

2016-17 Evaluation of Reasoning Mind

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EA17-512-4

At-a-Glance

In 2016-17, 29,714 Dallas Independent School District (ISD) students at 147 campuses used the Reasoning Mind (RM) mathematics curriculum. All district second- and third-grade teachers (except at Dealey, Mata, H. Stone, and Solar Preparatory) were required to use RM in 2016-17, but RM was optional for fourth- and fifth-grade teachers. RM was supplemental to the district curriculum in grades two to four, which means teacher time was split between using district and RM curricula. RM served as the full curriculum for grade five. The 2016-17 budget was \$1,763,660. The purpose of this report was to summarize 2016-17 RM implementation findings, campus staff survey findings, and mathematics assessment outcomes.

Methodology

The *Dallas ISD Reasoning Mind Evaluation Framework* developed by Bush and Kim (2015) was used to guide the evaluation. Context and process information were gathered from internal documents, the RM web site, and interviews with RM and Dallas ISD program staff. The lead evaluator held interviews with RM staff members in December and an interview with the district mathematics director in March. Student data were extracted from the October 2016 Public Education Information Management System (PEIMS) file and RM files. Frequency and descriptive analyses were used to examine student demographic characteristics, student use of RM, and teacher training completion rates. Quantitative and qualitative analyses were conducted for campus staff surveys, which were administered in January and February 2017.

Outcome analyses were carried out to determine how RM students performed on Spring 2017 mathematics assessments. These included *TerraNova*¹ and *State of Texas Assessments of Academic Readiness*² (STAAR). There were four main limitations of the analyses. First, achievement results could not be attributed solely to RM due to (a) the inability to create a comparison group for grades two and three and (b) the district's use of RM as supplemental to regular instruction in grades two to four (e.g., it is not possible to know how much achievement results should be attributed to RM and how much they should be credited to teacher instruction based on district curriculum). Second, implementation fidelity

continued to be a confounding factor as a sizeable proportion of students in all grades did not meet RM expectations for implementation. Third, there was possible selection bias between treatment and comparison groups for fourth and fifth grades.³ Fourth, per the spring 2017 RM teacher survey, a sizable percentage of teachers (23% to 55%) used additional mathematics programs such as Think Through Math.

Correlation coefficients were computed to note strength of relationships between test scores and RM indicators. Crosstab analyses were carried out to study the link between RM and achievement. Multiple regression analyses were conducted for each grade level to determine which RM indicators best predicted students' achievement scores. For fourth- and fifth-grade, multiple regression was used to determine if there were statistically and practically significant differences between RM and non-RM comparison group students.⁴

What were the demographic characteristics of students involved in Reasoning Mind?

A total of 29,714 students were enrolled in RM during 2016-17. This included 12,076 (93%) of the district's second-grade students, 12,368 (94%) of the district's third-grade students, 4,702 (36%) of the district's fourth-grade students, and 568 (5%) of the district's fifth-grade students. The percentage of students enrolled in RM decreased from Fall 2015 to Fall 2016 for all grades. It was especially notable that the number enrolled in fourth grade steadily decreased from 9,218 (119 schools) in Fall 2014 to 6,152 (81 schools) in Fall 2015 to 4,702 (73 schools) in Fall 2016. Most 2016-17 RM students were economically disadvantaged (89%) and Hispanic (71%). Half (51%) were English language learners (ELLs).

Did staff members participate in Reasoning Mind training as planned?

Seventy-one percent of first-year teachers completed the RM Qualification Course (QC) by the end of the first six weeks, which means 29 percent did not. Thus, many students could not begin using RM until later in the school year. About 15 percent ($n=135$) of the district's

¹ Data reported as of 7/19/17. Updates received after 7/19/17 are not reflected in this report.

² Data reported as of 6/15/17. Updates received 6/15/17 are not reflected in this report.

³ It is unknown how principal decision to opt in or out of using RM affected the treatment and comparison groups.

⁴ Propensity score matching (PSM) was used to create matched comparison groups of non-RM fourth- and fifth-grade students.

