Evaluating Return on Investment for Response to Instruction & Intervention (RTI^2)

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Return on Investment for Response to Instruction & Intervention
Prepared by the Department of Research & Performance Management

Executive Summary

Shelby County Schools (SCS) has set forth ambitious goals for its students including a goal for 80 percent of students to graduate college- or career-ready by 2025. Yet many students continue to struggle in mastering the grade-level content they need to be prepared for postsecondary education or the workforce. Among ninth graders who completed the TNReady assessment in 2018, only 14 percent were proficient in English I, and less than six percent were proficient in Algebra I.

As academic standards have gotten more rigorous and focus has increased on college- and career-readiness, both the State of Tennessee and SCS have made major investments in Response to Instruction and Intervention (RTI^2) to support struggling students early. In the RTI^2 framework, students who are not performing on grade level receive intervention that is tailored to their individual needs to help them bolster targeted skills in reading or math. Given the large number of students who are struggling academically in the District, RTI^2 targets students with the greatest need and places them in small-group Tier II or Tier III intervention. Periodic screening occurs throughout the school year that allows teachers to identify students to receive intervention, as well as students who have made enough gains during intervention to return to regular instruction. In 2017-18, more than 10,000 SCS students received reading intervention and more than 5,000 received math intervention.

This report addresses the following research questions pertaining to school- and District-level implementation of RTI^2 and corresponding student outcomes for 2017-18:

- What distinguishes high-implementation versus low-implementation schools? What are the best metrics to indicate that schools are providing the right RTI^2 services to students?
- Are academic outcomes for Tier II and III students better in high-implementation versus low-implementation schools? Are there best practices or recommendations that can improve outcomes for all schools going forward with RTI^2 implementation?
- What is the estimated annual cost of implementing RTI^2 in our District? What is the cost per student who shows academic improvement while in intervention?

Research Overview

In 2017-18, SCS' Department of Research & Performance Management (RPM) initiated research to assess the fidelity of RTI^2 implementation across schools and determine whether schools with indicators of strong implementation achieved better academic outcomes among Tier II and III students compared to other schools. We also collected data on schools' perceived ease of RTI^2 implementation and estimates of staff time and funding spent on this process to determine return on investment. Key data collection processes were as follows:

- Student Activity and Outcome Measures – RPM collected data from various online platforms and assessments to determine the frequency of required screening, benchmarking and progress monitoring that students targeted for RTI^2 support received throughout the 2017-18 school year. This report also examines how Tier II and III students performed over time on formative assessments and TNReady as measures of overall academic progress and also assesses the amount of skill progression students achieved during progress monitoring to calculate the overall cost per student demonstrating improvement.

- School-Level Implementation Measures – To determine how SCS schools compared to one another on their level of RTI² implementation, researchers created a Level of Implementation (LOI) index consisting of a variety of measures such as the number and percentage of students receiving required benchmarking and progress monitoring instances, students' activity on online interventions, schools' self-reported progress on implementation, and school staff's supporting activities for this process such as frequency of data team meetings and participation in District-led RTI² professional development.

- Staff Perception Measures – Researchers collected survey and focus group data to assess schools' perceptions on how easy or difficult various aspects of RTI² have been for schools to implement and also identify barriers to address and potential solutions. School-based RTI² Leads completed a survey at the end of each semester in 2017-18 to rate the level of difficulty and amount of staff time required to complete direct intervention and indirect administration tasks associated with RTI². These staff time estimates and District budget data on contracts and central office staff were used to estimate the overall amount of resources SCS spent to implement RTI² during the 2017-18 school year.

Data Limitations

The SCS Research team used a variety of measures associated with students who participated in RTI² implementation and school-level implementation to triangulate results and mitigate limitations of any single data source. However, some key data limitations are noted below and discussed in more detail in several sections of this report:

- Self-Reported Data – This research used school RTI² Lead self-reported survey data as one of multiple measures to assess each school's level of implementation and staff hours spent on completing RTI² tasks. Because self-reporting can be subjective and inconsistent, we administered the same survey multiple times (once per semester) to identify variances in responses at different times in the school year and mitigate the influence of seasonal effects. Moreover, we incorporated additional measures of implementation and cost that are not based on self-reporting to triangulate results.

- Paper-Based High School Activities – The online tools to complete intervention benchmarking were available only in paper format for high schools in 2017-18, and high school RTI² Leads were asked to record these results manually in spreadsheets. This manual data entry contributed to some benchmarking results being incomplete or potentially less accurate, so high school results in this report are analyzed separately from K-8 results.

- Limited Direct Measures of Intervention Quality – Although SCS is able to track many elements of RTI² activity using student- and staff-user platforms such as EdPlan, easyCBM, Achieve3000 and i-Ready, most of these can be characterized as proxy indicators of implementation rather than direct measures of intervention quality. While these online platforms provide standardized ways to assess the frequency and consistency of each school's intervention activities, SCS did not collect comprehensive, standardized data that directly measured face-to-face intervention quality in 2017-18. This means that our analysis puts heavier emphasis on students' online

activities and school compliance with RTI² requirements as an approximation for fidelity of implementation.

Implementation Limitations

In addition to some data limitations, the District experienced implementation limitations in 2017-18 worth noting because they suggest we may not expect to see the full impact of RTI² on student outcomes just yet.

- Platform Rollout Timing – Although all schools were expected to implement RTI² in school years prior to 2017-18, they lacked access to an online platform to assign and monitor interventions until 2017-18. Moreover, the platform was not scheduled to go live until October 2018, meaning schools did not have this tool available to support their work at the beginning of the school year and experienced some challenges transitioning from paper-based to online processes. We may expect to see more impact on students in Tier II or III intervention going forward now that schools can use this platform at the start of each school year.

- Limited Staff Allocations – Both the State and District have now recognized the need to have dedicated staff for RTI² implementation given the time-intensive responsibilities to deliver intervention and complete administrative tasks. However, there was no District-wide school- or student-level allocation of dedicated personnel for this work in 2017-18. Some individual schools built in full-time interventionist roles to support RTI², but many other schools had to coordinate and provide intervention enlisting only staff with other full-time responsibilities. In feedback forums, school staff consistently expressed concerns that they lacked adequate time and staff to implement RTI² fully as designed.

- Large Focus on Tier III Students – While the State requires only that students who fall in the national bottom achievement quartile be considered for Tier II or III support, it would not be feasible for SCS to provide intervention to all students who meet this criterion at all schools. Given the large volume of students who struggle academically, SCS permits schools to benchmark students who fall within the bottom 15 percent of achievement within each school. This ensures the students with the greatest need are prioritized for RTI², but it also means that SCS is serving mostly Tier III students who need the most intensive support and the longest period of time to show improvement. With this in mind, it may take multiple years of intervention for Tier III students to meet their full level of potential and move out of intervention altogether.

Key Findings

Key findings on the ease, level and cost of RTI² implementation in this report are as follows:

- Regarding level of implementation and perceived ease of implementation, high schools struggled notably more than elementary and middle schools by most measures.
- High schools with a dedicated interventionist had a higher average level of implementation that was statistically significant compared to high schools without an interventionist. This relationship was similar but not quite significant for elementary and middle schools.

- Tier II and III students who had at least 30 hours of online intervention activity demonstrated modest, positive effects on measures of academic achievement compared to Tier II and III students with low levels of activity (six hours or less).
    - Students with high online usage in reading intervention had an average of 4.3 points more growth on MAP and scored 3.3 points higher on TNReady in this subject than students with low usage.
    - Students with high online usage in math intervention had an average of 4.2 points more growth on MAP and scored 6.0 points higher on TNReady in this subject than students with low usage.
- As expected, Tier II students demonstrated a higher rate of growth than Tier III students.
- No other measures of RTI^2 implementation at the student or school level predicted student academic outcomes, including the school's overall level of implementation and whether or not a given school had a dedicated full-time interventionist.
- The District utilized a lower-end estimated $41.5 million in resources to implement RTI^2 in 2017-18, roughly four percent of SCS' overall budget. More than 80 percent of costs derive from the amount of time school staff reported spending on RTI^2, an average of 186 hours per school per week at minimum.
- Based on these budget estimates, it cost SCS roughly $3,306 per student RTI^2 who showed any academic progress and $24,408 per student who moved up at least one tier during the course of the 2017-18 school year.

Recommendations

Both SCS and the State have already begun to implement some measures that have the potential to further improve Tier II and III student outcomes. In addition to these measures, the Department of Research & Performance Management makes the following recommendations:

1. Continue adding school-level capacity so that schools with the most need can equitably serve a larger portion of Tier II and III students
2. Provide best practices and specific guidance for scheduling interventions (e.g., as blocks, classes, etc.) to meet both Tier I instruction and RTI^2 expectations for students
3. Address high school-specific challenges and needs related to RTI^2 implementation including:
    a. Having dedicated intervention staff experienced in teaching foundational skills
    b. Using online benchmarking and intervention tools tailored to high school students
    c. Adjusting implementation milestones to fit better with scheduling interdependencies
4. Expand trainings so that school staff can learn to use technology platforms more effectively for computer-based interventions, monitoring, and RTI^2 tracking
5. Determine how the academic RTI^2 framework should be integrated with the behavioral RTI^2 framework, especially for Tier III students who need the most intensive but targeted support
6. Work with the Tennessee Department of Education to reduce administrative requirements not directly related to delivering intervention
7. Use local best practices and forthcoming state guidance to show data teams how to review data from multiple sources to determine student response to intervention and decide next steps
8. Establish more standardized, consistent ways to monitor the quality of face-to-face intervention

Overview: Response to Instruction & Intervention (RTI²)

Defined by the Tennessee Department of Education, Response to Instruction & Intervention (RTI²) is "a framework for teaching and learning that includes regular screenings to identify student areas of need and a tiered model of intervention for those that need additional help. In Tennessee, it is also used to determine the eligibility of students to receive special education services for specific learning disabilities (SLD)."[1] Through a series of assessments, students struggling in English Language Arts (ELA) and/or math are identified to receive recurring small-group Tier II or III interventions during the school day. School data teams then periodically review students' academic progress in the skill areas in which they have deficits to determine when each student is either ready to return to Tier I status or may instead be eligible for Special Education services. This section of the report provides descriptions of RTI² program elements featured in our analysis.

Identifying and Tracking Students in Intervention

The steps to identify and track students in tiered intervention are as follows:

Universal Screener – In accordance with State requirements, all districts must administer a universal screener assessment to all students to identify those who should be benchmarked for tiered intervention. The State considers students who fall in the screener's nationally normed bottom quartile of achievement results in math and/or ELA to be eligible for benchmarking. To prioritize students with the greatest need and limit intervention caseloads to a manageable size, SCS permits schools to benchmark students who fall within the bottom 15 percent of achievement within each school if more than 15 percent of students fall below the national bottom quartile cut point. This is true for the majority of SCS schools. In 2017-18, SCS administered the NWEA Measures of Academic Progress (MAP) assessment three times (in fall, winter and spring) as its universal screener for all grades.

Benchmarking – The students identified in the bottom 15 percent on the universal screener then complete a benchmarking assessment to determine if they do in fact have academic deficits that merit intervention. The benchmarking process also determines whether students should receive less intensive (Tier II) or more intensive (Tier III) intervention and identifies the lowest academic skill area of deficit that the student needs to master to demonstrate progress. In 2017-18, SCS administered easyCBM benchmark assessments to identify Tier II and III students following each of the three MAP administrations.

Intervention Plans – Once students are benchmarked at Tier II or III, the school RTI² data team reviews these students' data and makes a final determination on whether each student will receive intervention. The data team then develops intervention plans for relevant students that indicates whether each student will receive Tier II or Tier III support in math or ELA. In 2017-18, SCS transitioned from paper-based to online intervention plans using the EdPlan online platform.

Progress Monitoring – Once students start receiving intervention, they complete short progress monitoring assessments so that the school RTI² data team can track the students' academic

[1] *Assessing Progress: Four Years of Learning from RTI² Implementation in Tennessee*. 2018. <https://www.tn.gov/content/dam/tn/education/reports/rpt_rti_report_assessing_progress.pdf>

improvement or lack thereof in intervention over time. Tier II students complete progress monitoring once every two weeks, and Tier III students complete progress monitoring every week. Progress monitoring results reflect a student's current skill area of deficit as well as their grade-level ability for a given skill. As students make gains in a skill area, they may begin to complete progress monitoring at a higher grade-level ability, a new, more complex skill area, or both. For students showing consistent improvement, the school data team may make a determination to change the student's tier to a less intensive intervention (from Tier III to Tier II) or to place them out of intervention altogether (Tier II to Tier I). For a student who fails to show improvement or who declines, the school data team may ultimately determine that the student should receive more intensive intervention (from Tier II to Tier III) or has a specific learning disability and needs Special Education services. Students must complete at least 20 rounds of progress monitoring before they can be considered for Special Education.

Components of Intervention Instruction

RTI^2 interventions are stand-alone instructional blocks to provide Tier II and III students intensive support in their skill areas of deficit in math or ELA. In total, Tier II elementary and middle school students must receive 30 minutes of daily intervention, and Tier II high school students must receive 150 minutes of weekly intervention. For Tier III students, the total minimums are 45 minutes daily for elementary and middle students and 225 minutes weekly for high school students. Key components of intervention instruction include:

Small-Group Face-to-Face Instruction – At the core of RTI^2 intervention is face-to-face instruction with students during their intervention blocks. Each week, Tier II students must receive a minimum of 60 minutes of teacher-led small group instruction within the intervention block. Tier III students must receive a minimum of 135 minutes of teacher-led small group instruction.

Online Intervention – Students also participate in online intervention activities for a portion of the intervention block. In 2017-18, SCS incorporated Achieve3000 (and the related Smarty Ants program for students in early grades and students needing reinforcement in foundational skills) for reading intervention and i-Ready for math intervention. Both Tier II and III students are recommended to spend 90 minutes on computer-based intervention each week.

Intervention Logs – RTI^2 requires that school staff complete intervention logs for each student each day that they participate in intervention. These logs notate the duration of each intervention, the date received, whether the intervention was face-to-face or online, and the specific skill area targeted. Unfortunately, only the overall frequency of intervention logs completed per student was present in District-level files, so we were unable to analyze the details captured within each log.

