTSS framework to counter the impact of the COVID-19 pandemic on 7th-grade students' academic performance in reading and math. The next two research questions (RQ3) and (RQ4) examined the impact on specific groups in the sample (e.g., gender, SPED status, and ethnicity). Renaissance STAR Reading and STAR math data served as the school's universal assessments and were leveraged to make placement decisions for serving students

individual needs of support and intervention services. These scores were used for all data analyses conducted in this study.

The participant group of 7th graders at one middle school included 2,068 students who met set criterion for which their STAR data were entered into SPSS. Additional student data were provided by the school district's data analyst that included the MTSS courses the students were enrolled in, along with the demographic information (e.g., gender, SPED status, ethnicity).

Summary and Discussion of Findings

MTSS is designed as a schoolwide system to meet individual student needs through intense and focused interventions and assessment measures. These interventions provide scientific, research-based strategies with consistent monitoring of student progress (Hunley & McNamara, 2010). Universal screening measures (i.e., Renaissance STAR) are adopted to ensure consistency in the academic areas. The screening data offer three perspectives: (a) the identification of individual students who need interventions and further assessments which may result in Tier 2 interventions, (b) class performance feedback as an analysis of the Tier 1 core instruction, (c) identification of students who do not flag as at risk until later in their school years (Johnson et al., 2006). With the data incurred during universal screenings, teachers are able to be proactive and preventive in their Tier 1 instruction. Tier 1 instruction is more commonly referred to as core instruction that every student is met with in the general education classroom. This intervention is categorized by high-quality, research-based instruction using practices that ensure that any student deficits cannot be attributed to the quality of instruction (VanDerHeyden et al., 2016).

MTSS Implementation involves a focus on secondary and tertiary interventions, referred to as Tier 2 and Tier 3. When a student's universal screening results indicate a deficit, research-

based instructional interventions are implemented. In this level of implementation, staff members typically increase the intensity of instruction in one or more ways. Tier 2 and Tier 3 consist of the collaboration of Tier 1 general education instruction as well as specific interventions to address critical educational deficiencies.

Effects of the pandemic have left educational decision-makers considering its academic implications on our schools. Unfortunately, gaps will only continue to widen for some students unless school systems provide the necessary supports. This study aimed to investigate the relationship between STAR Reading and STAR Math scores over the years included in the study with a specific focus on pre pandemic years vs. post-pandemic years. Furthermore, the researcher investigated the relationship between STAR Reading and STAR Math on the three tiers of instruction for which MTSS is based on. The findings in this study show that Renaissance STAR scores decreased over time between 2017-2022, with the COVID-19 pandemic widening this decrease. It is evident that although most students' performance remained above benchmark, in years 4 and 5 math and reading scores experienced a downward shift in their mean values. When the researcher examined STAR Reading Mean values, from Year 1 to Year 2 and Year 2 to Year 3, there was a 2-percentile rank (PR) decrease each year. However, from Year 3 to Year 4 there was a 4 PR decrease and then from Year 4 to Year 5 there was a 2 PR decrease. For STAR Math, the mean values from Year 1 to Year 2 increased by 1 PR, however, from Year 2 to Year 3 the mean values declined by 7 PR. From Year 3 to Year 4 it declined an additional 10 PR, yet the scores managed to increase 2 PR from Year 4 to Year 5. For years 4 and 5 the mean score for STAR Reading and STAR Math remained above the benchmark of 40 percentile rank which is considered Tier 1 and where MTSS objectives aims students to be.

It is hard to pinpoint why this decline was happening even before the COVID-19 pandemic. A multitude of factors could have contributed to this regression including exponential growth, diversity, curriculum changes, and fidelity of the interventions which includes teacher effectiveness. Since this study was grounded on program evaluation it is abundantly clear that the MTSS didn't seem to be meeting its objectives and it is suggested the school conduct a closer examination of each of the pillars of MTSS.

Another key finding in this study was that progressively more students were identified as needing Tier 2 or Tier 3 supports and interventions over the span of the identified years. This was observed when the researcher calculated the Student Growth Percentiles over the five years for STAR Reading and Math, the One-Way ANOVA for Reading and Math that measured STAR to Tier of Instruction, and then also when calculating the number and percentage of students that fell within each of the percentile rank bands.

