Reaching the Next Level in Intervention Management:

Evaluating Preliminary Outcomes of a Cloud-Based RTI/MTSS Program

BRANCHING MINDS

Introduction

The 2004 reauthorization of the Individuals with Disabilities Education Improvement Act (IDEA 2004) mandated the use of evidence-based instruction as part of identifying children with learning challenges. As a result, school districts across the country have implemented a Response to Intervention (RTI) or Multi-tiered System of Support (MTSS) approach as a way to systematically respond to academically and behaviorally at-risk students by providing targeted interventions and monitoring students' progress [1 2 3]. Studies have shown that the implementation of RTI/MTSS practices is associated with improvements in students' academic performance [4 5 6] and behaviors [7]. Yet, it is evident that RTI/MTSS effectiveness relies on high-quality implementation [8] and many school administrators and teachers have reported difficulty implementing the core components of RTI/MTSS with fidelity [9 10 11 12]. Given these challenges, the current study examined the feasibility and preliminary outcomes of a web-based RTI/MTSS program, which aimed to provide school leaders and teachers with the guidance and structure necessary to implement a successful RTI/MTSS practice.

MTSS Theory and Challenges

The underlying theoretical framework of RTI/MTSS proposes that when students are given an effective intervention, their responsiveness to that intervention can be used to identify whether additional services or interventions are required [8 3]. Therefore, to appropriately implement RTI/MTSS, teachers need to be able to identify why a student is struggling so they can then select an intervention that will effectively target the given issue. However, educators tend to rely on curriculum-based measures (CBMs), which identify subject areas that a student is struggling with but do not identify the underlying cause of a student's learning challenges [13]. If a teacher cannot accurately identify a student's learning issues, selecting an appropriate intervention to remediate those issues is difficult.

The RTI/MTSS theoretical framework also includes the use of data-based decision-making to determine whether a student has responded to the given intervention [8 3]. This process requires that teachers systematically track ongoing interventions and supports as well as the administration and results of progress monitoring assessments. This is often the most challenging component of RTI/MTSS models, and teachers and school administrators have reported difficulty with the collection and interpretation of student data [10 11].

Branching Minds' Approach

Branching Minds (BrM) was designed to help schools and districts overcome the challenges of implementing RTI/MTSS by providing teachers and school leaders with the guidance and structure necessary to implement a successful RTI/MTSS practice. To do this, we created a web application that helps teachers understand students' learning challenges, recommends research-based interventions for those learning needs, and tracks and reports on students' progress. The program—used individually by classroom teachers and collaboratively by RTI/MTSS teams—is intended to improve the implementation of the RTI/MTSS and ultimately student outcomes. BrM covers literacy, math, and behavioral issues for students K-8. BrM is delivered via an online web-based application and is platform-agnostic (functional on any mobile, tablet, and computer device).

Current Study

In order for a technology-based program to be successful, it is important that it demonstrates feasible application in schools [14] [15]. Therefore, in evaluating Branching Minds, we first start by examining teacher engagement. Additionally, in order for RTI/MTSS to be successful in schools, teachers need to feel empowered and capable of supporting their struggling students [16] [17]. For this reason, we next look at the impact of using Branching Minds on teachers' perceptions of their own ability to support struggling students. Finally, we examine how using Branching Minds as part of the RTI/MTSS practice influences student achievement in reading and mathematics.

Key Findings

- ✓ Schools are able to implement the Branching Minds program with high levels of teacher engagement for delivering RTI/MTSS
- ✓ The use of Branching Minds shows potential to improved teacher confidence in their own ability to support struggling students
- ✓ Supporting students on Branching Minds improves academic performance in reading and mathematics

Methods

Participants

Data were collected from teachers and students from four elementary schools within a school district in suburban New Jersey. The district is public, mid-low performing (27% and 19% of students proficient on state assessment in reading in math, respectively), mid-high poverty (68% of students receiving free or reduced lunch) with a K-12 enrollment of approximately 3,500 students.

Measures

Teacher engagement with the platform was measured via user analytics. Specifically, teachers' use of the platform to document their observations, create intervention plans, intervention selection, and data entry was monitored across the two years.

Data from RTI/MTSS Beliefs and Skills Survey [16] [17] were collected from teachers at the start and completion of the 2016-17 school year.