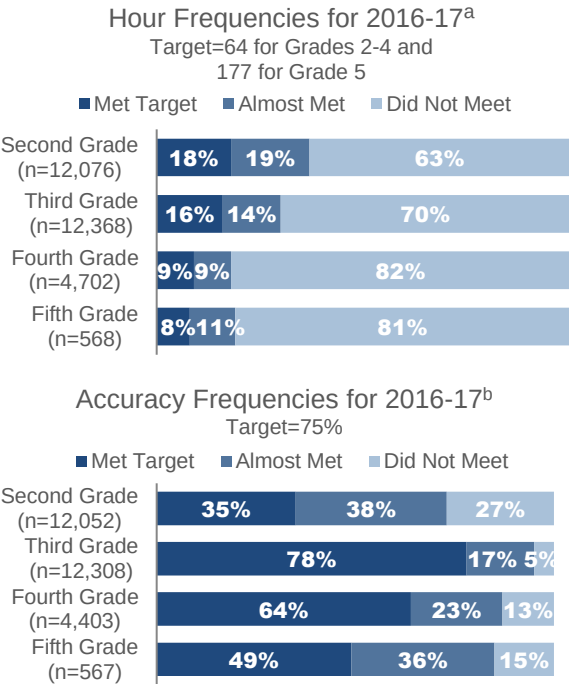
almost 900 RM teachers opted to participate in additional RM professional development (PD) during the fall semester. Also, approximately 94 district staff members (teachers, campus administrators, central administrators) participated in RM's 2016 Dallas Math PD Conference, which was held in October 2016.

Was the Reasoning Mind program used by students as planned?

Implementation fidelity continued to be a concern as the majority of campuses were classified as low implementing for second (66%), third (68%), fourth (85%), and fifth (89%) grades; this was of concern especially for fifth grade since RM served as the full curriculum.

Consistent with past years, a sizeable percentage of students in all grades did *not* reach the grade-level hour target for 2016-17 (see Figure 1). There were noticeably more fourth- and fifth-grade students (82% and 81%, respectively) in the “did not meet” category than second- and third-grade students (63% and 70%, respectively). For the accuracy target, many third- (78%) and fourth-grade (64%) students met the target, while less than 50 percent of second- (35%) and fifth-grade (49%) students met the target.

Figure 1: 2016-17 RM Student Hour and Accuracy Results



Source: PEIMS data (10/31/16); RM data (1/12/17 and 6/19/17).
 Note: The number of students with hour and accuracy data differ for each grade because some students did not have accuracy data.
^a Met=Logged 100% of expected hours. Almost Met=Logged 80 to 99% of expected hours. Did Not Meet=Logged less than 80% of expected hours. ^b Met=Attained Guided Study Level A accuracy rate of 75% or higher. Almost Met=Accuracy rate between 60 and 74%. Did Not Meet=Accuracy rate of less than 60%.

What were teacher and administrator perceptions of Reasoning Mind?

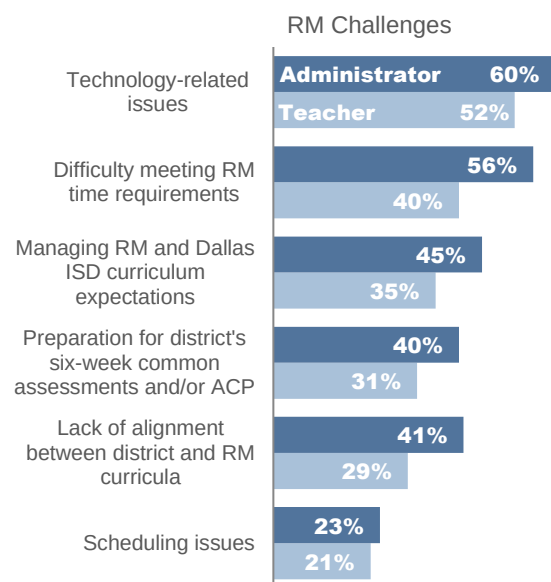
Per interviews with RM and district staff, the RM project director, RM implementation coordinators (ICs), and the district mathematics director viewed RM's single objective curriculum (SOC) and SOC PD as successes related to 2016-17 program implementation. Other successes included improved communication between RM and School Leadership due to the involvement of academic facilitators, more customized RM support based on individual campus needs, RM's 2016 Dallas Math PD Conference, principal focus group, and RM's online live tutoring. Barriers to implementation included technology problems; limited communication between RM, Teaching and Learning, and School Leadership staff; less available staff for campus support; high IC turnover; reduced budget; and teachers' preparation for the district's six-week common assessments.