Program Evaluation

The purpose of this study was to conduct a program evaluation of MTSS and its ability to support students' reading and math performance during the COVID-19 pandemic. The study utilized Ralph W. Tyler's (1949) objectives-based model to provide a longitudinal evaluative perspective to determine how the role MTSS played in supporting students during the complex times of the COVID-19 pandemic. The researcher found that even though there was a decrease in the reading and math score each year, the mean average remained at or above the 40th PR, the established benchmark for all three tiers except Tier 3 Math. As schools strive towards continuous improvement efforts, the school where this study took place and other schools experiencing a similar MTSS performance should consider what efforts must be made to reverse

this declining trajectory. Just because the 40th PR is the benchmark, the school must at the very least consider how to return the mean averages to pre-pandemic status.

The study was also grounded in the Leadership in Times of Crisis Framework for Assessment (Boin et al., 2013) as the study attempted to measure some of the most critical areas impacted by the school closure crisis triggered by the COVID-19 pandemic. In this framework, "impact is measured in terms of damage to people, critical infrastructure, and public institutions" (p. 81). School leaders examined the effects of their infrastructure and the people affected by the crisis to determine how to improve learning conditions. Since all staff in the district have Trauma Sensitive Schools training, it was important for the leaders to wear their trauma lens when working with students and staff post-pandemic.

Within the community of where this study was conducted, the population is growing at a rate of 72.9%. Because of this, the school district is faced with ensuring its systems are as efficient as possible to keep up with the growth such as the MTSS and the long-range facilities task force. This speaks to the demands that teachers and administrators have been facing (demographically speaking) while at the same time implementing MTSS.

MTSS in the study's school district where this study took place continued to make appropriate modifications to its systems leveraging data-based decision making. To ensure success of the MTSS, the study's school district secured made changes over the years to include a District MTSS coordinator, an MTSS Coach at each secondary building, and continued to invest time, money, and personnel to ensure high-quality core programming, including staff professional development, to reach successful levels of implementation. Academic achievement for students at the study's school showed no differences among years 1-3. The differences started

in Year 4 and continued in Year 5. Educational leaders should examine their school's data both longitudinally across several years to ensure their programs are continually improving.

There is an even greater decline of academic performance during the pandemic. It is hard to identify why the declines continue to occur as this isn't the direction MTSS efforts tend lead according to the literature in Chapter 2. However, these results could be expected during the Pandemic years even with MTSS in place. Schools new to implementing MTSS at the middle level should prioritize evidence-based intervention curriculum and effective interventionists to teach students at-risk of meeting benchmark standards.

Limitations

The findings of this study are not generalizable to all grade levels nor are they generalizable to all geographical locations. The findings of this research were most relevant to this school and schools with similar demographics. The use of existing, historical data is an identified limitation. The researcher had no control over the testing environments in which data were collected. This also became a problem when the researcher was unable to identify all of the course codes and names when pulling the Power School demographics. At the secondary level, interventions and supports often occur during a scheduled class time so some course identifiers were missed. At the time of the study, the school did not have a systematic way to identify which students received Tier 2 supports and interventions for Math so that data were also unable to be extracted.

Recommendations for Practice

Although the results of this study do not largely support the theory that MTSS has increased the academic achievement of students who receive support and intervention through a tiered model, it is important to remember that while scores were dropping, students' performance

in reading and math remained above benchmark. When implemented as directed, MTSS encompasses the following elements: (1) assessment, (2) data-based decision making, (3) multi-tier instruction, (4) infrastructure and support mechanisms, and (5) fidelity and evaluation (NDMTSS, 2021). When providing these supports, schools may need to consider individualizing instruction to support all students and the unique challenges of the specific school.