Scores from the Northwest Evaluation Association (NWEA) Measure of Academic Performance (MAP) were collected at three time points in the 2015-16 school year and two time points in the 2016-17 school year. The MAP assessment provides a standardized, nationally normed percentile for reading and math, which was used to evaluate student progress. These assessments have demonstrated evidence of reliability and validity when used with elementary school students (NWEA, 2004).

Student gender, race, grade, individual education plan (IEP) status, and socioeconomic status defined by free/reduced lunch (FRL) were also collected from all students at participating schools.

Results

Feasibility and Teacher Engagement

Across the four schools, 237 teachers were eligible to use the Branching Minds program. One hundred and fifteen teachers (49%) had some level of engagement with the program over the two-year period. Out of those 115 teachers, 102 (89%) used the platform to document student observations, 36 (31%) authored an intervention plan, 84 (73%) were assigned an intervention activity or progress monitoring assessment, and 74 (64%) completed an intervention activity or entered progress monitoring data. These numbers are consistent with teachers' roles and responsibilities for implementing RTI/MTSS, therefore, the program was used with high levels of engagement.

Teachers' Perception of Skills

Over the course of the year, the perception of teachers' own ability to support struggling students increased by 9.7% for teachers who used Branching Minds, and decreased by 2.5% for teachers who did not use Branching Minds. Additionally, the beliefs in the importance of RTI/MTSS increased by 2.9% for BrM teachers and decreased by 1% for non-BrM teachers. These differences were not statistically significant, likely due to a low response rate of 34 teachers.

Academic Achievement

We also examined students' academic performance on the NWEA MAP assessment over the course of the pilot. Students supported on BrM made significant reading gains over comparable students not supported on BrM, such that BrM students improved an average of 5 percentile points, whereas non-BrM students decreased an average of .3 percentile points over the course of 1.5 years, $t(137) = 2.2$, $p = .028$, $d = .38$. See Figure 1.