Fidelity Checks – School staff are also required to complete multiple fidelity checks over time for each student participating in intervention. Fidelity checks are used to verify whether the intervention instruction provided meets all requirements to be considered valid. All required fidelity checks must be completed for a student to be eligible for Special Education services, should the student show no improvement or decline after completing all necessary progress monitoring. RTI^2 requires that Tier II students have at least three fidelity checks for every 16-20 weeks of intervention, and Tier III

students have at least five fidelity checks for every 8-10 weeks of intervention. Unfortunately, fidelity check data are unavailable in a useable format for this analysis.

Staff Roles and Responsibilities

Schools can organize staff responsibilities for intervention instruction and administration in a variety of ways, as evidenced by a subsequent section of this report on budget and staff time estimates. However, some common roles and responsibilities are as follows:

School RTI² Lead – Each SCS building has at least one designated RTI² Lead who serves as a content expert for his/her school on RTI² implementation and ensures that the school complies with all intervention requirements. RTI² Leads receive periodic District training and coordinate administrative responsibilities for the intervention process at the school level. RTI² Leads are often non-classroom educators who hold administrative support positions in the school such as Assistant Principals or Instructional Facilitators.

Interventionist – Some schools have employed full-time Interventionists using discretionary funds such as Title I, but this position is not a District-wide requirement. Interventionists are classroom educators who provide direct instruction to Tier II and/or III students during a dedicated intervention block in accordance with SCS requirements for face-to-face and online intervention. Schools without a dedicated Interventionist enlist classroom teachers who also teach other Tier I courses to deliver Tier II and/or III intervention during scheduled blocks.

School Data Team – Per State guidelines, all schools are required to conduct RTI² data team meetings roughly every four weeks. Data teams may consist of a variety of school staff members including Principals, Assistant Principals, Counselors, Instructional Facilitators, traditional classroom teachers, and/or teachers specializing in Special Education or English as a Second Language. During these meetings, the data team reviews individual students' progress monitoring trends and other data points. The data team then determines whether to continue students' current intervention plan, make changes to the plan, make changes to the student's Tier, or refer the student to Special Education services if necessary. The data team is also responsible for establishing new intervention plans for additional students identified for intervention after each benchmarking window.

School Psychologist – District School Psychologists each serve a caseload of schools to support the RTI² process among other responsibilities. School Psychologists regularly attend school RTI² data team meetings to review student progress monitoring trends, offer content expertise on data interpretation, and guide school staff through the special education referral process for students as needed.

District RTI² Team – In 2017-18, SCS created a new central office RTI² team of five to provide direct support to schools. The RTI² team conducts school visits and consults with school RTI² Leads to ensure they provide high-quality intervention to students and also meet implementation requirements established by the State. This team is also responsible for providing professional development and District-wide communications to RTI² Leads to apprise them of best practices and important implementation milestones such as benchmarking and progress monitoring throughout the school year.

Stakeholder Feedback Analyses

In February 2018, the Tennessee Department of Education (DOE) released a report[2] that assessed the four-year progress of the statewide RTI[2] initiative. It identified four key challenges to RTI[2] implementation: integrating RTI[2] into school structures, staffing to support implementation, department guidance, and high school rollout. These challenges reflect the barriers to implementation recognized by our district's RTI[2] Leads.

RTI[2] School Procedure Survey

During the fall and spring semester of 2018, RPM disseminated a confidential RTI[2] procedure survey to all school leads. One hundred forty-eight schools out of the 151 schools implementing RTI[2] completed at least part of both surveys, representing a 98 percent response rate. Respondents were given the opportunity to identify their biggest challenges and successes with RTI[2] implementation in open-ended comments. In the fall and spring respectively, 71 percent (105) and 84 percent (124) of the respondents answered at least one of these two open-ended questions. We analyzed the open-ended responses by coding for key themes in the descriptions of challenges and successes.

The top challenges RTI[2] Leads identified were:

- Demands on staff time and/or the need for additional staff to support the program (60 percent fall; 55 percent spring)[3]
- Adapting to technology platforms such as EdPlan, i-Ready and Achieve3000 or dealing with platform data and functionality issues (38 percent fall; 27 percent spring)
- Scheduling intervention blocks, classes, and/or pull-outs for past or newly identified students while maintaining Tier I instruction requirements (8 percent fall; 21 percent spring)

The top successes RTI[2] Leads identified were:

- Scheduling interventions successfully to meet RTI[2] expectations for students (36 percent fall; 22 percent spring)
- Conducting effective data team meetings to monitor student progress (24 percent fall; 22 percent spring)
- Receiving more staff positions (i.e., interventionists), staff support, and staff buy-in for RTI[2] process (16 percent fall; 22 percent spring)
- Adapting to and more effectively using technology platforms for computer-based interventions and RTI[2] tracking (8 percent fall; 15 percent spring)

[2] *Assessing Progress: Four Years of Learning from RTI[2] Implementation in Tennessee*. 2018. <https://www.tn.gov/content/dam/tn/education/reports/rpt_rti_report_assessing_progress.pdf>

[3] Often, respondents mentioned difficulties scheduling interventions and progress monitoring, completing the daily intervention-log requirement in EdPlan, conducting fidelity checks and entering them in EdPlan, and participating in data team meetings as large time commitments.

- Seeing students buy in to the RTI² process and their progress (3 percent fall; 11 percent spring)

RTI² High School Focus Groups

In February 2018, RPM conducted a series of 90-minute focus groups with high school RTI² Leads to discuss barriers to high school implementation and recommendations for how RTI² can be improved to ensure more students are getting timely, high-quality intervention. We analyzed the responses by coding for key themes described below and in the Recommendations section of this paper.

The key barriers to high school RTI² implementation were:

- Lack of understanding and buy-in about the RTI² framework and its purpose in high schools
- Lack of high school teachers' expertise in providing intervention and instruction on lower grade levels and using technology
- Insufficient dedicated staff to provide intervention to all Tier II and III students in English and math
- Inefficiency and frequency of paper benchmarking and fidelity check documentation
- Timing of student data and the impact on scheduling and staffing
- Students having the classes/credits needed for graduation

Many of the RTI² Leads reported believing in the general RTI² concept and seeing evidence that the process can work but explained that they needed more resources and staff to implement the process with fidelity. See Appendix A for more information on the high school focus groups.

Measuring Level and Ease of RTI² Implementation

Creating Implementation Measures

One of the research goals of this evaluation was to determine what distinguished schools with high levels of RTI² implementation from schools with lower levels of implementation. Evaluating schools' implementation of RTI² was important for several reasons. First, at the most basic level, it was necessary to determine whether, and how well, schools were able to implement RTI². The program is comprehensive, containing many instructional, intervention, and administrative aspects. How capable were schools at putting all the pieces in place and providing the intervention services students required? Further, given the number of different parts to RTI², were there certain aspects of the program that the schools, as a group, found to be more or less difficult to implement?

Second, subsequent analyses throughout this evaluation report depend on level of implementation. For example, given the magnitude of the program, one question evaluated was schools' perceptions of the difficulty involved in implementing RTI². Ideally, schools with high levels of implementation that reported low levels of perceived difficulty can be identified. Further analyses of the characteristics of these schools could help RTI² implementation throughout the District.

Finally, level of implementation factors into student outcome analyses that are presented later in this evaluation report. To attribute changes in academic standing to RTI² participation, the degree of RTI² implementation within each school must be assessed and included.

Two different measures were used to examine RTI² implementation throughout the District. One was designed to look at the level of implementation of RTI² in each school. The second assessed the school's ease of implementation of the program. For each measure, an index was created using the available, relevant data, which resulted in each school receiving a numeric value for each scale. The level of implementation index was further divided into two separate indices due to differences in available data –- one index for grades K-8 and a second for grades 9-12. Two schools served students in grades 6-12. Those schools received scores for both the K-8 index and the 9-12 index.

Level of Implementation

K-8 Level of Implementation Index

The data used to create the K-8 Level of Implementation Index (K-8 LOI Index) came from seven different data sources representing four different aspects of implementation: 1) school-reported monthly snapshots of RTI² throughout the year; 2) RTI² processes; 3) intervention activities; and 4) participation in additional training.

- ***School-Reported Monthly Snapshots*** – Each school was asked to submit a monthly snapshot reflecting the current status of implementation of the RTI² program in their school. Schools were asked to complete the online snapshot template during the last two weeks of the month from October through May. This provided eight opportunities over the year for schools to submit details about the program. The snapshot collected information on the basic structure of RTI² in each school, the processes for identifying and placing students in intervention tiers, and tracking the intervention activities. Schools were asked to rate their progress on various program indicators as being "preliminary," "progressing," or "on track." Although self-

reported by RTI² Leads, the snapshot was included in the LOI Index because it provided a status report of the program in its entirety at each school.

Given that each school submitted the snapshot on a monthly basis, the following process was used to create a single numeric score to be included in the LOI Index. First, all individual monthly snapshots submitted by a school were averaged indicator-by-indicator to get a single average score for each item rated in the snapshot across the entire school year. Next, the items in the averaged snapshot were themselves combined and averaged to get a single Snapshot Index score that was included in the overall LOI Index. The Snapshot Index ranged from 1-3 with lower numbers reflecting preliminary progress and higher numbers indicating schools were more on track.

- ***RTI² Processes*** – Two data points provided insight on the implementation of RTI² processes.
  - **Percentage of Identified Students Benchmarked in easyCBM** – All students identified through NWEA MAP screening as being in the bottom 15 percent of their school in Reading and/or Mathematics were to be further benchmarked using easyCBM to determine their placement in RTI².[4] The percentage of students who were identified through NWEA MAP screening and who were subsequently benchmarked (either partially or fully) also served as a data point in the LOI Index. This data point served as a proxy for how capable schools were at completing the first step of the RTI² process for all flagged students.
  - **Number of Data Team Meetings** – Schools were asked to upload evidence of their monthly data team meetings into a shared folder. The number of data team meetings that were documented by schools was summed and used as a data point in the K-8 LOI Index. This data point served as a proxy that reviews and updates to students' intervention plans were occurring as often as required by the RTI² model.
- ***Intervention Activities*** – Three sources provided data related to intervention activities.
  - **Computer Interventions** – Both Tier II and Tier III students in RTI² were expected to participate in **I-Ready** (for Mathematics) and/or **Achieve3000** (for Reading) computer interventions for 90 minutes per week as part of the program. The average number of hours per student was calculated for each computer intervention for each school. These averages provided information on the amount of computer intervention time students were actually receiving and were included as two data points in the LOI index.
  - **Progress Monitoring** – Students' progress was monitored using easyCBM on a weekly or bi-weekly basis depending on the students' assigned Tier. This data point was one source of information for how well schools were tracking the impact of intervention on each individual student. The average number of times schools monitored students' progress was included as a data point in the LOI Index.
- ***Participation in Additional Training*** – Basic RTI² training was available and required of staff in all schools. However, schools that participated in additional training related to delivery of

[4] For purposes of evaluating implementation, students who were partially benchmarked using easyCBM were considered to be benchmarked because of the latitude afforded teachers and other school staff to determine the best placement of students in interventions. The numbers used in the present analysis may vary from numbers presented throughout the school year during Continuous Improvement stat sessions during which the benchmark data reported were restricted to students fully benchmarked to the level of compliance.

interventions in RTI² were credited for their efforts. This was viewed as an indication that schools were able and interested in going beyond the mechanics of the RTI² program and looking at ways to ensure they were providing high quality intervention services to students. Attendance at additional RTI² trainings (as documented by attendance rosters) was used as a data point in the LOI Index. Schools received either one or zero points reflecting participation in additional RTI² training versus no participation.

The K-8 LOI Index was created by first converting the data from each of the different sources to 10-point scales to create equal scales (with the exception of additional training which was not converted to a 10-point scale). All data points were given equal weight in the index with the exception of the additional training, which was given 30 percent of the weight of the other items. Data from a sample school are presented in the table below showing the raw value, converted value, and weighted value of each data point.

Sample School Scores for K-8 LOI Index			
Data Source	**Raw Value**	**Converted Value** (range 0-10)	**Weighted Value**
Monthly Snapshot	2.68	8.38	8.38
% Students Benchmarked	.95	9.50	9.50
# Data Team Meetings	5.00	5.00	5.00
Average Hours i-Ready	32.98	7.33	7.33
Average Hours Achieve3000	21.66	4.81	4.81
Average # Progress Monitoring	10.01	3.34	3.34
Additional Training	1.00	N/A	3.00

The seven weighted data points (in the far right column) were then summed and averaged to create the K-8 LOI Index. If a school was missing any data point, it was omitted from the calculation and the index for that school was calculated using available data.[5] The K-8 LOI Index had a range of 0-9, with lower numbers indicating lower levels of implementation.

9-12 Level of Implementation Index

At the high school level, data on student benchmarking were not available. Therefore, a separate RTI² Level of Implementation Index was calculated for high schools using the six data points below. The data details are the same as for the K-8 LOI Index and are described in the section above.