Given the researcher was unable to collect Tier 2 math data in its entirety, it is recommended that the study's school create a systematic process to collect Tier 2 math data. This could be done through course codes and titles that are unified between the three middle schools in the study's school district. Moving forward, it is the recommendation that all three middle schools in the study's school district use the same course codes and titles for all intervention classes at the Tier 2 and Tier 3 level including the interventions used (e.g., Read 180, AddVantage Math Recovery (AVMR)). Additionally, the study's school district should collect additional demographic data so that data analysis could be more refined in terms of identifying the needs of very specific groups, especially Socio-Economic Status (SES) noted later in this chapter.

The cumulative impact of the COVID-19 pandemic on academic achievement has been large. School districts and states must make important decisions about which interventions and strategies to implement to mitigate the learning declines during the last two years. These include hiring additional academic interventionists to counter the learning regressions students have faced due to the COVID-19 pandemic, offering tutoring services, summer learning, and extending the school day. Elementary and Secondary School Emergency Relief (ESSER) investments from the American Rescue Plan provided nearly $200 billion to public schools to spend on COVID-19 -related needs. Of that sum, $22 billion was dedicated specifically to

addressing learning loss using “evidence-based interventions” focused on the disproportionate impact of COVID-19 on underrepresented student groups. There is much work to be done, and the challenges for students, educators, and parents are considerable. This may be a time when decades of educational reform, intervention, and research pay off if we use it to move our systems forward, possibly through MTSS.

To support sub-groups the study school should consider how to systematically support Tier 2 math students. Because the researcher was unable to identify Tier 2 Math students utilizing Power School classes, it left a gap in what the researcher hoped to include in the study’s tiered approach. Another consideration is to increase the rigor of interventions for Tier 3 reading students to include more professional development for the teachers and utilizing more progress monitoring to inform teachers of their students’ progress and leverage evidence-based instructional strategies. These students experienced little to no growth and in some cases regressed when measuring the Fall to Winter mean scores. Stakeholders should also further their understanding of why boys outperform girls in math and why Hispanic and African American students underperform Caucasian and Asian American students. One might also consider expanding the study across the three middle schools in the study to ensure equity between the schools and ensure inter-rater reliability.

Recommendations for Further Research

The COVID-19 Pandemic

While the MTSS at the school studied seemed to mitigate some of the negative trends in percentile rank of Renaissance STAR Reading and STAR Math, as compared to the state and national levels, it will need continued investigation over time to ensure the study’s school remains above the state average. Administrators at the study’s school should continue to

calculate the STAR Reading and STAR Math scores in the years to come to come. State and national level action is needed to investigate these results to see if there are other implications leading to this downward trend to include Social and Emotional health which includes trauma, a reliance on technological devices, and financial strains on families. Data will continue to emerge that associate the COVID-19 pandemic to high school graduation rates. This study has added to a limited body of literature surrounding the COVID-19 pandemic and student achievement and potentially allows further research to better prepare for and respond to abrupt change of supports due to the COVID-19 pandemic.

MTSS at the Secondary Level

The body of research regarding MTSS primarily focuses on primary grade levels, creating a gap in better understanding the role of MTSS at the secondary level. Early intervening services provided in the framework of MTSS carry apparent benefits in the primary grades as students are still acquiring basic academic skills, however, some students are entering the secondary grades (6-12) and performing below grade-level in math and/or reading. Researchers have shifted their focus to implement the MTSS framework at the secondary level, with more studies occurring at the middle level (grades 6-8) (Dufrene et al., 2010; Fuchs et al., 2010; King et al., 2012; Solis et al., 2014).

MTSS serves as a framework to support students that struggle academically. It is the researcher's suggestion that schools considering implementing MTSS also adopt a tiered approach to behavior and social emotional learning (SEL). As more studies are conducted on the impact of the pandemic on students' academic achievement, the most effective path forward to achieve equitable outcomes is to begin to close the opportunity gap through a holistic approach. It was the researcher's intention to study the three pillars of MTSS which include Academics,

Behavior/SEL, and Attendance but the COVID-19 pandemic required a shift in focus for the researcher and also became increasingly complicated to measure due to unforeseen logistical aspects of the pandemic.