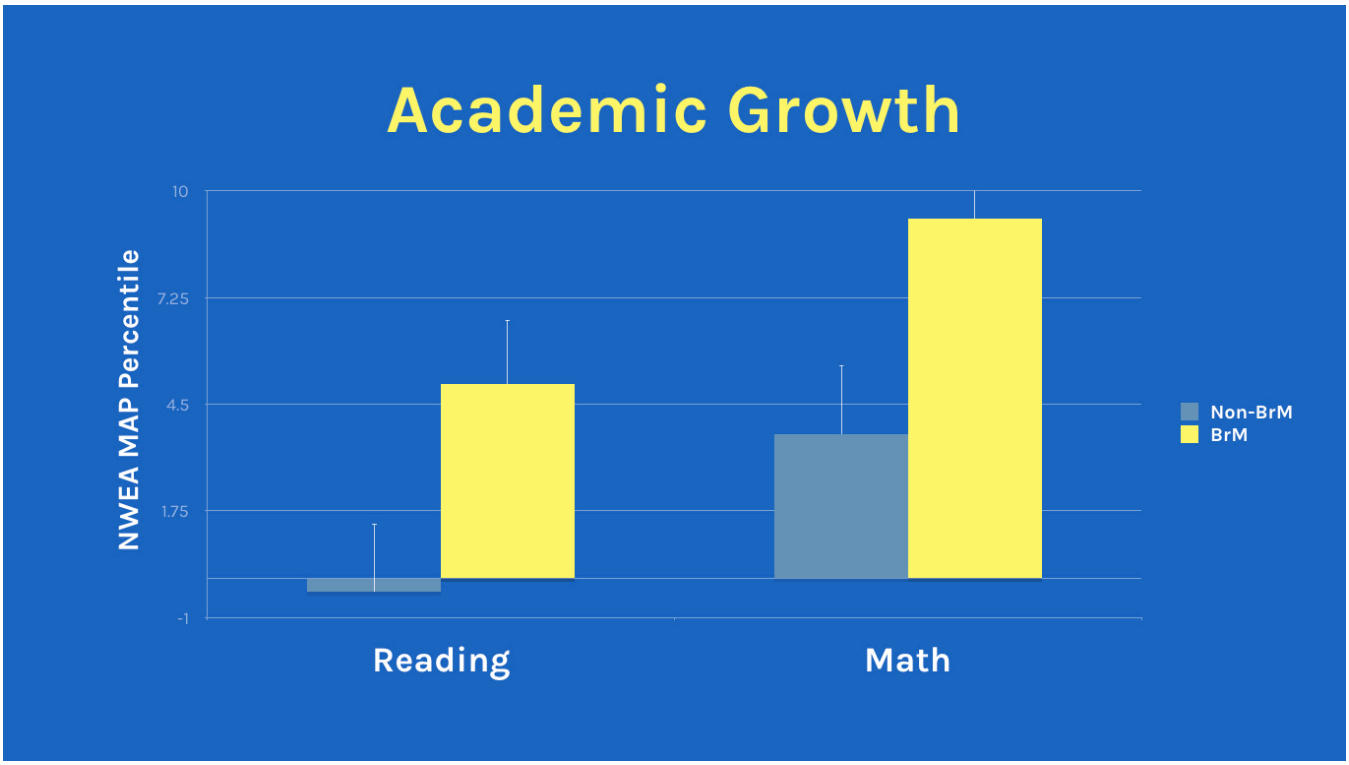

Figure 1: Percentile change in reading and math for BrM and Non-BrM students over 1.5 years

While, the difference between groups was not statistically significant until 1.5 years, the performance gap emerged after just one year. See Figure 2.

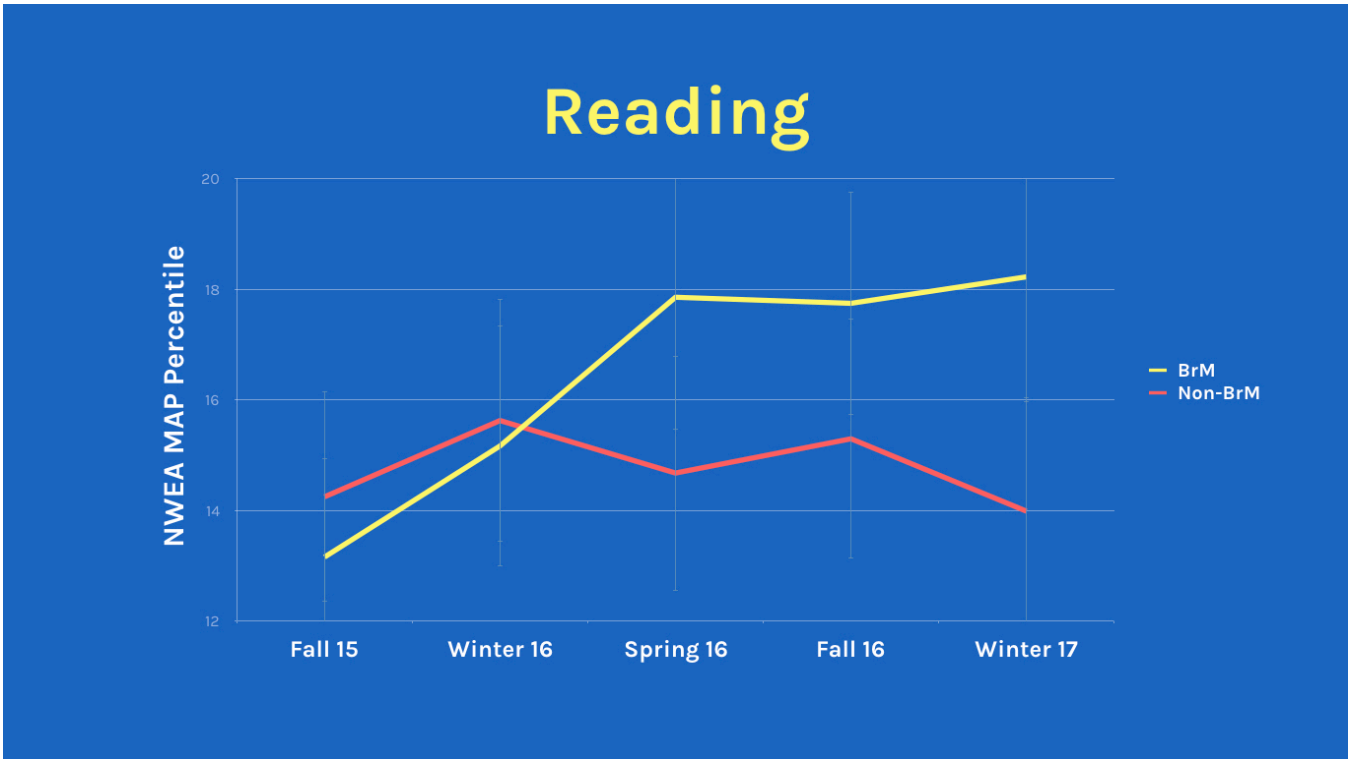

Figure 2: NWEA MAP Reading percentiles for BrM and Non-BrM Students over the course of the pilot

Additionally, students supported on BrM made significant mathematics gains over comparable students not supported on BrM, such that BrM students improved an average of 9.3 percentile points, whereas non-BrM students increased an average of 3.7 percentile points over the course of 1.5 years, $t(130) = 2.4$, $p = .019$, $d = .41$. See Figure 1. The difference in performance between the groups was statistically significant after just one year. See Figure 3.