- **School-Reported Monthly Snapshots**
- **Number of Data Team Meetings**
- **Average Hours per Student for i-Ready**
- **Average Hours per Student for Achieve3000**
- **Progress Monitoring**
- **Attendance at Additional RTI² Training**

The 9-12 LOI Index was created following the same process used for creating the K-8 LOI Index. First, the data from the different sources (with the exception of additional training) were converted to 10-point scales to create equal scales. Again, all data points were given equal weight in the index with

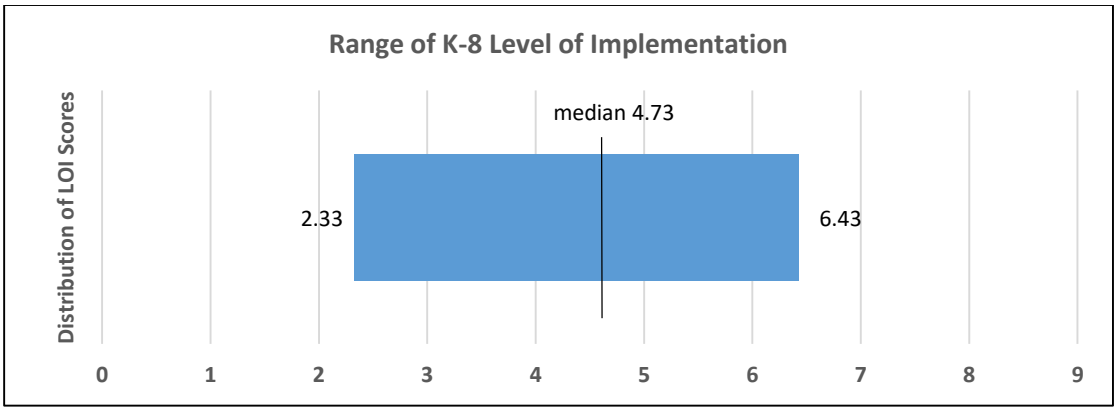
[5] For statistical details on creating implementation indices, please contact Marie Sell (sellma@scsk12.org).

the exception of attending additional training which received 30 percent of the weight of other data points. The sum of the five data points was averaged to obtain the 9-12 LOI Index. The 9-12 LOI Index had a range of 0-8.83, with lower numbers reflecting lower levels of implementation. Data on raw values, converted values, and weighted values are similar to the data presented in the sample school table presented above.

Analysis of Level of Implementation

Analysis of K-8 Level of Implementation

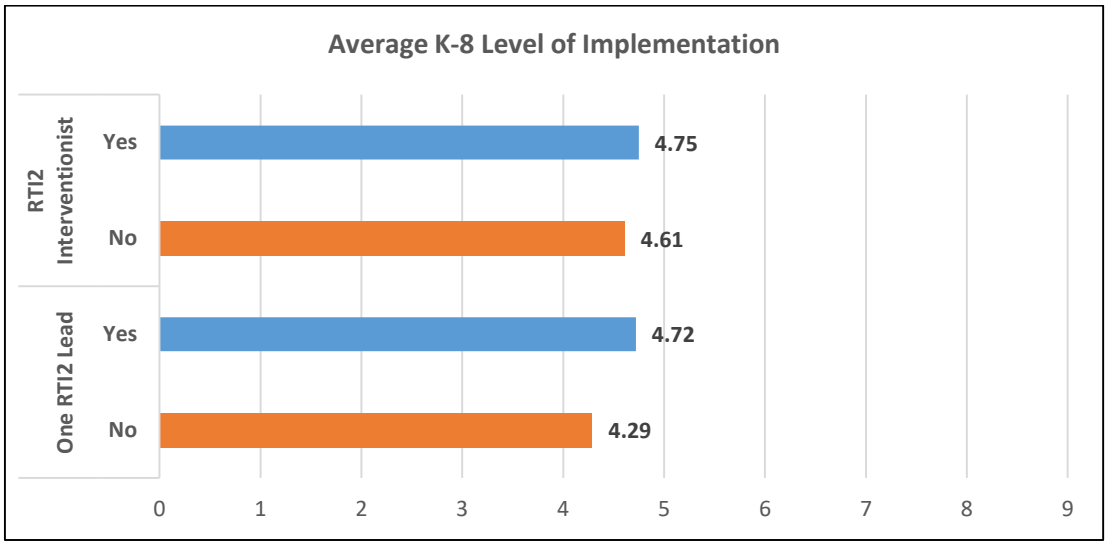
The K-8 LOI Index had a possible range of 0-9, with 0 indicating no RTI² implementation at the school (as measured by the data captured in this index) and 9 being maximum RTI² implementation. One hundred twenty (120) schools that served K-8 students received scores on the K-8 LOI Index. Scores ranged from 2.33-6.43. The mean was 4.66 and the median was 4.73. The graph below shows the schools' LOI scores compared to the possible range. As can be seen, the schools as a group had LOI scores that fell in the mid-range of the index.



Since the data were converted to 10-point scales, it is possible to determine which components were more fully implemented by the schools. Schools had the highest implementation scores for percentage of identified students benchmarked (8.71) followed closely by the monthly snapshots (8.21). Number of data team meetings had the third highest score (6.10). The lowest implementation score was received by the average number of times progress was monitored (2.76). Two points are worth noting. First, although monthly snapshots received the highest implementation score, 13 K-8 schools did not submit any of the monthly snapshot information over the course of the school year. Second, scores for participation in additional training were not included in the above analysis since they were not converted to the 10-point scale. However, 54 K-8 schools (45 percent) participated in at least one additional training session.

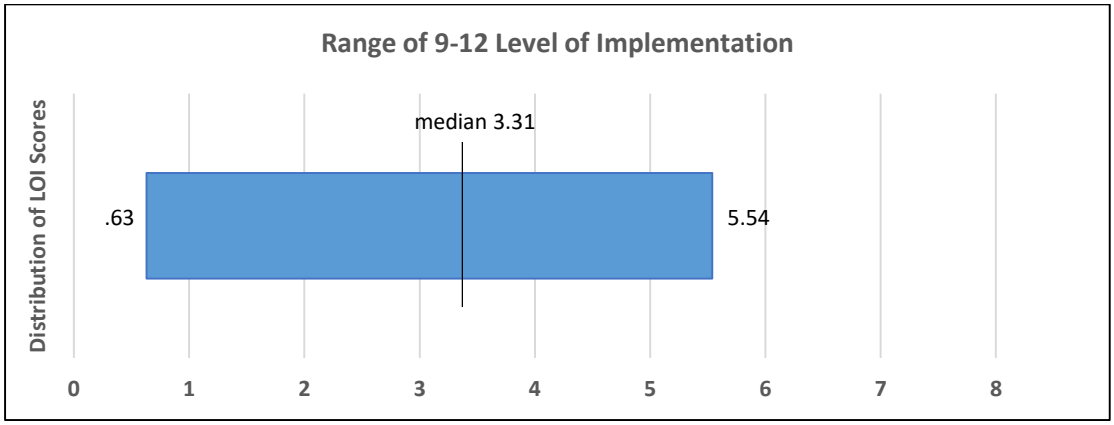
Finally, schools additionally were asked two questions about the staff working on the RTI² program: 1) whether they had an interventionist dedicated to RTI²; and 2) whether the RTI² Lead had been in that role all year or if the assignment had changed to a different staff member during the school year. Fifty schools reported having an interventionist dedicated to working on RTI² and 70 reported they did not. One hundred three (103) schools reported they had kept the same RTI² Lead all school year and 13 reported having had more than one person in that role. (Schools were asked to report on RTI² Lead changes in the survey at the end of spring semester. Four of the 120 K-8 schools did not complete the spring survey. The total number of schools responding to this question is 106.)

Schools with an RTI² Interventionist had a slightly higher level of implementation (4.75) compared to schools who did not (4.61), although this difference was not statistically significant[6] (*p*=.33). There was a slightly greater difference between schools with one RTI² Lead for the year compared to schools with changes in RTI² Leads (4.72 vs. 4.29, respectively). Again, this difference was not statistically significant at the .05 level (*p*=.08), but was marginally significant at the .10 level. The graph below shows these slight differences.



Analysis of 9-12 Level of Implementation

The 9-12 LOI Index had a possible range from 0-8.83 with 0 indicating no RTI² implementation at the school (as measured by the data captured in this index) and 8.83 being maximum RTI² implementation. Thirty-three schools served students in grades 9-12. Scores ranged from 0.63-5.54. The mean and the median were both 3.31. The graph below shows the high schools' LOI scores compared to the possible range. While scores ranged widely, some high schools had low RTI² implementation as measured by the data used to create this index.

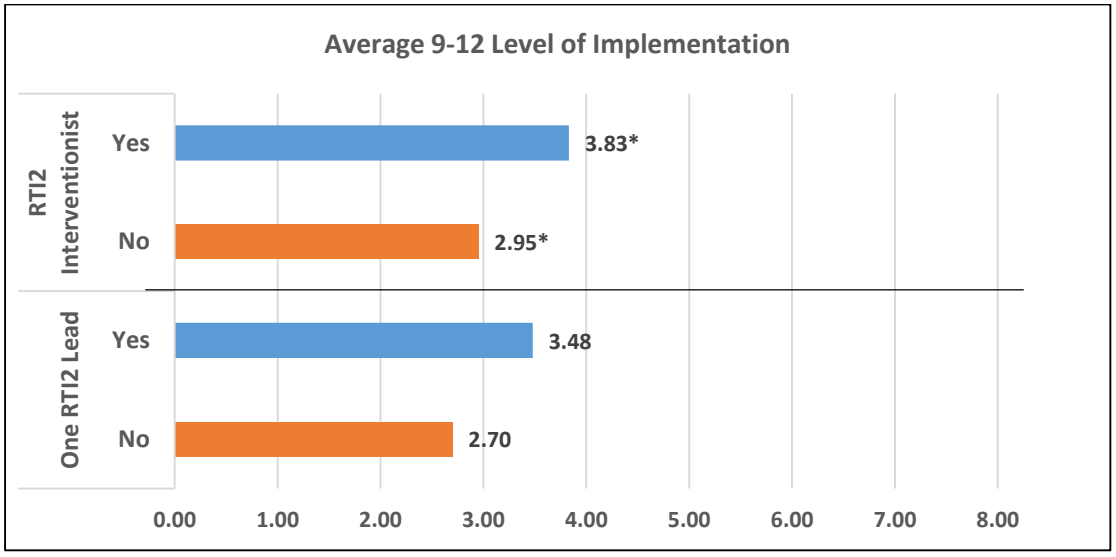


[6] The criterion for statistical significance in this evaluation is .05. A p-value greater than this number indicates the finding was not statistically significant.

As with the LOI Index for the K-8 schools, the 9-12 LOI Index was further examined to identify components schools were able to most fully implement. At the high school level, monthly snapshots received the highest implementation score (7.22) with 25 of the 32 schools submitting snapshot information during the school year, followed by data team meetings (5.56). Interestingly, the score for average number of times progress monitoring occurred received a much lower implementation score in this index (2.94). Again, participation in additional training was not captured in this analysis; however, staff from 11 high schools (34 percent) attended additional training sessions.

High schools were also asked whether they had an RTI² Interventionist and whether the same person served as RTI² Lead for the entire school year. Thirteen schools reported having an interventionist dedicated to RTI² and 19 reported they did not. Twenty-seven schools reported the RTI² Lead was the same person throughout the year and four schools indicated that more than one person filled that role. (One school serving grades 9-12 did not complete the spring survey so there is no information about the RTI² Lead at that school.)

Schools with a dedicated RTI² Interventionist had a higher level of implementation compared to those without (3.83 vs. 2.95, respectively). The difference was statistically significant (p=.02). Schools with the same person as the RTI² Lead throughout the year had higher implementation scores (3.48) compared to schools with changes in that role (2.70). However, this difference was not statistically significant (p=.16). These levels of implementation are presented in the graph below. It appears that at the high school level, schools benefitted from consistency – either in the form of a dedicated RTI² Interventionist or as one person filling the role of RTI² Lead throughout the entire school year.



*Statistically significant difference

Ease of Implementation

Ease of Implementation Index

The second index created to analyze RTI² implementation at the schools, the Ease of Implementation (EOI) Index, was designed to gauge how much effort schools put into implementing the RTI² program. The purpose of this index was to identify characteristics of schools who reported relative ease of

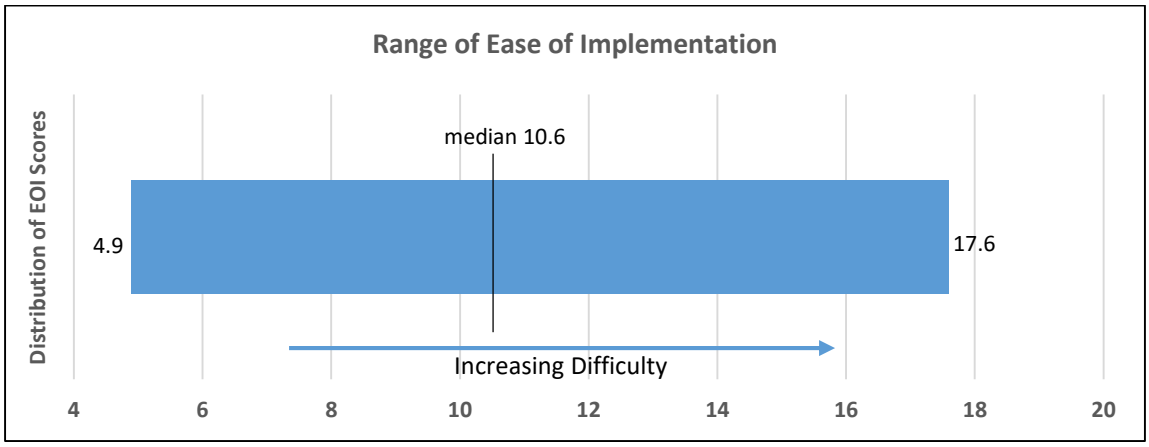
implementation to see whether those features might be shared with other schools to reduce their effort. The RTI² Lead at each school was asked to complete a survey at the end of the fall semester and again at the end of the spring semester. Seventeen of the survey items asked respondents to report their agreement on a five-point Likert scale (from 1 = "Strongly Agree" to 5 = "Strongly Disagree") with items related to their perception of how the RTI² program is operating in their school. Schools' responses to the fall and spring surveys were combined to get an average response for each survey item, which were then used to develop the EOI Index.

The first step in creating the EOI Index was to conduct a factor analysis on the survey items, which resulted in the following four-factor solution: The Ease Factor consisted of items such as "It is easy for me to implement RTI² as designed in my school." The Resources Factor included items to determine whether RTI² resources were helpful for the school (e.g., "EdPlan RTI Tracker has been helpful in managing student data and monitoring progress in RTI²"). The Time Factor tapped into whether a school was able to manage the necessary time requirements of RTI², as in "It is easy for teachers at my school to find enough instructional time during the day to provide RTI² intervention." Finally, the Understanding Factor included items that assessed the level of understanding for different individuals (e.g., "The principal at my school understands the RTI² program"). All seventeen survey items were clearly grouped into one of the four factors.