Continual Improvement Monitoring

It is critical for the reader to also note that the study's school where the study was conducted continues to experience an extremely intense increase in enrollment due to growth in the district which has also resulted in increasing diversity. The researcher noted that hybrid learning occurred in Year 4 of the study which resulted in students only attending school in person two days a week with only half the students in the building. Due to this, more individualized attention was given, and less behaviors and distractions took place. School leaders should begin making data-based decisions based on the data presented in this study to combat the issues they are experiencing. The researcher also suggests the study school's leaders to continue to compare their academic achievement scores to state and national averages to gauge effectiveness of maintaining a high level of student achievement.

Compassionate Leadership

In less than a year, teachers were required to facilitate different modes of learning and shift their instructional practices with little to no time or professional development. Along the way, they implemented mitigation strategies and navigated the process of some students missing several days or even weeks due to quarantine. Schools have been faced with teacher and substitute shortages and have gone through traumatic experiences themselves and yet continue to show up for their students to provide a meaningful educational experience. Leaders must lead with compassion and offer Social Emotional Learning (SEL) practices to staff. They must be understanding and provide a listening ear to their staff.

Socioeconomic Status (SES) Analyses

The researcher was unable to gather data necessary that determine students SES. This would have been valuable data in terms of overall achievement declines and widening opportunity gaps. This could be tied to SPED status and ethnicity to gather a further understanding of these individual factors. Kuhfield et al. (2022) noted that specifically, during the 2020-21 school year, high-poverty schools continued to experience declines in math and had larger losses in reading, whereas low-poverty schools avoided further losses in math and saw less severe losses in reading. By examining the academic impact of the COVID-19 pandemic on SES students, the school can identify ways in which they can best meet those students needs and provide supports.

Conclusion

It should come as no surprise that large academic declines were observed due to interruption and experiences caused by the COVID-19 pandemic. Kuhfield et al. (2022) stated that the "COVID-19 pandemic has been a seismic and on-going disruption to K-12 schooling (p.3)." They noted that observed declines were more substantial than during other recent school disruptions, such as those due to natural disasters. Although research on the impact of the COVID-19 pandemic on students' academic performance has just begun and the most urgent needs are accounted for, studies can begin being conducted by school system members. Educational leaders should seek ways to improve achievement scores and combat the effects of the COVID-19 pandemic.

Transforming education is an enormous undertaking, yet it is the responsibility of educators and educational leaders to ensure that all students experience school success. This can be done through efforts of implementing MTSS through continuous improvement efforts and

making data-based decisions. We must engage and support all learners and continue to close the opportunity gap that continues to take its toll on our schools today.