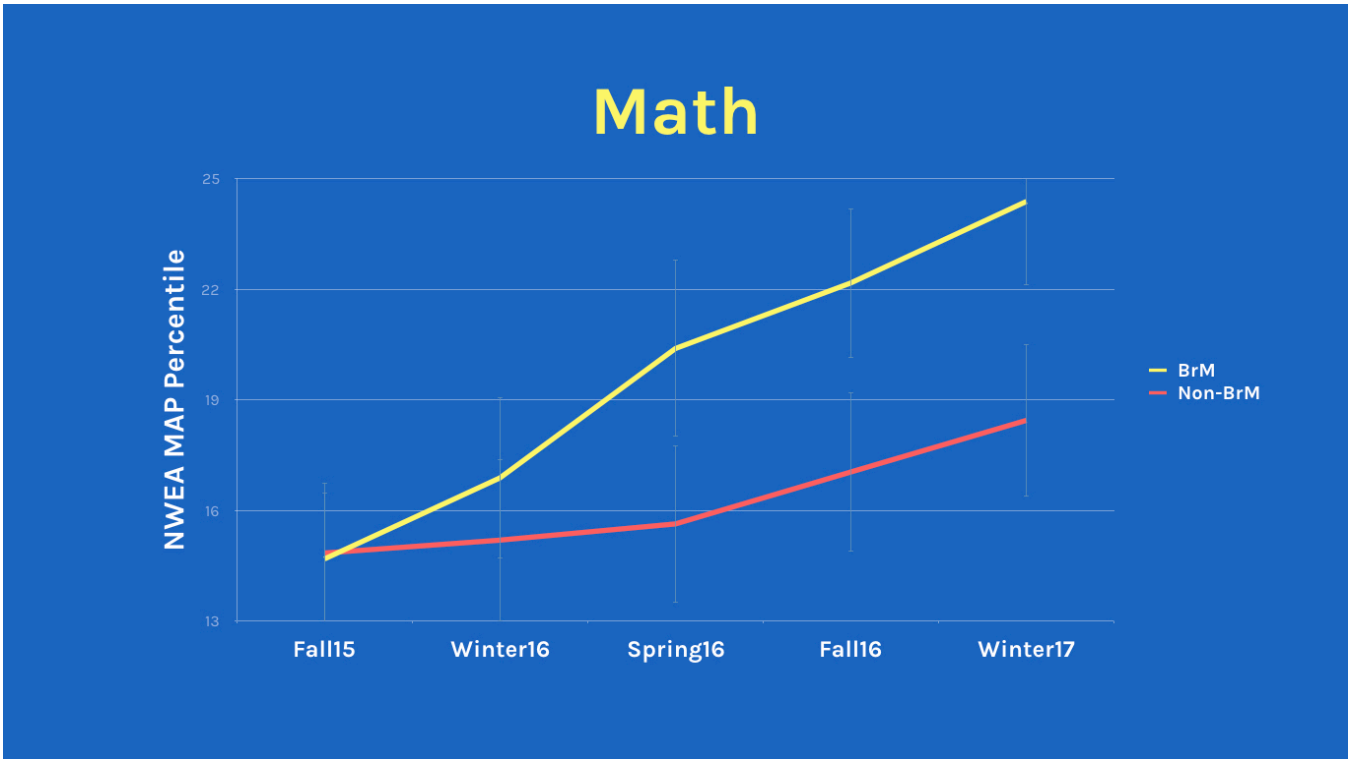

Figure 3: NWEA MAP Mathematics percentiles for BrM and Non-BrM Students over the course of the pilot

Concluding Remarks

Branching Minds was designed to reduce the burden of implementing RTI/MTSS by helping teachers and schools work together to understand student learning needs, find evidence-based interventions aligned to those needs, and seamlessly monitor and report on progress. The goal of this study was to evaluate the impact of using Branching Minds as a RTI/MTSS platform on students' academic achievement. We reported 4 main findings:

- ✓ As a technology-based platform, it is feasible to implement Branching Minds and expect strong teacher engagement.
- ✓ Branching Minds shows potential to improve teachers' perceptions of their own ability to support struggling students, though more data are needed
- ✓ Students supported on Branching Minds made statistically significant gains in reading (an average increase of 5 percentile points) over similar students not supported on Branching Minds (an average decrease of .3 percentile points).
- ✓ Students supported on Branching Minds made statistically significant gains in mathematics (an average increase of 9.3 percentile points) over similar students not supported on Branching Minds (an average increase of 3.7 percentiles points).

References

1. National Center for Learning Disabilities (2014). The state of learning disabilities: Facts, trends, and emerging issues, third edition. National Center for Learning Disabilities: New York.
2. Fletcher, J. M., & Vaughn, S. (2009). Response to Intervention: Preventing and remediating academic difficulties. Child Development Perspectives, 3, 30–37.
3. 3. Vaughn, S., & Fuchs, L. S. (2003). Redefining learning disabilities as inadequate response to instruction: The promise and potential problems. Learning Disabilities Research and Practice, 18, 137–146.
4. O'Connor, R. E., Bocian, K. M., & Beach, K. D. (2013). Special education in a 4-year response to intervention (RTI) environment: Characteristics of students with learning disability and grade of identification. Learning Disabilities Research and Practice, 28, 98–112.
5. Otaiba, Al, S., Connor, C. M., Folsom, J. S., Wanzek, J., Greulich, L., Schatschneider, C., & Wagner, R. K. (2014). To wait in tier 1 or intervene immediately: A randomized experiment examining first-grade response to intervention in reading. Exceptional Children, 81, 11–27.
6. Valenzuela, V. V., & Gutierrez, G. (2014). Response to intervention: Using single-case design to examine the impact of tier 2 mathematics interventions. School Psychology Forum, 8, 144–155.
7. Fairbanks, S., Sugai, G., & Guardino, D. (2007). Response to intervention: Examining classroom behavior support in second grade. Council for Exceptional Children, 73, 288–310.
8. 8. VanDerHeyden, A. M., Witt, J. C., & Gilbertson, D. (2007). A multi-year evaluation of the effects of a Response to Intervention (RTI) model on identification of children for special education. Journal of School Psychology, 45, 225–256. doi:10.1016/j.jsp.2006.11.004.
9. Pyle, A. (2011). Considering coherence: Teacher perceptions of the competing agendas of RTI and an existing special education model. Exceptionality Education International, 21, 66-81.
10. Werts, M. G., Carpenter, E. S., & Fewell, C. (2014). Barriers and benefits to response to intervention: Perceptions of special education teachers. Rural Special Education Quarterly, 33, 3–11.
11. Werts, M. G., Lambert, M., & Carpenter, E. (2009). What special education directors say about RTI. Learning Disability Quarterly, 32, 245-254. doi:10.2307/27740376.
12. Sansosti, F. J., Goss, S., & Noltemeyer, A. (2011). Perspectives of special education directors on response to intervention in secondary schools. Contemporary School Psychology, 15, 9–20.
13. Fuchs, D., Fuchs, L. S., & Compton, D. L. (2012). Smart RTI: A next-generation approach to multilevel prevention. Exceptional Children, 78, 263–279.
14. Means, B. (2010). Technology and education change: Focus on student learning. Journal of Research on Technology and Education, 42, 285–307.
15. Noeth, R.J., & Volkov, B.B. (2004). Evaluating the effectiveness of technology in our schools. ACT Policy Report. ACT, Inc.
16. Castillo, J.M., Dedrick, R.F., Stockslager, K.M., March, A.L., Hines, C.V., & Tan, S.Y. (2015). Development and initial validation of a scale measuring the beliefs of educators regarding response to intervention. Journal of Applied School Psychology, 31, 1-30.
17. Castillo, J.M., March, A.L., Stockslager, K.M., & Hines, C.V. (2016). Measuring educators' perceptions of their skills relative to Response to Intervention: A psychometric study of a survey tool. Assessment for Effective Intervention, 41, 94-108.
18. Northwest Evaluation Association (2004). NWEA achievement level tests and measures of academic progress. Northwest Evaluation Association: Oregon.