The second step was to calculate a factor score for each factor which was the average response of all the items within each factor. Finally, the individual factor scores were summed to get the EOI Index score for each school. The EOI Index ranged from 4-20, with lower scores indicating schools had an easier time implementing RTI².

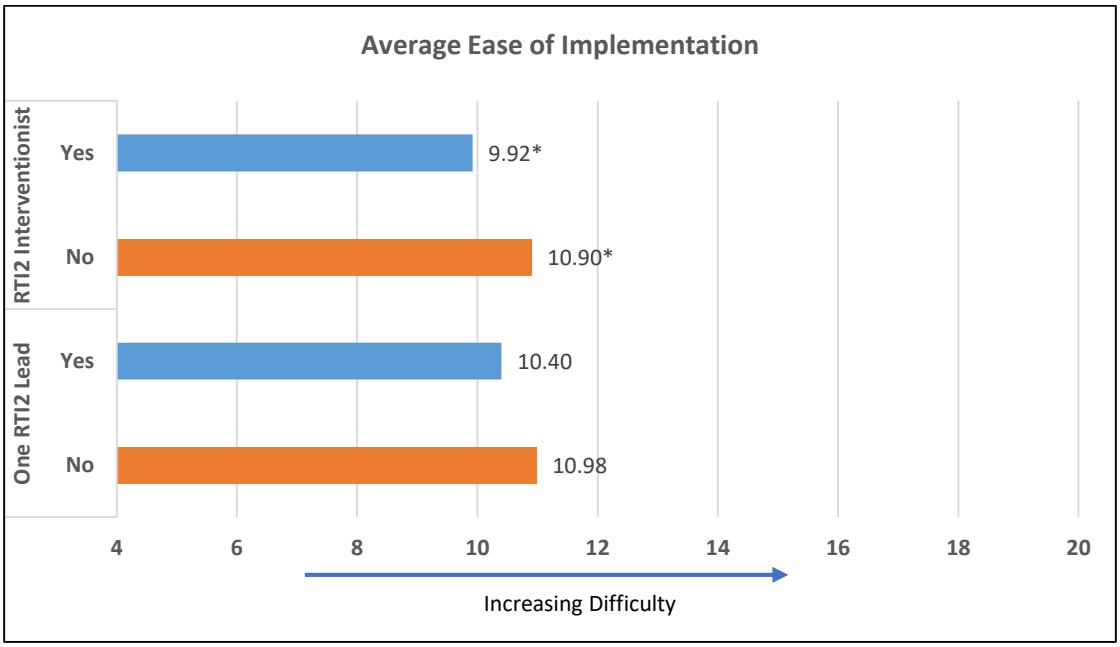
Analysis of Ease of Implementation

One hundred fifty-one (151) schools received EOI scores that ranged from 4.90-17.60. The mean was 10.50 and the median was 10.60. The graph below shows the schools' scores compared to the possible range. As can be seen, schools reported a broad range for ease of implementation.



As with level of implementation, scores for ease of implementation were compared for schools depending on RTI² Interventionist status and RTI² Lead status. Schools with dedicated RTI² Interventionists (N=62) scored lower on the EOI index, indicating it was easier for them to implement RTI² (9.92 compared to 10.90 for schools without an RTI² Interventionist; p=.02). Likewise, schools with one person serving as the RTI² Lead for the entire year scored approximately half a point lower

on the EOI index than schools with RTI² Lead changes (10.40 vs. 10.98, respectively). This difference, however, was not statistically significant (*p*=.35).



*Statistically significant difference

Relationships Between Level and Ease of Implementation

A final set of analyses examined relationships between level and ease of RTI² implementation, including the impact of RTI² Interventionist status and RTI² Lead status. A correlation analysis revealed that ease of implementation and K-8 level of implementation were weakly, but statistically significantly, (negatively) associated with each other (r=-.31; *p*<.001) such that as schools perceived RTI² easier to implement, level of implementation increased. Interestingly, ease of implementation and 9-12 level of implementation were not significantly correlated (r=-.28; *p*=.11). Given the low association between ease of implementation and level of implementation, it may be difficult to identify schools that were able to most fully implement RTI² with the least amount of difficulty to serve as model schools. Additionally, since no schools were able to fully implement RTI², as measured by the data included here, identifying potential model schools at this point may be premature.

Finally, two separate regression analyses were conducted using K-8 LOI and 9-12 LOI as the two outcome variables. In each analysis, ease of implementation, the school's RTI² Interventionist status, and the school's RTI² Lead status were entered as predictors. To gain more insight into specific variables that may have impacted the level of implementation, the four factors used to create the overall EOI Index were entered into the regressions individually as predictors. Thus, there were a total of six predictors for each regression analysis: Ease Factor, Resources Factor, Time Factor, Understanding Factor, school's RTI² Interventionist status, and school's RTI² Lead status.

For K-8 level of implementation, the Resources Factor was the sole significant predictor, accounting for approximately 13 percent of the variance (p=.003). Four survey items composed the Resources Factor that all asked RTI² Leads to provide ratings of available resources to support RTI²:

- I have enough support from District staff to be effective as the RTI² Lead for my school.
- The data team meetings in my school are effective at monitoring progress and making placement decisions about students in RTI².
- EdPlan RTI Tracker is working well at my school.
- EdPlan RTI Tracker has been helpful in managing student data and monitoring progress in RTI².

The beta coefficient for the Resources Factor was .49, which means that for every point of more agreement RTI² Leads rated the combined four survey items in the Resources Factor, the K-8 LOI Index increased approximately one-half point (on the 10-point scale).

For 9-12 level of implementation, the only significant predictor was whether the high school had an RTI² Interventionist (accounting for approximately 15 percent of the variance; p=.03). The beta coefficient for status of RTI² Interventionist was .92. For schools that reported having an interventionist, the 9-12 LOI Index increased nine-tenths of a point (on the 10-point scale).

Both regression analyses identified factors related to support of the RTI² process as important in level of implementation. For K-8 schools it was support resources and for high schools it was the presence of an RTI² Interventionist. Interestingly, the presence of an RTI² Interventionist was not a significant predictor of level of implementation in K-8 schools. While the differences in the roles of the RTI² Interventionist at the different schools should be investigated, one possibility could be that the RTI² Interventionists played a support role for the RTI² Leads in the high schools, whereas they provided more intervention services to students at the K-8 level.

Summary

The analyses revealed that schools had a wide range of RTI² implementation, both in terms of the level to which it was implemented and in terms of how difficult it was to implement the program. For both K-8 and 9-12 grade bands, no schools fully implemented the aspects of RTI² that were measured with the above indices.

A few caveats should be noted regarding the above analyses. First, analyses were constrained by the data that were available. Some aspects of RTI² implementation were not able to be included in the indices because data were lacking. For example, easyCBM benchmarking did not assign students to Tier levels. This process was completed by school personnel in data team meetings. Therefore, it was not possible to know what percentage of students who were benchmarked at Tier II or Tier III were actually receiving intervention services, or to discern if there were implementation differences for students in the two tiers. Instead, rosters are available from the schools of students in Tier II and Tier III, but there is no meaningful way to compare these rosters to easyCBM benchmarking outcomes. Second, the data reporting the amount of time spent on i-Ready and Achieve3000 includes the use of the program for all students at the school, not necessarily only for students in RTI². In the analyses, all computer intervention times reported were assumed to be times for students participating in RTI². Third, there were no reliable data for student start dates in RTI². Benchmarking of potential RTI² participants occurred three times per year. However, due to an overwrite feature in EdPlan that

updated records with most current data (including start dates), it was difficult to determine when students began intervention. As such, it was difficult to know the number of expected progress monitoring reports and the overall expected amount of time using i-Ready or Achieve3000. To compensate for the lack of data, all schools were assumed to have students participating in RTI^2 for the entire school year.

Finally, it should be noted that the implementation data that were available largely focused on issues related to level of implementation. No available data spoke to the quality of the RTI^2 program in the schools. (Staff attendance at additional RTI^2 training might be an indication of schools' interest in quality of intervention services. However, without direct information from the intervention sessions themselves, the issue of quality cannot be answered.)

Despite these data limitations, it is interesting to note the trends that emerged between level and ease of implementation. For K-8 schools, level of implementation and ease of implementation were correlated such that as schools perceived implementation to be easier, the level of implementation increased. Ease of implementation also predicted level of implementation, while schools having an RTI^2 Interventionist and a consistent RTI^2 Lead did not. For the 9-12 schools, level of implementation and ease of implementation were not correlated. Further, regression analysis revealed that the sole significant predictor of level of implementation was whether schools had a dedicated RTI^2 Interventionist. These analyses suggest that providing additional RTI^2 Interventionists to support high schools would improve the level of implementation.

Measuring RTI² Outcomes

To determine the District's return on investment for RTI², we must first ascertain the extent to which students' academic outcomes are associated with RTI² interventions. Given the very large investment of money, time, and effort that implementing RTI² requires, it is important to measure the program's outcomes carefully and thoroughly, to ensure that the results are as robust as possible. To that end, the analyses presented in this report examine RTI²'s association with multiple academic outcomes: NWEA MAP reading and mathematics scores, TNReady achievement reading and mathematics scores, and scores on four different TNReady end-of-course exams: English I, English II, Algebra I, and Geometry. This selection offers three different assessment approaches and covers students in grades K–10, along with a few 11th graders.

Methods

The crux of this entire study is to determine how actions at the school level (i.e., implementing RTI²) impact outcomes at the student level (i.e., reading or math achievement). The Level of Implementation (LOI) index, discussed earlier, is a school-level measure designed to capture how well schools managed to implement the myriad requirements of RTI². This index is the best estimate we have of how schools implemented the program; thus, the main focus of the analyses presented here is linking schools' scores on the LOI index to students' performance on various standardized assessments.

Given the hierarchical nature of the data (students nested within schools) and the question at hand (how school-level actions are related to student-level outcomes), the most appropriate method of analysis is hierarchical linear modeling (HLM), a form of multilevel modeling. HLM can account for school effects in ways not possible with commonly employed single-level approaches such as ordinary least squares (OLS) regression or analysis of variance (ANOVA). Many HLM experts recommend a minimum sample size of 50 level-2 units (in this case, schools), each containing at least five level-1 units (in this case, students).

Fortunately, these sample-size thresholds were easily met for the MAP and TNReady achievement outcomes. But the number of high schools and the number of Tier II and III students taking each end-of-course (EOC) exam were too low to enable the use of HLM for EOC outcomes. Therefore, the single-level method of OLS regression was applied in the EOC analyses. HLM is actually an extension of OLS regression; thus, the checking of assumptions and the interpretation of results are similar, though not identical, for the two methods.

In the following sections, please note that, unless stated otherwise, the threshold for statistical significance is $p<.05$ (two-sided), as is conventional. The marginal statistical significance level of $p<.10$ (two-sided) is considered in certain instances, but it is always designated as such in the discussion. Also, please note that all results presented are the *net effects* of each variable, controlling for all the other variables in the model. Since prior achievement was included as a statistical control in each model, any variable's association with the achievement outcome can be considered that variable's contribution to students' growth in achievement.

Outcome: MAP

SCS uses the NWEA MAP assessment as its universal screener for RTI². The District administers MAP three times a year, including once at the beginning and once toward the end of the school year. These

factors make MAP an ideal choice for examining RTI² outcomes. Spring MAP RIT score was the outcome variable in the following analyses, while fall MAP RIT score and grade level (both student-level variables) served as statistical controls. There was one student-level predictor variable: for reading, it was total hours spent on Achieve3000; for math, total hours spent on i-Ready. LOI index (rescaled to 0–100 for analysis purposes) was the sole school-level predictor variable. In an effort to be as thorough as possible in detecting any associations between RTI² implementation and MAP performance, three different modeling approaches were undertaken.

MAP Approach 1: By Subject, By Tier

The first approach entailed a thorough analysis of MAP reading by tier and MAP math by tier, using all the Tier II and III students who had both a fall and spring MAP score for their intervention subject. The resulting sample sizes (after removing extreme outliers, as recommended for sound statistical analysis) were as follows:

- MAP reading Tier II: 3,407 students in 147 schools
- MAP reading Tier III: 7,349 students in 148 schools
- MAP math Tier II: 2,337 students in 147 schools
- MAP math Tier III: 3,287 students in 146 schools

A separate analysis was undertaken for each subject–tier pairing, for a total of four models. All the variables were statistically significant in every model. However, nearly all the student-level variance in spring MAP score was accounted for by fall MAP score. Though time spent in computer-based intervention was positively and significantly associated with spring MAP performance, its effect size was negligible: it explained less than 1 percent of the student-level variance in spring MAP score, both in the case of Achieve3000 and i-Ready. As for LOI, it actually *decreased* each model's explained variance by a tiny amount and therefore cannot be considered a factor in students' MAP performance.

These results indicate that students' time spent in RTI² computer intervention had a miniscule positive effect on students' MAP performance, while schools' level of RTI² implementation had none. However, the above analyses included nearly all Tier II and III students at nearly all non-charter schools, so it is possible that an effect for students' RTI² computer time and/or schools' RTI² implementation level exists, but that it is washed out over the distribution of students and schools in the analysis. With that in mind, a second approach was carried out that put school RTI² implementation in sharper contrast.

MAP Approach 2: High-LOI Schools Versus Low-LOI Schools

To detect whether a link exists between school RTI² implementation and student MAP performance, we restricted our analyses to schools with high or low levels of RTI² implementation. First for Tier II/III reading and then for Tier II/III math, the distribution of *schools* on the LOI index (rescaled as 0 to 100, as mentioned earlier) was examined to ascertain the cut points for the top and bottom quintiles. The distributions of reading and math *students* were also examined to make sure there were enough students in each of the top- and bottom-quintile schools to support an HLM analysis. The resulting LOI cut points were fairly similar across the four distributions and were a bit above and a bit below the LOI scores of 40 and 60 for the bottom and top quintiles, respectively. Since the purpose of this approach is to show differences between high and low implementers without watering down the analysis with medium-level implementers, 40 and 60 were chosen as the LOI cut scores, resulting in slightly shaved bottom and top quintiles of schools to analyze.