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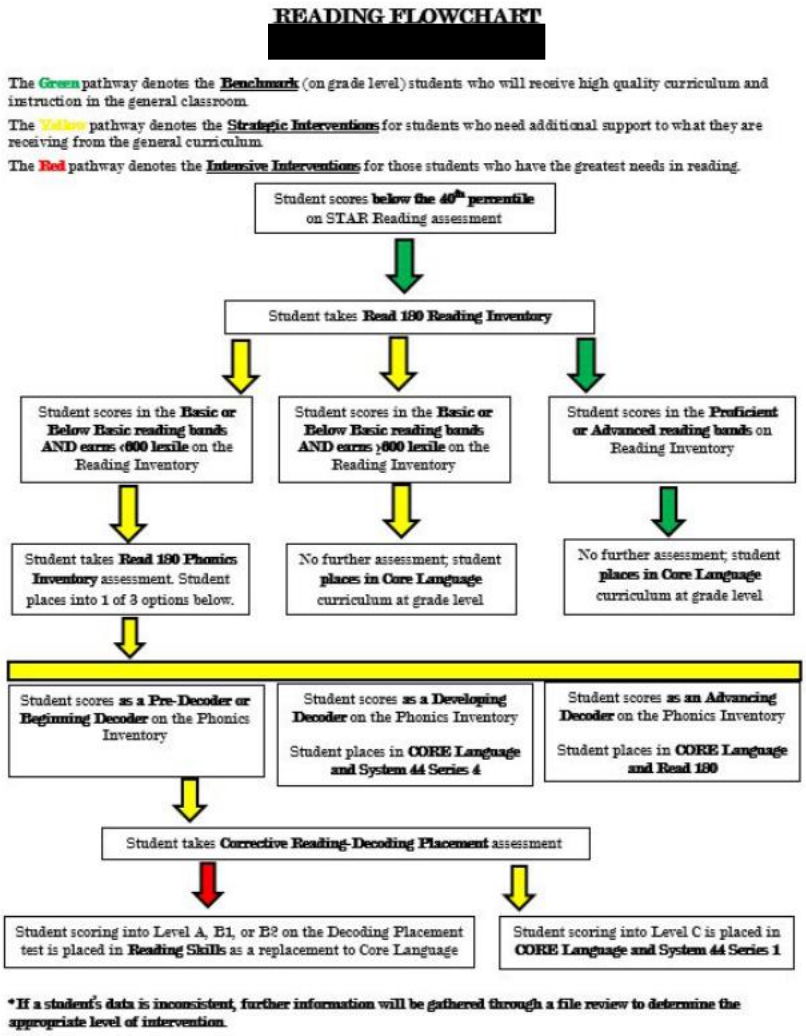
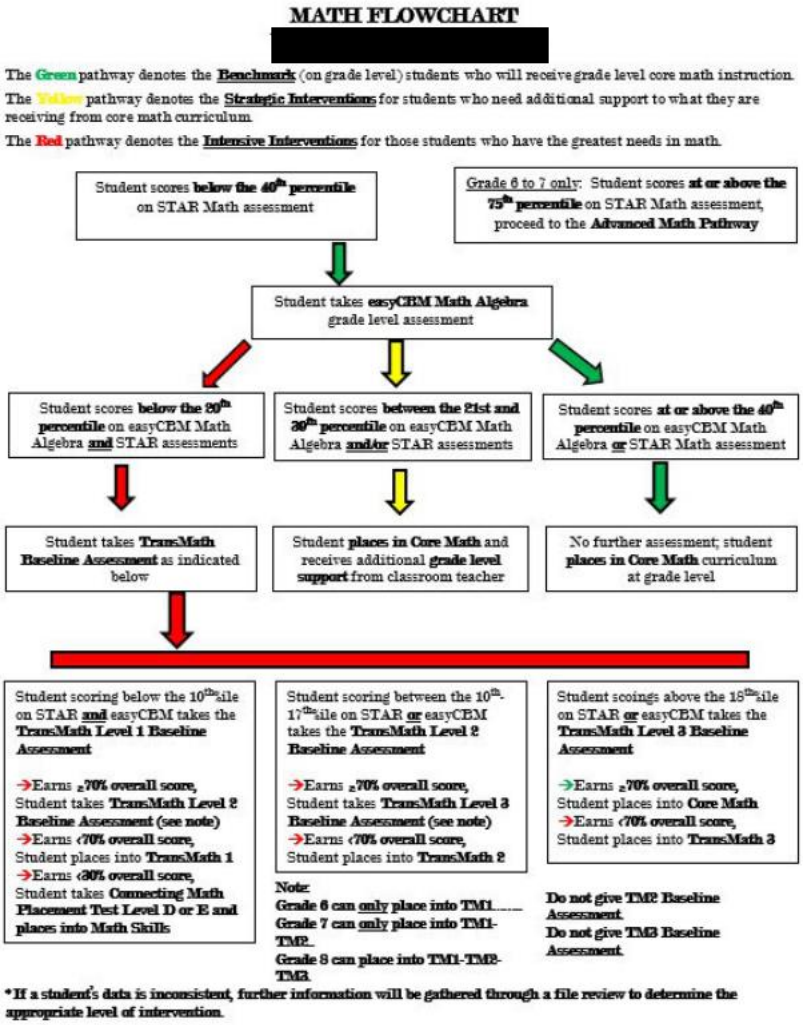
APPENDIX A