As in previous years, campus staff survey results revealed that teachers were more positive than campus administrators on the overall survey items. Most teachers (72% to 83%) believed students improved on key indicators (e.g., enjoyment of mathematics, confidence in mathematics ability, etc.). Some campus administrators and teachers reported technology issues, especially with laptops/computers on wheels (COW) carts (40% to 43%) and computers not charged/not holding their charge (29% to 34%). Between 23 percent and 55 percent of teacher respondents used other mathematics intervention programs (e.g., Think Through Math, Houghton Mifflin Harcourt Personal Math Trainer, etc.) in addition to RM.

In terms of RM successes, teachers (34% to 70%) were more positive than campus administrators (23% to 48%) with one exception. Over half of teachers indicated 4 of 10 areas as successes of using RM in 2016-17, whereas less than half of campus administrators indicated each area as a success. Campus administrators were more positive than teachers on RM's STAAR modules (46% and 34%, respectively).

The most cited challenges were technology issues and meeting RM time requirements (see Figure 2). Primary suggestions included aligning RM to district/state curriculum requirements and increasing access to working technology (see Figure 3).

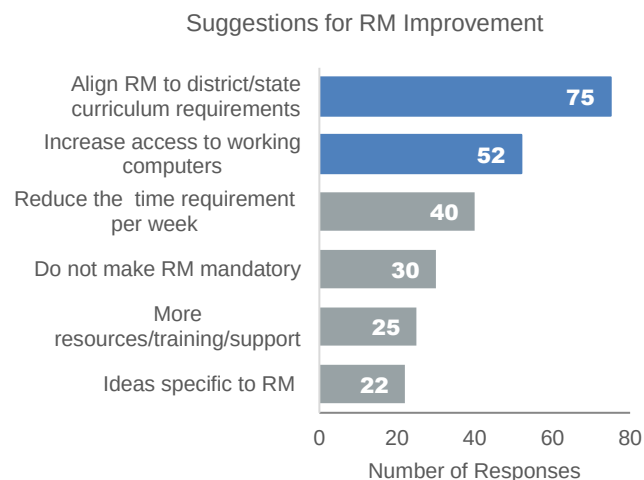
Figure 2: Campus Staff Survey Responses for RM Challenges



Source: RM campus staff (administrator and teacher) surveys administered in Spring 2017.

Note: Respondents could mark one or more category. This figure was limited to categories with 20 percent or more of respondents ($n=545$ for teachers and $n=229$ for campus administrators).

Figure 3: Campus Staff Survey Responses for Suggestions to Improve RM Implementation



Source: RM campus staff (administrator and teacher) surveys administered in Spring 2017.

Note: The figure shows the results of the open-ended item: "What suggestions do you have to improve the implementation of RM at your school?" Some respondents gave comments that fit into more than one category. Comments given by fewer than 20 respondents were excluded.

What were student mathematics achievement outcomes?

Outcome results were consistent with previous findings (Bush & Kim, 2016). RM students that met the accuracy target outperformed those who did not. Students that "met" the hour target tended to have slightly higher test scores than students in the "almost met" and "did not meet" categories; however, hour differences were not as pronounced as those for accuracy.