Unlike in the previous approach, Tier II and III students were analyzed together (by subject) to help make up for the reduction in sample size that this approach incurred. This combination resulted in a sample of 3,364 students in 50 schools for the reading model and 1,941 students in 50 schools for the math model. The student-level variables in each model were identical to those in the previous approach (outcome: spring MAP score, controls: fall MAP score and grade level, predictor: time spent in computer intervention), along with one additional control variable: an indicator of each student's tier designation (since Tier II and III students were not modeled separately in this approach). As for the school level, a dichotomous variable for high- versus low-implementing schools (0 = LOI score of 40 or below, 1 = LOI score of 60 or above) replaced the continuous LOI index used in the previous approach.

The results for this approach were extremely similar to those of the previous approach. The student-level controls and predictor were all statistically significant, but fall MAP scores explained nearly all the student-level variance in spring MAP scores. Again, though the relationship between time spent in computer-based intervention and spring MAP performance was positive and statistically significant, the effect size was negligible (less than 1 percent of student-level variance explained). As for tier designation, Tier II students saw an average of 3 points more growth in both reading and math than did Tier III students, though this should not be surprising, given that Tier III is the tier designation for the most struggling students. Perhaps most importantly, high-vs-low LOI was not statistically significant in either model. In sum, the results of this approach supported, rather than refuted, the results of the first approach in showing a very small positive effect for computer-based intervention and no effect for schools' level of RTI^2 implementation.

These findings, however, suggest a third analytical approach. Perhaps a closer look at the *instructional* aspect of RTI^2 might illuminate a closer link between RTI^2 and MAP performance. Unfortunately for this study, we did not have a feasible way to measure the quality of teacher-delivered RTI^2 instruction. However, small-group instruction is not the only instructional facet of RTI^2; computer-based intervention is also a key element of the RTI^2 model. The Achieve3000 and i-Ready software track students' time spent working in the programs, providing measures of RTI^2 dosage for both reading and math computer-based intervention. Though time spent in Achieve3000 and i-Ready did not make substantive contributions to the models discussed above, it is again possible that the effects of the programs were diluted when looking at the entire distribution of Tier II and III students. So, in the interest of thoroughness, a third and final analytical approach was undertaken.

MAP Approach 3: Students with High Versus Low Computer Usage

In this approach, Tier II and III students with low computer usage (Achieve3000 for reading, i-Ready for math) were compared to those with high computer usage to see if a more marked effect for participation in computer-based intervention could be discerned. Low usage was defined as six hours or less for the entire school year. Since 1.5 hours per week is the recommended dosage under RTI^2 guidelines, six hours or less is the equivalent of four weeks (about a month) or less. High usage was defined as 30 hours or more for the school year, which is the equivalent of 20 weeks (about five months) or more. Thus, the high-usage group spent at least five times more time working in the computer intervention than did the low-usage group. (These cut points were established in a process similar to the one used to determine cut points for the high and low LOI groups in MAP Approach 2.)

Spring MAP RIT score was predicted by the same student-level control variables used in the preceding approach: fall MAP RIT score, grade level, and tier. However, the student-level predictor of the previous approaches (hours spent in Achieve3000 or i-Ready) was replaced with an indicator of high

or low usage in the programs. The school-level predictor was the LOI index. To meet HLM sample-size requirements, Tier II and III students were included in the same model. The sample sizes were: 6,413 students in 150 schools for the reading model and 2,231 students in 148 schools for the math model.

All variables were statistically significant in both models, with fall MAP scores predicting the bulk of the variance in spring MAP scores and each of the other variables predicting very little apiece. Tier II students averaged about four points more growth on MAP reading and two points more growth on MAP math, as compared to Tier III students—which, as mentioned earlier, is to be expected. While high-vs-low computer usage did not explain a substantial amount of student-level variance in spring MAP performance, a small, positive effect was detected for both reading and math. Students with high usage of Achieve3000 realized an average of 4.3 points more growth on MAP reading compared to those with low usage in the program, and students with high usage of i-Ready realized an average of 4.2 points more growth on MAP math compared to those with low usage in the program. As for LOI index, it again *decreased* model fit, and thus must be discounted as having any impact on spring MAP scores, despite its statistical significance.

Taken together, the three MAP approaches all told the same story: 1) schools' level of RTI^2 implementation had no effect on MAP performance, 2) Tier II students realized more MAP growth than Tier III students, and 3) time spent in computer-based intervention had a positive but weak association with MAP performance.

Outcome: TNReady Achievement

Examining MAP outcomes makes sense because of MAP's role in identifying students for RTI^2 benchmarking; also, the more outcomes examined, the more robust the information about program effectiveness. However, the outcomes of the most interest to the District are the TNReady achievement and end-of-course exams, which are discussed in this section and the next, respectively.

HLM was the statistical modeling method for the TNReady achievement outcomes. The analyses proceeded in a manner similar to the MAP analyses, with the first approach encompassing the entire sample of students who had pre- and post-test results, the second focusing on high- and low-implementing schools, and the third comparing students who spent a fair amount of time in computer intervention to those who spent little.

TNReady Achievement Approach 1: By Subject

Whereas the students taking MAP spanned grades K–11, those taking the TNReady achievement test spanned grades 3–8. This lowered the sample size, making separate Tier II and Tier III analyses infeasible. Therefore, all the TNReady achievement analyses included both Tier II and III students together, along with an indicator variable identifying each student's tier designation. Spring 2018 TNReady scale score (reading/language arts or mathematics) was the outcome variable, while fall MAP percentile, grade level, and tier were control variables. Hours spent in computer intervention (Achieve3000 for reading, i-Ready for math) served as the student-level predictor, and LOI index served as the school-level predictor.

The reason fall MAP was chosen as the pre-test variable was that it eliminated the effects from summer learning loss that would have been present in the model if spring 2017 TNReady achievement had been used instead. In addition, it preserved more of the grade-level coverage as well as the sample size, because using the previous year's TNReady results would have entailed the

loss of third-graders from the analysis, since they did not take a TNReady achievement test in second grade. (Fall MAP *percentile* was chosen over fall MAP RIT score simply because it accounted for a slightly higher percentage of the variance in spring TNReady scores.)

The sample sizes for the two analyses were:

- TNReady reading: 6,505 students in 120 schools
- TNReady math: 3,577 students in 118 schools

Each model consisted of spring TNReady score predicted by: fall MAP percentile, grade level, tier, and time spent in computer-based intervention (all student level) and LOI index (school level). The student-level variables were all statistically significant in both models, whereas LOI index was not.

The three control variables accounted for most of the student-level variance in spring TNReady scores in both models. Similar to the MAP findings, Tier II students saw an average of seven points more growth in reading and five points more growth in math than did Tier III students. As for time spent in computer-based intervention, it was positively and statistically significantly associated with spring TNReady performance, but it explained only about one percent of the student-level variance in scores, both in the case of Achieve3000 and i-Ready.

TNReady Achievement Approach 2: High-LOI Schools Versus Low-LOI Schools

The second approach to examining the relationship between RTI² implementation and TNReady achievement outcomes was very similar to that used for MAP outcomes. Schools were divided into low and high implementers: low = LOI score of 40 or below, high = LOI score of 60 or above; schools with mid-range LOI scores were excluded from the analysis. Spring TNReady score was predicted by: fall MAP percentile, grade level, tier, time spent in computer-based intervention (all student level), and an indicator of high-vs-low LOI (school level).

High-vs-low LOI was not statistically significant in either model, while all the other variables were (though tier designation was just marginally statistically significant ($p<.10$) in the math model). Tier II students averaged about seven and three points higher than Tier III students on the TNReady reading and math tests, respectively. Time spent in Achieve3000 was positively related to TNReady reading performance, though the effect was very weak. Likewise, time spent in i-Ready was positively but weakly related to TNReady math performance.

TNReady Achievement Approach 3: Students with High Versus Low Computer Usage

The third approach to measuring TNReady achievement outcomes for RTI² was very similar to MAP Approach 3. Students with high computer usage (30 hours or more) were compared to those with low usage (six hours or less). The outcome variable was spring TNReady scale score; the student-level control variables were fall MAP percentile, grade level, and tier; the student-level predictor was high-vs-low computer usage; and the school-level predictor was the LOI index. The sample sizes were 2,730 students in 119 schools for reading and 1,417 in 112 schools for math.

The LOI index was not statistically significant in either model; all the other variables were. On average, Tier II students improved by about eight more points on TNReady reading and by about six more points on TNReady math, as compared to Tier III students. As for high-vs-low computer usage, students with high usage of Achieve3000 scored an average of 3.3 points higher on the TNReady reading test compared to those with low usage in the program, while students with high usage of i-Ready scored about 6.0 points higher on the TNReady math test compared to those with low usage in the program.

All in all, the TNReady achievement results indicate that: 1) schools' level of RTI² implementation and students' TNReady achievement performance were unrelated, 2) Tier II students outperformed Tier III students on both TNReady reading and math, and 3) time spent in computer intervention had a positive but weak association with TNReady achievement scores. In other words, the TNReady achievement findings are virtually identical to the MAP findings.

Outcome: TNReady End-of-Course

Whereas elementary and middle-school students take TNReady achievement tests, high-school students take TNReady end-of-course (EOC) exams at the end of select courses. Fewer high-schoolers participated in RTI², as compared to elementary- and middle-schoolers. Thus, as mentioned earlier, the sample sizes for the EOC analyses were too low to support multilevel modeling; OLS regression was therefore the method of analysis for these outcomes. Four EOC exams had sufficient numbers of Tier II and III students for analysis. The sample sizes were as follows:

- English I: 542 students
- English II: 425 students
- Algebra I: 280 students
- Geometry I: 224 students

The spring 2018 EOC scale score for each of the above exams served as the outcome in each of the four models. The pre-test control variable was fall MAP RIT score (which predicted slightly more variance in EOC scores than did fall MAP percentile). An indicator variable for tier designation also served as a control variable. Predictors were time spent in computer intervention (Achieve3000 for English I and II, i-Ready for Algebra I and Geometry I) and LOI index.

As expected, fall MAP score was positively and significantly related to spring EOC score in each model. For English I, tier designation was marginally statistically significant ($p<.10$), with Tier II students scoring about 3 points higher than Tier III students on the English I EOC exam. Tier designation was also statistically significant for Algebra I, with Tier II students averaging about 10 points higher than Tier III students on that exam.

LOI index was not statistically significant in any of the models. Time spent in computer intervention was not statistically significant in any model, with one exception: time spent in Achieve3000 was marginally statistically significant ($p<.10$) for English II, but it explained only 1.2 percent of the variance in English II EOC scores. Controlling for the other variables, for every hour students spent in Achieve3000, their English II EOC score increased by .08 points on average. Tier II and Tier III reading students taking the English EOC exam averaged about 19.5 hours in Achieve3000 for the year. This translated into about a point and a half higher EOC performance than if they had spent zero hours in the program (.08 x 19.5 = 1.56). T students who spent the 1.5 recommended hours per week in the program for 30 weeks (i.e., most of the school year) would average 3.6 points higher on the English II exam than those who spent no time in the program, controlling for the other variables in the model (1.5 x 30 x .08 = 3.6).

The small sample sizes for the EOC outcomes precluded any analyses similar to the second and third approaches used for the MAP and TNReady achievement outcomes. Because those approaches entailed reducing the samples to just students in high- and low-implementing schools or just students with high or low computer usage, the remaining samples would have been too small for meaningful analysis.

The conclusions that can be drawn from the EOC analyses presented here are: 1) level of RTI² implementation was not related to EOC performance, 2) Tier II students outperformed Tier III students on English I and Algebra I EOC exams, and 3) time spent in Achieve3000 was positively, though weakly, related to performance on the English II EOC exam.

Other Variables Considered

Although the primary RTI² variables of interest in the student-outcome analyses were schools' level of implementation and students' time spent in computer-based intervention, a few other RTI²-related variables were included in the modeling processes described above, but were dropped from consideration after they failed to show statistical significance across multiple outcomes. They were all school-level variables:

- the school's score on the Ease of Implementation index
- whether or not the school had an interventionist
- total dollar amount the school spent on RTI² implementation
- the school's per-student spending on RTI² implementation
- number of intervention students at the school

Determining Return on Investment for RTI²

Estimating RTI² Costs

In order to calculate an overall return on investment for RTI², we first needed to estimate the total costs associated with RTI² implementation during the 2017-18 school year. Some direct costs were straightforward to quantify such as the personnel, technology and other resources specifically dedicated to RTI² such as EdPlan, Achieve3000, i-Ready and the central office RTI² team. Other costs derive from more indirect measures such as the self-reported number of hours per week other central office and school personnel have spent on administrative or instructional tasks associated with RTI² in addition to other non-intervention responsibilities they have. These time estimates were then prorated to a percentage of a 40-hour work week and converted to an overall percentage of annual salary and benefits for each role type. More detail on each cost assumption category is provided below.

Central Office Personnel - Central office personnel cost is based on estimated percentage of time spent on RTI² across nine different role types in five central office departments responsible for various aspects of implementation (Core RTI² personnel are included at 100 percent, additional Curriculum & Instruction, Professional Development, Exceptional Children, Instructional Technology and the Office of Schools personnel are based on self-reported percentages of time).

School Personnel – School personnel costs are based on the results of the semi-annual survey designed by the Department of Research & Performance Management to gauge each school's perceived level of ease implementing RTI² as well as the estimated number of personnel and hours spent supporting intervention. For the purposes of estimating costs, we only used the spring semester survey results, and 147 schools (97 percent) completed this information. Because many schools were still getting acclimated to RTI² requirements and software such as EdPlan in the fall semester, our assumption is that spring semester results are more reflective of the typical amount of time needed to implement RTI² in steady state. Indeed, the average minimum time schools report spending on RTI² dropped from 208 hours per week in the fall to 186 hours based on spring survey reporting. The time estimate portion of the survey asked each school RTI² Lead to report the number of staff members who had some responsibility for RTI² by each role type (e.g., RTI² Lead, Assistant Principal, General Education Teacher, Special Education Teacher), the minimum and maximum number of hours each of these roles spent per week on average to complete administrative RTI² responsibilities, and the minimum and maximum number of hours each of these roles spent per week on average on direct RTI² instruction. Those ranges of hours were then used to prorate the percentage of a given role's annual salary/time spent on RTI² based on mid-point salary data.