READING FLOWCHART
[redacted]
The Green pathway denotes the Benchmark (on grade level) students who will receive high quality curriculum and instruction in the general classroom.
The Yellow pathway denotes the Strategic Interventions for students who need additional support to what they are receiving from the general curriculum.
The Red pathway denotes the Intensive Interventions for those students who have the greatest needs in reading.
Student scores below the 40th percentile on STAR Reading assessment
Student takes Read 180 Reading Inventory
Student scores in the Basic or Below Basic reading bands AND earns <600 lexile on the Reading Inventory
Student scores in the Basic or Below Basic reading bands AND earns >600 lexile on the Reading Inventory
Student scores in the Proficient or Advanced reading bands on Reading Inventory
Student takes Read 180 Phonics Inventory assessment. Student places into 1 of 3 options below.
No further assessment; student places in Core Language curriculum at grade level
No further assessment; student places in Core Language curriculum at grade level
Student scores as a Pre-Decoder or Beginning Decoder on the Phonics Inventory
Student scores as a Developing Decoder on the Phonics Inventory
Student places in CORE Language and System 44 Series 4
Student scores as an Advancing Decoder on the Phonics Inventory
Student places in CORE Language and Read 180
Student takes Corrective Reading-Decoding Placement assessment
Student scoring into Level A, B1, or B2 on the Decoding Placement test is placed in Reading Skills as a replacement to Core Language
Student scoring into Level C is placed in CORE Language and System 44 Series 1
*If a student's data is inconsistent, further information will be gathered through a file review to determine the appropriate level of intervention.

APPENDIX B


MATH FLOWCHART
[redacted]
The Green pathway denotes the Benchmark (on grade level) students who will receive grade level core math instruction.
The Yellow pathway denotes the Strategic Interventions for students who need additional support to what they are receiving from core math curriculum.
The Red pathway denotes the Intensive Interventions for those students who have the greatest needs in math.
Student scores below the 40th percentile on STAR Math assessment
Grade 6 to 7 only: Student scores at or above the 75th percentile on STAR Math assessment, proceed to the Advanced Math Pathway
Student takes easyCBM Math Algebra grade level assessment
Student scores below the 20th percentile on easyCBM Math Algebra and STAR assessments
Student scores between the 21st and 39th percentile on easyCBM Math Algebra and/or STAR assessments
Student scores at or above the 40th percentile on easyCBM Math Algebra or STAR Math assessment
Student takes TransMath Baseline Assessment as indicated below
Student places in Core Math and receives additional grade level support from classroom teacher
No further assessment; student places in Core Math curriculum at grade level
Student scoring below the 10th%ile on STAR and easyCBM takes the TransMath Level 1 Baseline Assessment
→Earns ≥70% overall score, Student takes TransMath Level 2 Baseline Assessment (see note)
→Earns <70% overall score, Student places into TransMath 1
→Earns <30% overall score, Student takes Connecting Math Placement Test Level D or E and places into Math Skills
Student scoring between the 10th-17th%ile on STAR or easyCBM takes the TransMath Level 2 Baseline Assessment
→Earns ≥70% overall score, Student takes TransMath Level 3 Baseline Assessment (see note)
→Earns <70% overall score, Student places into TransMath 2
Note:
Grade 6 can only place into TM1-TM2
Grade 7 can only place into TM1-TM2
Grade 8 can place into TM1-TM2-TM3
Student scoings above the 18th%ile on STAR or easyCBM takes the TransMath Level 3 Baseline Assessment
→Earns ≥70% overall score, Student places into Core Math
→Earns <70% overall score, Student places into TransMath 3
Do not give TM2 Baseline Assessment
Do not give TM3 Baseline Assessment
*If a student's data is inconsistent, further information will be gathered through a file review to determine the appropriate level of intervention.

APPENDIX C

GCC-A

RESEARCH STUDY REQUEST

I hereby request permission to conduct a research study in the West Fargo Public School District during

the period from August 2019 to June 2021.

TOPIC: Effectiveness of Multi-Tiered System of Supports on STAR and Reading Inventory Scores, Office Discipline Referrals, and Attendance

If this request is granted, I agree to abide by the district policy governing research studies, refer to the Administrative policies in each building Administrator's office or in the Human Resources office.