Likewise, students' mathematics scores were more highly correlated with accuracy ($r^2=0.52$ to 0.72) than with objectives completed ($r=0.26$ to 0.41) or hours online ($r=-0.10$ to 0.17). Multiple regression analyses showed that with the exception of fifth grade, RM accuracy, prior achievement, and RM objectives completed were major predictors of Spring 2017 assessment scores (see Table 1).

For the assessment comparisons for fourth-grade RM and non-RM comparison students, when prior achievement and economically disadvantaged status were accounted for, differences in STAAR 2017 scale scores between the two groups were statistically significant (favoring RM students) but showed no practical significance ($f=0.03$).⁶ As for fifth grade, there were no statistically or practically significant differences in STAAR 2017 scale scores between RM and non-RM comparison students.

Table 1: Multiple Regression Major RM Predictors of Spring 2017 Mathematics Scores

Grade	Major Predictors	β	p	Variance Explained
2 ($n=10,012$)	Accuracy	.40	<.001	64%
	Prior Achievement	.40	<.001	
	Objectives Completed	.17	<.001	
3 ($n=9,719$)	Accuracy	.33	<.001	63%
	Prior Achievement	.48	<.001	
	Objectives Completed	.12	<.001	
4 ($n=2,481$)	Accuracy	.26	<.001	65%
	Prior Achievement	.57	<.001	
	Objectives Completed	.07	<.001	
5 ($n=521$)	Accuracy	.25	<.001	71%
	Prior Achievement	.63	<.001	

Source: PEIMS district data (10/31/16); RM data (1/12/17 for fall and 6/19/17 for spring); TerraNova (7/19/17); STAAR (6/15/17).

Note: TerraNova NCE scores were used for second grade. STAAR scale scores were used for grades three to five.

Recommendations

- **Ensure higher levels of implementation for 2017-18 RM campuses.** Across grade levels, there were more campuses in the "low" implementing category than in the "medium" and "high"

⁵ For the correlation coefficient (r), absolute values of .1, .3, and .5 are considered to be small, medium, and large, respectively (Cohen, 1988).

⁶ Cohen's f values of .10, .25, and .40 are considered small, medium, and large, respectively (Cohen, 1988).

implementing categories. Strong implementation of RM is important to effectively impact student achievement and to ensure the district receives an adequate return on its investment of \$1,763,660. As a result, the district should ensure higher levels of RM implementation for all RM campuses in 2017-18.

- **Make sure teachers receive adequate guidance on how to meld two different curricula (district and RM) using SOC.** In an effort to alleviate the lack of alignment concern between district and RM curricula, RM introduced SOC in 2016-17 and provided SOC webinars for teachers between December 2016 and February 2017. SOC allows teachers to customize the RM curriculum to district curriculum. It is important to make certain that every teacher recognizes the availability of SOC and has sufficient guidance on how to customize the RM curriculum to district curriculum as needed.
- **Strategically plan for next year's RM QC training to make sure more teachers complete the QC prior to or at the onset of the 2017-18 school year.** A notable percentage of teachers (29%) did not complete QC training by the end of the first six weeks of Fall 2016. Although completion rates increased by eight percentage points from Fall 2015, the results meant that many students could not use RM until after the first six weeks of the school year. As recommended in the past, the district needs to make sure more teachers complete the QC prior to or at the start of the school year.
- **Increase communication between RM, School Leadership, Teaching and Learning, and Information Technology staff members.** Per interviews with RM and district staff, limited communication between RM, School Leadership, Teaching and Learning, and Information Technology staff continued to be problematic. Ongoing communication is needed to overcome barriers to implementation, strengthen campus support, and ensure the district is receiving a good return on its investment in RM (time and funds allocated).
- **Make certain all campuses have adequate working technology and are reporting issues to Information Technology as problems occur.** Technology issues continued to be a challenge based on surveys and interviews. It will be important to continue to add and upgrade campus technology while ensuring ample campus support and timely submission of tickets to Information Technology.

References

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The full 2016-17 report can be found at www.dallasisd.org/Page/888. For more information, please contact Program Evaluation at evaluation@dallasisd.org.

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