Given the 97 percent response rate for that survey, the cost estimate calculated from those responses represents nearly all District-managed schools involved in RTI². However, for the purposes of estimating the District's return on investment (ROI) for the program, it is desirable to include an estimate for all the schools (N=151) implementing RTI², including the few that did not respond to the spring survey. Therefore, the 2017–18 total District expenditure for RTI² includes cost estimates derived from the fall 2017 responses of the schools that did not respond to the spring survey (using

the same formula as that used to calculate costs from the spring responses). That total comes to $48,218,492.

Software – Five technology platforms were incorporated into direct RTI² cost estimates. EdPlan, i-Ready, Achieve3000 and easyCBM costs are inclusive of all associated expenses with each software product because these platforms are used primarily to deliver online intervention or to complete administrative requirements for RTI². The NWEA MAP cost was prorated at 15 percent of the total contract amount because roughly 15 percent of all SCS students who complete the MAP are identified for benchmarking for Tier II or III intervention.

Other Significant Expenses – Maintenance & Development, Training, Travel, Materials & Supplies, Fees & Consulting are incorporated to capture additional categories of expense necessary to support both software implementation and on-going district support efforts. The Maintenance and Training amounts are based on proposed contracts. The remaining accounts are estimates based on the prior year spending.

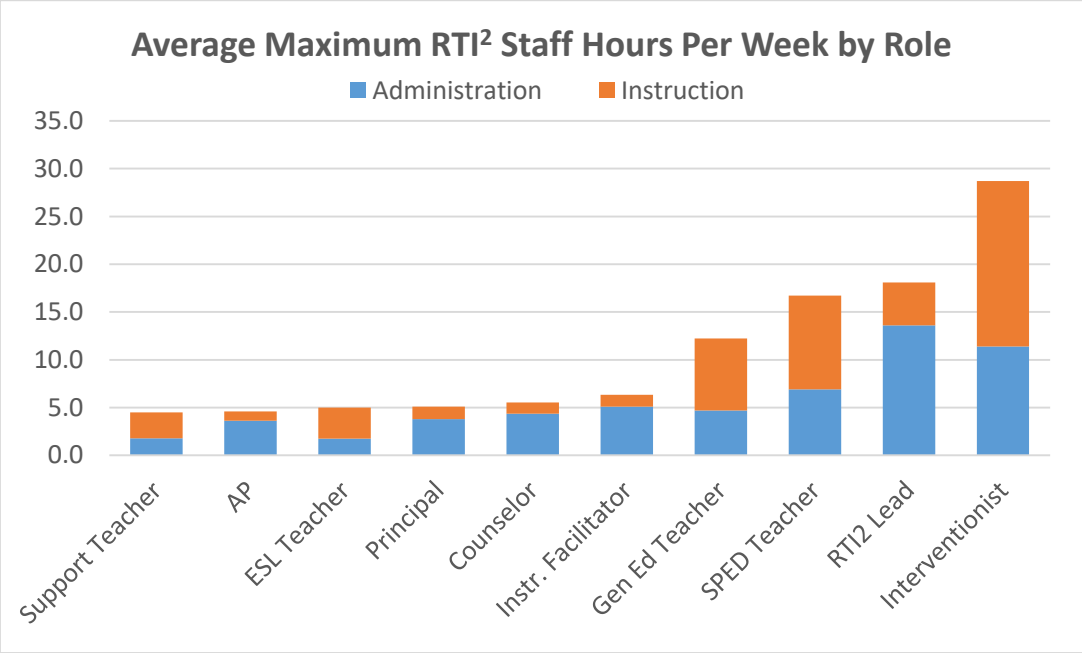
Based on the above assumptions and data sources, the District utilized an estimated $48.2 million in resources to implement RTI² during the 2017-18 school year, comprising four to five percent of SCS' total annual budget. The vast majority (83 percent) of these costs are derived from school staff time spent on administrative and instructional responsibilities for RTI², so additional details and underlying trends related to school staff time are provided in this section.

	2016-17	2017-18	2018-19	2019-20	Total
Personnel (Central Office)		$ 1,437,131	$ 2,036,298	$ 2,036,298	$ 2,036,298
Personnel (School)	$31,700,000	$40,056,073	$40,056,073	$40,056,073	$151,868,219
Software					
i-Ready	$ 745,200	$ 1,643,140	$ 2,559,815	$ 2,559,815	$ 7,507,970
Achieve 3000	$ 719,670	$ 2,855,400	$ 2,855,400	$ 2,855,400	$ 9,285,870
easyCBM	$ 152,500	$ 138,500	$ 159,100	$ 159,100	$ 609,200
EdPlan		$ 711,188	$ 497,446	$ 497,446	$ 1,706,080
NWEA MAP (15%)	$ 127,350	$ 127,350	$ 121,083	$ 121,083	$ 496,865
Maint & Dev	$ 163,920	$ 415,702	$ 381,652	$ 404,532	$ 1,365,806
Training (incl stipends)	$ 175,000	$ 441,848	$ 393,147	$ 328,411	$ 1,338,406
Travel	$ 12,000	$ 12,000	$ 12,000	$ 12,000	$ 48,000
Materials & Supplies	$ 230,160	$ 230,160	$ 230,160	$ 230,160	$ 920,639
Fees & Consulting	$ 150,000	$ 150,000	$ 150,000	$ 150,000	$ 600,000
TOTAL	**$34,175,800**	**$48,218,492**	**$49,452,174**	**$49,410,318**	**$181,256,784**

The average minimum time each school spent on RTI² per week was 186 hours based on spring survey reporting. The average maximum time per week was 300 hours, and the median was 243 hours. Across the District, schools reported spending 44 percent of their time on administrative tasks (i.e. data meetings, fidelity checks, paperwork and tracking) versus delivering direct intervention support to students. Forty-one schools (28 percent) reported spending less than 100 hours per week on average on RTI² work, while 13 schools (nine percent) reported spending more than 500 hours per week on average. The median weekly school-level hours reported for the spring survey reflect an

equivalent of roughly 710 full-time staff completing 1,250,000 hours of RTI² responsibilities across all schools during the 2017-18 school year.

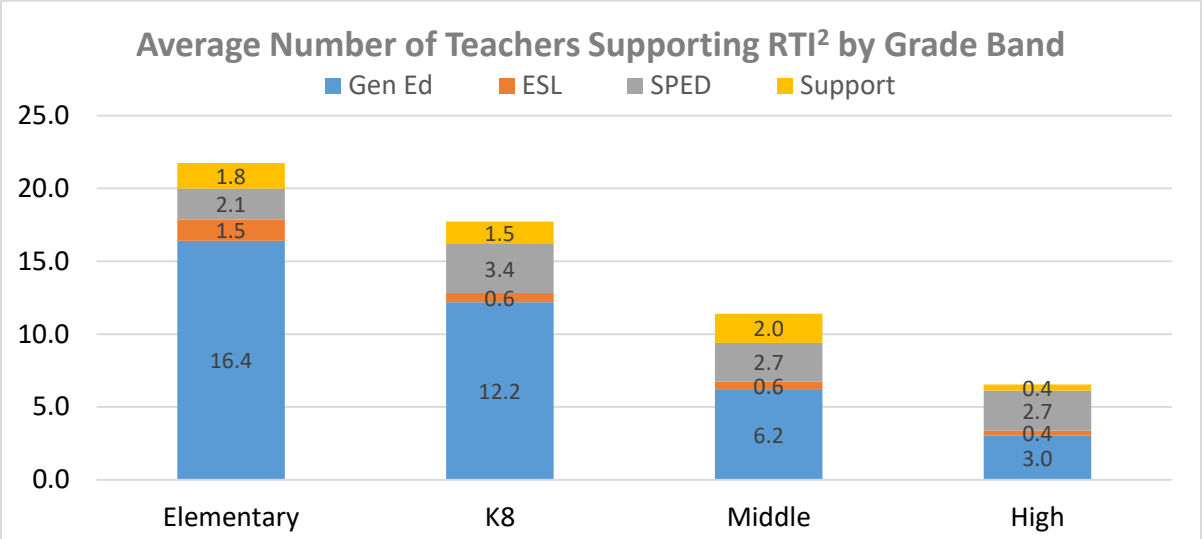
In all grade bands, the four roles that spent the most time on RTI² were the Interventionists (where available), RTI² Leads, General Education Teachers and Special Education Teachers. Note that the average Interventionist hours in the following chart do not take into account schools that did not have Interventionists.



When comparing staff time results by grade band, the average minimum and maximum amount of time spent per week per individual did not vary by more than two hours between any two grade bands. However, when average staff time is weighted according to the number of staff in each role multiplied by the hours they collectively spend, there is a marked difference in the maximum time spent at the elementary and K-8 levels compared to middle and high schools.

Average RTI² Staff Time per School by Grade Band				
	Avg. Minimum Hours Per Week Spent Per Individual Staff	Avg. Maximum Hours Per Week Spent Per Individual Staff	Weighted Minimum Hours Per Week Spent Across All Staff	Weighted Maximum Hours Per Week Spent Across All Staff
Elementary	5.9	9.6	218	353
K-8	4.0	8.0	199	358
Middle	5.5	8.1	174	258
High	5.3	8.7	111	181

The main driver of this difference is the average number of teachers involved in RTI² by grade band. Elementary and K-8 schools reported a substantially higher number of GenEd Teachers supporting this process compared to middle and high schools.



Several factors may explain this difference. For one, elementary grades tend to build RTI² into self-contained teachers' schedules while middle and high school grades are more likely to schedule intervention courses that a small subset of teachers lead for multiple periods during the day. Based on benchmarking results, it is also likely that high schools are serving a smaller percentage of their student population than lower grades and have not assigned as many staff to RTI² for this reason.

Linking Student Outcomes to Expenditures

As shown in the previous section, the District spent an estimated $48 million on RTI² in 2017–18. The lion's share of this cost came from the time school personnel spent implementing the program, according to schools' responses to the spring administration of the semi-annual RPM survey on staff hours and ease of implementation. Note that this figure represents the cost of implementing RTI² *in a typical week* for the entire 36 weeks of the school year. (The RPM survey asked schools to estimate average staff hours spent on RTI² in a typical week. Each school's weekly cost estimate was then calculated using the method described in the previous section and then multiplied by 36.) However, given that schools experience many interruptions to their typical week, especially during the first and last few weeks of school, it may be helpful to present the District's return on investment for RTI² two ways: 1) assuming 36 weeks of typical implementation, and 2) accounting for interruptions to the typical week by assuming 30 weeks of typical implementation. Calculating school personnel costs based on 30 weeks of typical implementation instead of 36 brings the adjusted total District expenditure on RTI² to **$41,542,480**.

This figure and the $48 million figure above can be thought of as the lower and upper estimates of the District's RTI² spending in 2017–18. Determining the District's return on this investment requires linking those expenditures to student progress. As discussed earlier, the MAP and TNReady outcomes were positive but meager; moreover, those assessments are situated outside of the RTI² framework. Since the ultimate goal of RTI² is to help students improve enough to move out of their current tier (or to be identified for special education services if increased intervention is not successful), then linking tier improvement to expenditures is one way to assess the District's return on investment for RTI².

Unfortunately, the data from EdPlan RTI Tracker made assessing tier changes very difficult. The method we used to determine how many students moved to a higher (meaning more improved) tier was as follows: 1) ignore all records with tier designations containing *MCS* in the title, as those appeared to be left over from the previous EdPlan system; 2) ignore the *Selector* and *Plan Type* fields (these contained tier-change indicators, but they frequently did not correspond to an actual change in tier designation); and 3) count only those records which entailed an improvement from *Old Tier* to *New Tier*, removing from that group any students who at a later date were reassigned to the more intensive tier. If the method we used is correct, then 1,702 students moved to a higher tier without backsliding at a later point in the year. The cost per student to realize these tier improvements is presented in the table below.

2017–18 Per-Student Return on Investment for RTI², as Measured by Tier Improvement		Total RTI² Spending	
		30 Weeks $41,542,480	36 Weeks $48,218,492
Number of Students Improving by at Least One Tier*	1,702 (9%)	**$24,408**	**$28,330**

**out of 19,101 students with an intervention plan in EdPlan RTI Tracker*

According to this assessment, it cost the District roughly between $24,000 and $28,000 to move a student from one tier to the next. This price seems steep, but it is important to remember that if a student started out near the bottom of a tier, s/he could make a lot of progress without managing to climb to the next tier before the end of the school year. Since the District prioritized its most struggling students for RTI², measuring progress based solely on tier improvement would likely overlook the progress of many students.

A more granular measure of progress is therefore desirable, and the weekly or biweekly RTI² progress-monitoring data provide such a measure. Given that the entire purpose of progress monitoring is to track students' rate of improvement in the program, it makes sense to use that information in the calculation of the District's return on investment. Students can make progress from one skill area to another within a grade level, they can progress within the same skill area across grade levels, or both. The table below presents the cost per student to achieve: 1) a progression in skills whether within or across grade levels, and 2) a progression in skills from one grade level to the next.

2017–18 Per-Student Return on Investment for RTI², as Measured by Growth in Progress Monitoring		Total RTI² Spending	
		30 Weeks $41,542,480	36 Weeks $48,218,492
Number of Students Making Progress*	Skill Progressions 12,566 (56%)	**$3,306**	**$3,837**
	Grade-Level Progressions 9,516 (42%)	**$4,366**	**$5,067**

**out of 22,443 progress-monitored students*

It cost the District between about $3,000 and $5,000 to help a student realize measurable progress in RTI². The numbers of students in the table above represent students who made at least one skill-area or grade-level progression, but note that some of those students improved by more than one skill area or grade level, as shown in the table below. Thus, while the ROI calculation is based on the number of *students* who made progress, the actual number of *progressions* made by those students is much higher. In other words, the District's cost per skill progression was cheaper than its cost per student.