Signature of Researcher: Sonia Nistler

Institution of Higher Education: Minnesota State University-Moorhead

Signature of Graduate Advisor: [signature]

Date: September 24, 2020

In addition to completing the Research Study Request Form, a copy of the following items is attached for review:

1. Abstract of the project
2. Questionnaire(s) to be used
3. Consent letter to be sent to parents

Endorsement: This request is ✓ approved ____ disapproved

Administrator: [signature] Carol Zent

Date: 9/24/2020

A copy of the approval form must be presented to the school building principal and the assistant superintendent before conducting any survey. The principal has the final approval to conduct a survey in a school building.

Please print your name and the mailing address where you want this form returned:

Name: Heritage Middle School Attn: Sonia Nistler

Street Address: 6350 76th Ave S

City, State, & Zip: Horace, ND, 58047

APPENDIX D

Institutional Review Board

MINNESOTA STATE UNIVERSITY MOORHEAD

DATE:	September 29, 2020
TO:	Boyd Bradbury, Principal Investigator Sonia Nistler, Co-Investigator
FROM:	Lisa Karch, Chair Minnesota State University Moorhead IRB
ACTION:	**DETERMINATION OF EXEMPT STATUS**
PROJECT TITLE:	[1636112-1] The Impact of Multi-Tiered Systems of Support on Student Success, Behavior and Absenteeism
SUBMISSION TYPE:	New Project
DECISION DATE:	September 29, 2020

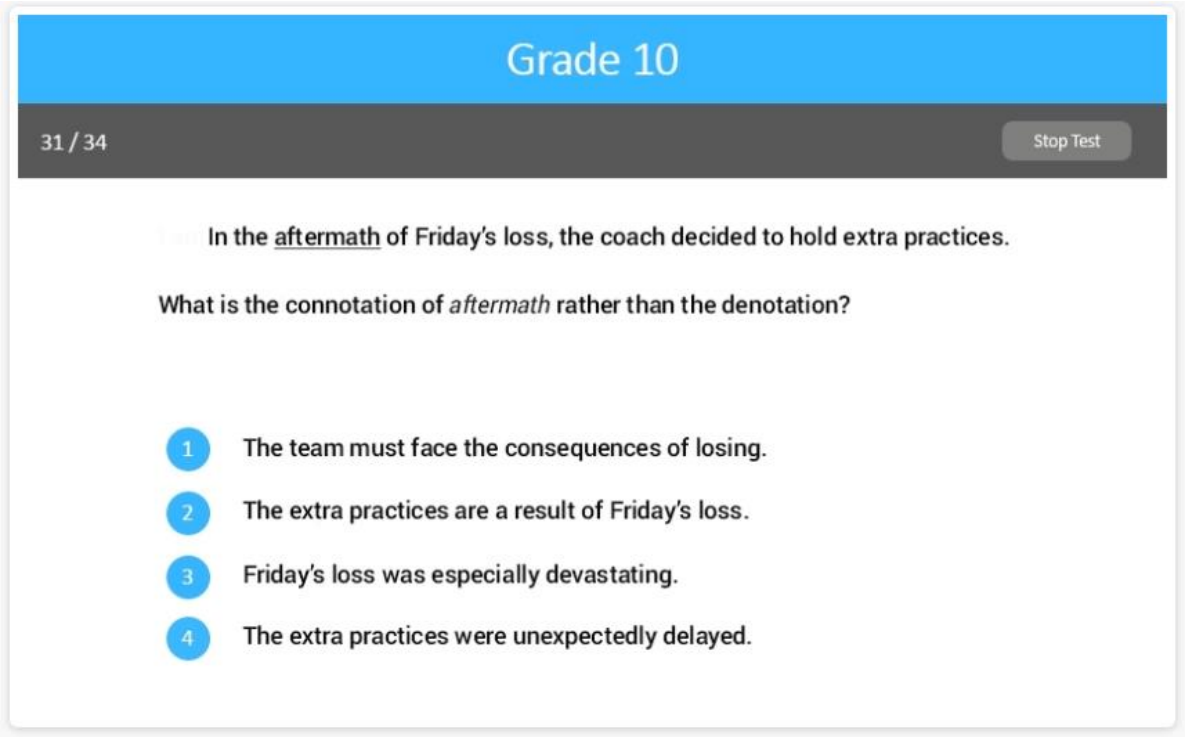
Thank you for your submission of requested revisions for this project. The Minnesota State University Moorhead IRB has determined this project is EXEMPT FROM IRB REVIEW according to federal regulations under 45 CFR 46.104.

We will retain a copy of this correspondence within our records.

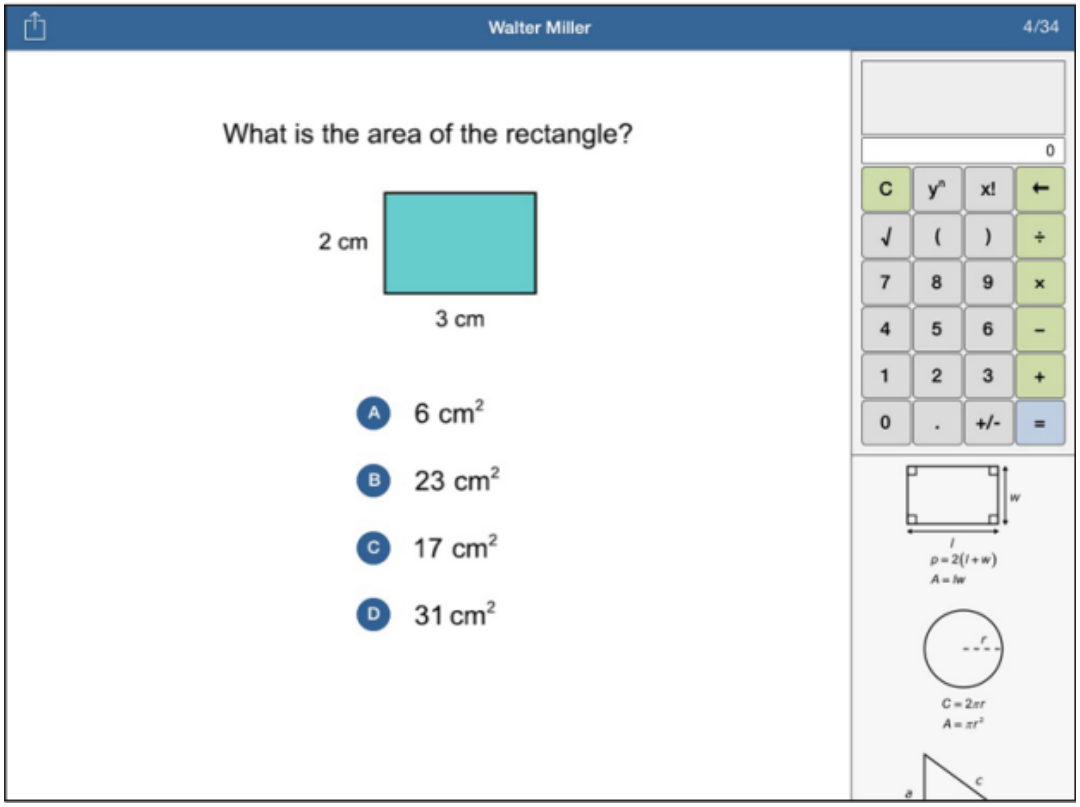
If you have any questions, please contact the Minnesota State University Moorhead IRB. Please include your project title and reference number in all correspondence with this committee.

This letter has been issued in accordance with all applicable regulations, and a copy is retained within Minnesota State University Moorhead's records.

APPENDIX F


Grade 10
31 / 34
Stop Test
In the aftermath of Friday's loss, the coach decided to hold extra practices.
What is the connotation of aftermath rather than the denotation?
1 The team must face the consequences of losing.
2 The extra practices are a result of Friday's loss.
3 Friday's loss was especially devastating.
4 The extra practices were unexpectedly delayed.

APPENDIX G


Walter Miller
4/34
What is the area of the rectangle?
2 cm
3 cm
A 6 cm²
B 23 cm²
C 17 cm²
D 31 cm²
0
C
yⁿ
x!
←
√
(
)
÷
7
8
9
×
4
5
6
−
1
2
3
+
0
.
+/-
=
w
l
p = 2(l + w)
A = lw
r
C = 2πr
A = πr²
a
c