Students with Skill Progressions			Students with Grade-Level Progressions		
# of progressions	N	%	# of progressions	N	%
0	9,877	44%	0	12,927	58%
1	6,549	29%	1	6,801	30%
2	3,311	15%	2	2,038	9%
3	1,496	7%	3+	677	3%
4+	1,210	5%			
Total	22,443	100%	Total	22,443	100%

Discussion and Conclusions

Our analysis is decidedly mixed on the degree to which RTI² has had a positive impact on student outcomes. On the one hand, we do see modest, positive MAP and TNReady results in both math and ELA among Tier II and III students who participated in 30 or more hours of online intervention compared to those with six or fewer hours of online intervention. Online intervention is the most direct measure of individual students' level of RTI² dosage that was available for this analysis, so it is encouraging that this measure has a positive if somewhat weak relationship to other academic outcomes. Because we do not have a direct measure of the frequency or quality of face-to-face intervention sessions with students, it is not possible for us to know whether these positive effects are solely due to the online interventions themselves, or if they are serving as a proxy indicator that students with high usage are also getting more consistent, high-quality face-to-face intervention compared to students with low usage and are therefore achieving better academic results. In either case, if this trend continues in 2018-19, we may expect to see a higher percentage of Tier II and III students demonstrate academic improvement given that schools are now far more acclimated to the RTI² process, have had earlier access to the technology platforms they need to implement the program, and have increased levels of school and District staff support compared to 2017-18.

On the other hand, no other aspects of RTI² implementation that we measured yielded strong correlations to student outcomes including the presence or absence of a dedicated Interventionist or the Level of Implementation Index (LOI) for a given school. This could mean one of several things: 1) RTI² is an expensive, time-consuming process that unfortunately does not improve student achievement; 2) the measures used to construct the LOI index were not complete enough to capture true level of implementation; or 3) mere *level* of implementation is not a sufficient condition for seeing results with RTI². To elaborate on the third point, faithfully implementing RTI² entails a lot of administrative work that is not associated with actual instruction. Based on our spring semester school staff time survey estimates, the average school team spends nearly half of its time completing administrative rather than instructional tasks for RTI². It is possible that many schools, while managing to attend to the myriad of administrative requirements of RTI², lack the staff time and/or expertise to implement high-quality small-group instruction tailored to the skill deficits of their Tier II and III students. Yet it is the instructional, not the administrative, aspect of RTI² that holds promise for impacting student achievement.

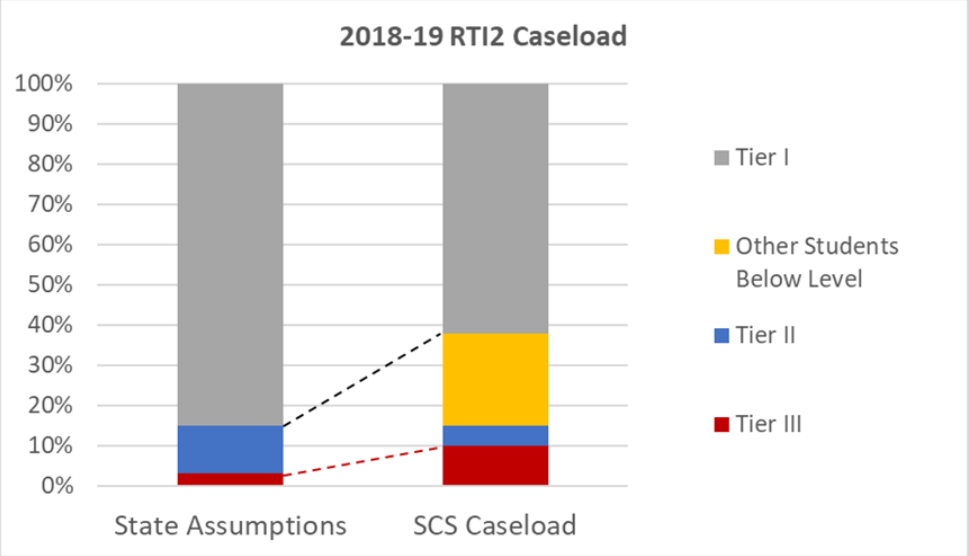
Given that our most direct measure of individual student intervention activity yielded some positive results and that our other measures of RTI² implementation may have been more reflective of administrative rather than instructional activity, the rest of this section focuses on identifying known barriers to implementation that can lead to opportunities to improve RTI² service delivery.

Limited School Capacity – Capacity to implement RTI² can be impacted in two ways: 1) lacking the right amount of people or staff time, and 2) lacking the skills and expertise to implement with fidelity. We have discussed elsewhere in this report that schools did not receive fixed District- or State-wide allocations to hire dedicated staff to implement RTI² in 2017-18, and many SCS campuses did not use discretionary funds for this purpose. Based on self-reporting, schools currently spend an average of 186 hours per week implementing the intervention process, which translates to more than three full-time equivalent employees. It is therefore understandable that most schools struggled to meet

all program requirements, especially schools using only staff with other full-time responsibilities. Moreover, the RTI^2 process is still new to many staff and has several complex requirements that take time to learn in full. Given that schools reported spending less time on RTI^2 in the spring than they did in the fall, we may expect to see RTI^2 implementation continue to improve in terms of efficiency and quality in 2018-19 as schools continue to get more acclimated. The ongoing professional development and on-site support that our central office RTI^2 team provides to schools is also critical to ensuring that implementation leads to high-quality outcomes for students.

Implementation Timing – Although this should not be a point of concern going forward, our mixed results may also have something to do with the timing of different aspects of the rolling out of RTI^2 in 2017-18. The central office RTI^2 team was not in place until July 2017, limiting the amount of guidance and training they could provide to schools regarding the intervention process prior to the start of the school year. Additionally, the EdPlan platform that schools use to assign students to intervention plans and complete many reporting and compliance activities was not available until October 2017. This could have contributed to delays for many schools in initiating intervention with students, and it could have ultimately limited the amount of intervention some eligible students received by at least two months. Even for schools that implemented RTI^2 from the onset of the school year as instructed, making the transition from paper-based to online intervention could have presented unique implementation barriers or capacity challenges for 2017-18. In these cases, we may not see as much academic growth in our results compared to outcomes for students with a full school year of intervention.

Prioritization of the Lowest Performing Students – A key tenet of the RTI^2 process is to identify and intervene first with the students struggling the most academically, and we support this tenet as a matter of equity. However, in a district like SCS with a large volume of struggling students, this means that many schools can only provide intervention to their most profoundly struggling Tier III students who have significant ground to make up across several foundational skill areas before they can return to Tier II or I status. In our 2017-18 sample, 65 percent of RTI^2 students received Tier III support compared to just 35 percent in Tier II. During SCS' most recent universal screening window in fall 2018, 38 percent of all K-8 students met the State's criteria to be benchmarked for intervention, meaning they performed in the bottom achievement quartile nationally on the MAP assessment. This ratio is in stark contrast to the State's assumptions that 10 to 15 percent of students will receive Tier II intervention and just one to five percent will receive Tier III intervention.



One implication of this is that we may not expect to see rapid or large-scale growth for our treatment group because this group of students may need multiple years of intensive support to address all of their academic intervention needs. Another implication is that other struggling students may not receive any RTI² they need because they did not fall in the bottom 15 percent of their school's academic screening tool despite meeting the State's criteria for intervention. Yet another consideration is that many Tier III students who are in the very lowest achievement percentiles may also have other significant needs related to socioemotional and mental health or poverty that need to be addressed before or in conjunction with academic intervention. There appear to be many opportunities for the District to collaborate with the State on ways to revise and diversify our intervention service model so that the maximum number of eligible students receive an effective, tailored form of academic support within or outside of the formal RTI² process.

<u>High School-Specific Needs</u> – SCS has already enacted some changes in 2018-19 to adapt the RTI² process for high schools that are detailed elsewhere in this report. However, it merits emphasis that high schools have faced unique challenges in implementing RTI² to this point that have limited the number of students served and the quality of data available for our analysis for return on investment. In 2017-18, SCS high schools completed three rounds of benchmarking in fall, winter, and spring to identify students for Tier II or III intervention. Yet high schools were limited in their ability to adjust students' schedules and initiate intervention courses after the beginning of the school year without compromising other courses students needed to graduate. This means many students benchmarked in the winter or spring were not scheduled for intervention courses during the 2017-18 school year. Moreover, because of vendor constraints, high school students completed the benchmarking process on paper, and school staff were to manually enter these data into spreadsheets, increasing the chances of having incomplete or inaccurate benchmarking data. In addition to these logistical challenges, high schools may have been at a disadvantage in providing high-quality intervention to the students who were scheduled for Tier II or III support. The online intervention tools Achieve3000 and i-Ready are designed for K-8 use and therefore may not have had the same level of academic impact for high school students. We also heard in our high school focus group feedback that some

high schools have had to rethink staffing needs to implement this program. Because RTI² focuses on helping students master below-grade-level foundational skills, some schools noted that teachers in traditional high school subjects may not have the expertise needed to teach this kind of content and have sought out teachers with K-8 experience to fill Interventionist roles. This could have been a challenging dynamic for high schools that did not have the flexibility to hire dedicated Interventionists that may have limited the overall effectiveness of this program.

Recommendations and Next Steps

State-Level Recommendations Implemented and In Progress

In February 2018, the TN DOE made three recommendations to improve RTI^2 implementation, including easing the burden of RTI^2 guidelines, enhancing support and resources for district RTI^2 implementation, and differentiating RTI^2 for high schools. In the spring, they conducted a statewide listening tours gathering feedback on RTI^2 implementation from educators, parents, and students to develop recommendations on how to modify the framework and better support districts. Their initial proposed guidance on each identified area of improvement[7] is as follows:

- Easing the burden of RTI^2 guidelines – Shift from focusing on the procedural collection of a set number of data points/checks for progress and fidelity monitoring to focus on schools reviewing data trends from multiple data sources to assess student response to intervention.
- Enhancing support and resources - Provide more professional learning opportunities, guides for selecting screeners and interventions, and best practice materials and provide state funding for RTI^2 district positions. During the 2018 Legislative Session, the General Assembly passed legislation on the BEP funding formula to provide a minimum of one RTI^2 position per district, with additional funding allotted at a ratio of one position to every 2,750 students.[8]
- Differentiating RTI^2 for high schools - Support high schools by providing high-school specific RTI^2 webinars, implementation guides, promising practices, and opportunities for regional collaboration.

The State will supply more details about what this guidance looks like in practice in July 2019, but the Department of Education recognizes a need to focus more on the quality than the quantity of implementation. The recommendations collected from our District's staff and actions taken reflect these statewide themes and provide specific suggestions for how to implement RTI^2 more effectively and meaningfully in our context.

SCS Recommendations Implemented and In Progress

In the spring and summer of 2018, the RTI^2 Team worked to modify local guidelines and processes to address the barriers and recommendations identified through stakeholder feedback and District continuous improvement sessions. Below is a list of the key recommendations that have already been implemented or are in progress:

- Expanded District capacity and support by increasing the number of District RTI^2 Team members from four to 13 and using the new BEP funding to create new interventionist positions, including ones for middle and high school literacy teachers

[7] *RTI^2 Listening Tour Takeaways and Next Steps. Framework Revisions, Enhancing Resources and Support, and High School Specific Guidance and Support*. Tennessee Department of Education. 2018. https://www.tn.gov/education/instruction/tdoe-rti2/rti2-rediect/rti-current-update.html

[8] *District-Level Response to Instruction and Intervention (RTI^2) Positions*. Tennessee Department of Education. 2018. https://www.tn.gov/content/dam/tn/education/special-education/rti/District-RTI-Position.pdf

- Streamlined high school RTI² processes to reduce time demands and improve data quality:
  - Provided student's assessment information and grades electronically so that high schools can search for 8th graders from feeder schools to better determine their RTI² staffing and scheduling needs for the following year
  - Moved from using NWEA-MAP as a universal screener three times a year in high schools to using Early Warning System (EWS) data on the BrightBytes Clarity platform to screen students once a year for RTI² benchmarking
  - Reduced easyCBM benchmarking to once a year based on Clarity early warning data
  - Moved high school RTI² benchmarking from a paper-based to an online process
- Provided RTI² guidance and support tailored to high school-specific needs:
  - Conducted RTI² secondary school-specific trainings during the school year and summer
  - Provided specific written guidance (e.g., implementation guide) that focuses on the RTI² process for high schools
  - Scheduled four Secondary Communities of Practice sessions throughout the school year
- Provided professional development and best practices sessions for RTI² Leads, support staff, and interventionists during the summer and throughout the school year
  - Held a half-day training for RTI² Leads to learn about how the professional roles of RTI² Advisors, SPED Advisors, and School Psychologists support intervention programs in their assigned schools; training included opportunities to network with these staff members and build a community of support around shared goals
  - Providing on-going collaborative training sessions on effective data team meetings and monitoring student progress
  - Conducted a RTI² Boot Camp for RTI² interventionists to observe effective instructional strategies for small group instruction and to gain a better understanding of the necessary components needed to plan high-quality instruction
  - Providing on-going interventionist training sessions on planning small group instruction and developing instructional strategies in ELA and Mathematics to address the specific needs of struggling students
- Held RTI² trainings during ILD zone meetings in order to increase school staff attendance after school
- Facilitated continuous improvement "Stat" sessions to assess and improve the quality of RTI² implementation versus focusing only on compliance

Overall Recommendations and Next Steps

Both SCS and the State have already begun to implement some measures that have the potential to further improve Tier II and III student outcomes. In addition to these measures, the Department of Research & Performance Management makes the following recommendations:

1. Continue adding school-level capacity so that schools with the most need can equitably serve a larger portion of Tier II and III students

2. Provide best practices and specific guidance for scheduling interventions (e.g., as blocks, classes, etc.) to meet both Tier I instruction and RTI² expectations for students
3. Address high school-specific challenges and needs related to RTI² implementation including:
    a. Having dedicated intervention staff experienced in teaching foundational skills
    b. Utilizing online progress monitoring and intervention tools tailored to high school students
    c. Adjusting implementation milestones to fit better with scheduling interdependencies
4. Expand trainings so that school staff can learn to use technology platforms more effectively for computer-based interventions, monitoring, and RTI² tracking
5. Determine how the academic RTI² framework should be integrated with the behavioral RTI² framework, especially for Tier III students who need the most intensive but targeted support
6. Work with the Tennessee Department of Education to reduce administrative requirements not directly related to delivering intervention
7. Use local best practices and forthcoming state guidance to show data teams how to review data from multiple sources to determine student response to intervention and decide next steps
8. Establish more standardized, consistent ways to monitor the quality of face-to-face intervention

Below we provide details and context for each of these overall recommendations and next steps.

1. Continue adding school-level capacity so that schools with the most need can equitably serve a larger portion of Tier II and III students

As stated earlier, to prioritize students with the greatest need and limit intervention caseloads to a manageable size, SCS permits schools to benchmark students who fall within the bottom 15 percent of achievement within each school if more than 15 percent of students fall below the national bottom quartile cut point. This is true for the majority of SCS schools. This approach means that other struggling students may not receive any RTI² they need because they did not fall in the bottom 15 percent of their school's academic screening tool despite meeting the State's criteria for intervention. In addition to that gap in service, schools report that RTI² Leads, intervention providers, and data team members have multiple responsibilities in their schools that strain their ability and their schools' capacity to fully implement RTI² for even the 15 percent of identified students. Given the District's large volume of struggling students, most schools can only provide intervention to their most profoundly struggling Tier III students who have significant ground to make up across several foundational skill areas, which means many potential Tier II students do not receive intervention. Expanding school-level capacity by increasing the number of staff and their time dedicated to RTI² would enable schools to more equitably serve a larger portion of Tier II and III students. In response to listening tour results, the State is working on reducing the burden of RTI² guidelines, developing best practices guides, offering professional learning and regional collaboration opportunities, and providing funding to districts for RTI² positions. While additional resources would certainly increase the level of support for students in the RTI² program, we also recommend that the District work with the State on ways to revise and diversify our intervention service model so that the maximum number

of eligible students receive an effective, tailored form of support outside of the formal RTI² process where schools have particularly large caseloads of struggling students. In instances where the majority of students at a school would be eligible for RTI² based on the State's criteria, it may not be feasible to deliver intensive small-group intervention to all of these students without a significant influx of resources. However, there may be other, more scalable models to reinforce foundational skills and differentiate instruction to more struggling students that will ensure they receive tailored support regardless of whether they fall in their school's bottom 15 percent or not. For example, this year the RTI² Advisors will work collaboratively to support schools in their implementation of RTI² by developing RTI² Plans in EdPlan for Tier II/Tier III students to address specific deficit areas in literacy and/or mathematics.

2. Provide best practices and specific guidance for scheduling interventions (e.g., as blocks, classes, etc.) to meet both Tier I instruction and RTI² expectations for students

Schools identified scheduling as a top challenge and source of success in implementing RTI². Many RTI² Leads emphasized the importance of early planning and incorporating RTI² into the master schedule (e.g., as blocks, classes, etc.) to meet both Tier I instruction and RTI² expectations for students. They also noted the need to plan to have additional slots for students who are identified as needing intervention over the course of the school year, which can be particularly difficult for secondary schools with complex scheduling interdependencies. This concern has been partly addressed by reducing benchmarking to once a year in high school. The RTI² District Team should continue incorporating schools' different experiences when developing best practices and guidance for scheduling, especially given that elementary schools have more scheduling flexibility than secondary schools because high schools have to schedule semester classes and allow for students to meet their class/credit requirements for graduation. In addition, the State found that some schools have struggled with time and group-size constraints for scheduling intervention periods and are considering ways to provide schools more flexibility with group size while still while maintaining focus on several variables that increase intensity of interventions. Because SCS is the largest school district in Tennessee and serves many struggling students, we recommend that the District provide feedback to the State on revising the RTI² framework and provide local best guidance to help address one of the main barriers to successful RTI² implementation - scheduling.

3. Address high school-specific challenges and needs related to RTI² implementation

In addition to scheduling, both the State's and our District's inquiries show that high schools have specific challenges and needs related to RTI² implementation that require differentiated support. We must take into account the differences between high schools and elementary schools when designing and setting implementation expectations. One of those key differences is that there is a greater need for high schools to hire dedicated intervention staff experienced in teaching foundational skills because high school teachers are not typically content experts in intervention or lower instructional levels. Some high school stakeholders feel that RTI² is more of an elementary-focused model with requirements that have not been modified to fit high school needs. In particular, the State reports that it is more difficult to find age-appropriate progress monitoring tools, diagnostic assessments that inform instruction, and engaging instructional materials to teach skills for high

school students. We see evidence of this difficulty in our District through the challenges we faced using easyCBM for benchmarking and progress monitoring in high schools because this is a K-8 platform that was previously administered only on paper to high school students. To build high school interventionists' capacity, the RTI² District Team will provide ongoing trainings on foundational skills and instructional strategies for secondary students. To address concerns about high school testing fatigue, the District moved the benchmarking window to avoid heavy testing times. This year, the State is creating a high school-specific RTI² implementation guide with recommendations and best practices for using benchmarking, progress monitoring, and intervention tools. Given the lack of technology vendors and materials specific to high school intervention, our District can benefit from these resources and from learning from others about how to develop a school culture for effective RTI² implementation by participating in the regional high school communities of practices meetings hosted by the State in 2018-19.

4. **Expand trainings so that school staff can learn to use technology platforms more effectively for computer-based interventions, monitoring, and RTI² tracking**

Schools identified adapting to and more effectively using technology platforms for computer-based interventions and RTI² tracking as both a top challenge and an area of success. As discussed above, elementary teachers are more familiar with using computer-based interventions for skill development than secondary school teachers, but all teachers and interventionists have had to adapt to using technology platforms for RTI² purposes. A key instructional challenge is knowing when and how to use those platforms to best address each student's deficits. This year the RTI² District Team's plans to hold on-going interventionist training sessions on developing instructional strategies in ELA and Mathematics to address the specific needs of struggling students. Interventionists also had a big learning curve last year in moving to the EdPlan platform for RTI² documentation and tracking. While the state is working to ease the RTI² administrative burden by reducing the number of required student data points, schools can still benefit from consistently and strategically using EdPlan to track students' plans and progress. We recommend that the District continue offering software training and support, developing targeted training for how teachers can effectively use computer-based interventions, and providing guidance to school leaders and staff on how to make RTI² tracking a job-embedded activity.

5. **Determine how the academic RTI² framework should be integrated with the behavioral RTI² framework, especially for Tier III students who need the most intensive but targeted support**

As the State and District continue to make inroads on academic intervention implementation, both entities have also launched an "RTI²-B" focused on multi-tiered interventions for student behavior. These academic and behavior intervention models are each rooted in evidence-based best practices to support students with the greatest need while mitigating exclusionary practices. However, it is likely that some students identified for the most intensive Tier III support for behavior will also be identified for Tier II or III academic support. Given the significant time and scheduling demands of RTI² for students and school staff alike, we recommend that the State and District provide schools with clear guidance on how to coordinate academic and behavior intervention efforts for students identified to participate in both. Coordination of services will be particularly important for Tier III

students who are struggling academically but have underlying socioemotional needs that may need to be prioritized first in order for academic RTI² to be most effective.

6. Work with the Tennessee Department of Education to reduce administrative requirements not directly related to delivering intervention

Across the District, schools reported spending almost half of their time on administrative tasks (i.e. data meetings, fidelity checks, paperwork, and tracking) versus delivering direct intervention support to students. This finding reflects what the State heard across Tennessee about the difficulties educators have faced in implementing certain process-based requirements of RTI² with fidelity. Specifically, some schools and districts have struggled with the required frequencies of universal screening, progress monitoring, and fidelity checks. As emphasized earlier, it is the instructional, not the administrative, aspect of RTI² that holds promise for impacting student achievement. Given the time constraints, school staff have to support this program versus other full-time responsibilities, so it is imperative that we limit non-instructional aspects of RTI² to only the most essential administrative tasks. In response to these concerns, the State is working on reducing the burden of RTI² guidelines by adjusting the specific requirements to ease the burden on schools without compromising program quality. The District has already made efforts to address these challenges by moving to the Early Warning System and reducing the number of benchmarking requirements in high schools. Progress and fidelity monitoring remain challenges at all grade levels. We recommend that the District continue providing feedback to the State, seeking out best practices from other districts, and working with the State to reduce the frequency and time needed to complete administrative requirements not directly related to delivering intervention.

7. Use local best practices and forthcoming state guidance to show data teams how to review data from multiple sources to determine student response to intervention and decide next steps

In relation to easing the burden of RTI² guidelines, the State is shifting emphasis from the procedural collection of a set number of data points/checks for progress and fidelity monitoring to focus on schools reviewing data trends from multiple data sources to assess student response to intervention. While the State and the District already recommend that data teams use a variety data points (e.g., review of schedule, intervention lesson plan, attendance, progress monitoring data, teacher feedback, etc.) to assess a student's progress and inform instructional decisions, the State has recognized the need to provide more detailed guidelines and professional learning to help data teams do so effectively and consistently. We recommend that the District use forthcoming state guidance and professional learning and collaboration opportunities to develop local best practices and show data teams how to review data from multiple sources to determine student response to intervention and decide next steps. These efforts will help staff and schools provide more holistic and consistent support to students receiving intervention.

8. Establish more standardized, consistent ways to monitor the quality of face-to-face intervention

While much of the State's and District's focus has been on meeting the administrative and quantitative RTI² implementation requirements (e.g., number of student data points, frequency of data team meetings, and amount of intervention time), both have recognized the need to focus on the quality of implementation beyond the level of implementation. One indication of this need is that

for this study there were no available data that spoke to the quality of the RTI² program in the schools. For example, we were not able to assess the frequency or the quality of small-group instruction. The SCS RTI² Quality stat sessions conducted this year seek to address this gap by focusing on three key district-wide activities: consistently monitor student intervention activity and quality; assess and provide feedback on the quality of intervention instruction; and build school capacity through professional development and the sharing of best practices. We recommend that the District partner with the State to strengthen support for schools to improve the quality of face-to-face interventions and to develop more standardized, consistent ways to monitor the quality of implementation (e.g., meaningful fidelity checks of small-group instruction) and provide constructive feedback to schools.

Appendix A

High School Focus Groups

In February 2018, RPM conducted a series of 90-minute focus groups with high school RTI² Leads to discuss barriers to implementation as well as recommendations for how RTI² can be improved to ensure more students are getting timely, high-quality intervention. To determine the sample, the RTI² Team recommended 12 high schools representing a range of successes and struggles implementing RTI² this year. Ultimately, 11 RTI² Leads participated including one interventionist, two Professional Learning Community (PLC) Coaches, three Instructional Facilitators, and five Assistant/Vice Principals. Their experience at their current schools ranged from less than one year to over fifteen years, with a median of two and a half years of experience. Six participants were in their first year as a RTI² Lead and five participants were in their second year at their current school.

Participants were told that the purpose of the focus group was to learn about best practices for what is working and about key barriers and supports needed to address what is not working. We explained that we would summarize the findings with no school or staff names included. The focus group interview questions concentrated on schools' experiences with the main RTI² processes and compliance checkpoints; implementation successes and challenges and how they addressed barriers; and recommendations for best practices and supports needed. In addition to the barriers described in the stakeholder feedback section of this paper, we analyzed the responses by coding for key themes around recommendations and best practices.

<u>Recommendations to Improve Implementation:</u>

Much of the Leads' feedback had to do with accounting for differences in high school capacity and structure, such as teacher capacity to provide lower-level instruction, scheduling semester classes, and course/credit requirements students need to graduate, and students' testing fatigue. They recommended that the District:

- Hire dedicated RTI² staff at each school, ideally including five roles: a RTI² Lead/Coordinator, Gen Ed RTI² Leads in English and math, and SPED RTI² Leads in English and math.
- Customize RTI² guidance and training in high schools by highlighting high school-related parts of the implementation guide, doing step-by-step training with teachers on benchmarking and progress monitoring, moving high school benchmarking online, and hiring more RTI² District staff to work one-on-one with high schools. Provide training as early as possible during in-service or at the beginning of the school year.
- Give high schools a projected roster of 9th graders (based on feeder schools) and their spring benchmark scores in the spring/summer so schools can plan for staffing and course needs.
- Reduce the number of benchmarks from three times to twice a year (state only requires one benchmark) by deleting the winter benchmarking. Use fall benchmark to schedule spring semester classes and spring benchmarking to schedule fall semester classes.

Best Practices for New RTI² Leads

We asked the Leads what advice they would give to new RTI² Leads based on their experiences and lessons learned. Most of the best practices they identified focused on planning, preparation, and team work:

- Schedule interventions versus doing pull-outs
- Scheduling on the front end is key to success; work with administrators and counselors to have classes built in the schedule to place students
- Get training early, including summer training. During in-service or in the first or second week of semester, sit down with RTI² District Team staff to go over process
- Meet with school psychologist to learn about the process, including doing fidelity checks
- If you know who your teachers are, pull them together early
- Have principal and/or RTI² Leads make assignments to data team members on the front end, like doing fidelity checks
- Have separate data team meetings for SPED and Gen Ed
- Garner support from the top, the principal, to back you up; more possible now that it is part of principals' evaluations
- Be a strong advocate for the program and get assistance from a group of staff
- Provide incentives for students making progress (e.g., pizza party, gift cards, certificate/award, public recognition on wall) because it helps kids want to work

The RTI² Team initiated planning and collaboration efforts with a cross-functional advisory team to enact changes that align with the recommendations above. In March 2018, the advisory team discussed the focus group findings and made the following suggestions:

- Use a predictive early warning system (EWS) as screener instead of MAP
- Reduce benchmarking to 1-2 times based on EWS
- Conduct PD in Zone meetings right after school to increase high school attendance
- Support development and sharing of 9th grade intervention roster in the spring/summer to high schools based on feeder patterns

Moreover, Academics requested additional school- and district-level staff as a FY19 investment to support improved RTI² implementation and quality of interventions provided to students.

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