

REASONING MIND:

Results for the 2010-2011 School Year

Reasoning Mind's annual report
on the program's impact



Nataliya Yufa, Ph.D., Senior Analyst
Jesse Obbink, Director of Development

Executive Summary

In 2010-2011, over **19,000** children studied in Reasoning Mind. Data from several school districts were collected and analyzed. This report summarizes the findings. Here are the main results:

- ✓ In independent evaluations as well as internal ones (including a randomized controlled trial), Reasoning Mind students outperformed their non-RM peers on state tests, including the Texas TAKS, the California CST, and the Louisiana LEAP.
- ✓ Reasoning Mind benefits students of all ethnicities, irrespective of their socioeconomic status.
- ✓ Students who had Reasoning Mind go on to have higher passing rates in Algebra I, a course which is known to be an important gatekeeper to success in college and beyond.
- ✓ As seen in prior years, quality of implementation matters: Students at schools that allocate enough time to the program (at least 1-2 hours per week) and follow Reasoning Mind's recommendations do better with the program and show stronger results.
- ✓ As schools get more experience with Reasoning Mind, they obtain better results. The strongest results come from veteran schools with experienced Reasoning Mind teachers.

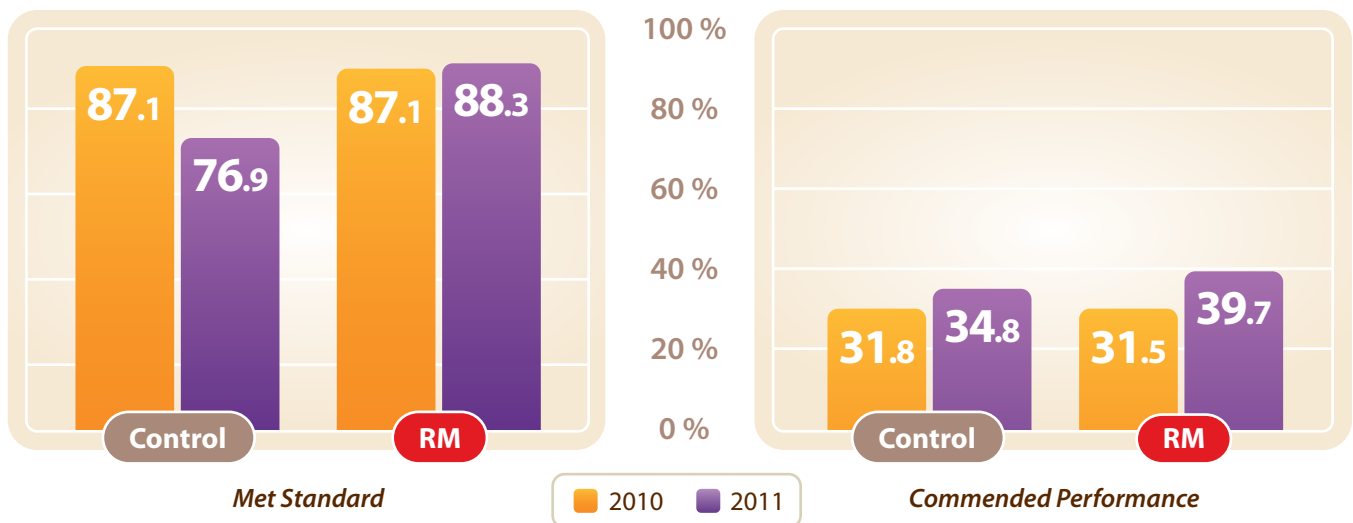
These findings attest that Reasoning Mind is maintaining its high standards of educational quality while dramatically scaling up the number of students and schools using the program. The findings also confirm the importance of giving students enough time online, securing buy-in from administrators and teachers using the program, and providing robust teacher support and professional development.

Independent evaluations confirm Reasoning Mind's effectiveness

Two independent evaluations of Reasoning Mind have recently been completed analyzing 2010-2011 data: one in the Houston Independent School District (HISD) and another in the Beaumont Independent School District (BISD). Both studies involved a large number of students and found that students experienced a significant positive impact on their TAKS (Texas Assessment of Knowledge and Skills) standardized test scores in mathematics after studying with Reasoning Mind for one year.

Houston Independent School District

The first independent study was conducted by the Houston Independent School District itself. In this evaluation, the HISD matched students on the basis of prior performance, race, socio-economic status, and gender to create a pool of control students with demographics similar to those of the RM cohort. The sample size was 1,375 4th grade Reasoning Mind students, who used the program as a supplement, matched with 2,458 other students. In addition to comparing test score data, the study surveyed Reasoning Mind students and teachers.



In 2010, before any of the students had used Reasoning Mind, the percentage of students who met TAKS passing standards was the same for RM and control-group students. However, RM students achieved an increase in the proportion of students who met the state's passing standard by 1.2 percentage points, while the control group showed a substantial decrease in their "met standard" rate of -10.2 percentage points. The "commended" rates of the two groups also diverged. While both groups began with a similar rate of students achieving commended performance on the TAKS, at the end of the one-year trial period the percentage of Reasoning Mind students achieving "commended" scores had increased by 8.2 percentage points, while the percentage of non-Reasoning Mind students achieving "commended" scores had increased by only 3.0 percentage points.

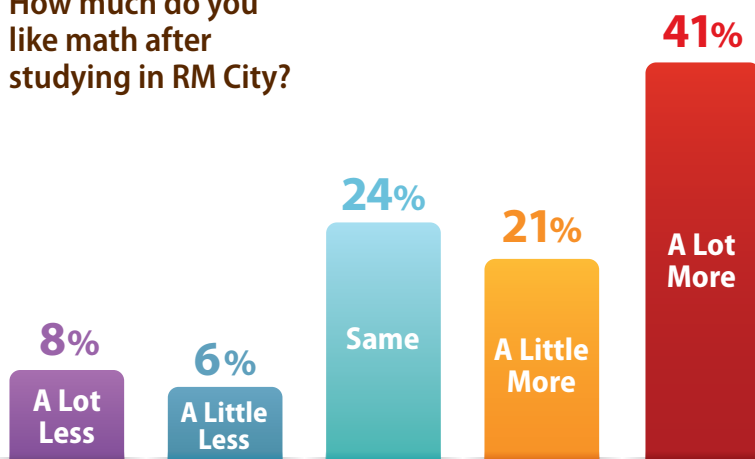
“Gains in the mathematics performance, particularly among historically underperforming student groups in mathematics, provide evidence of the benefits of the program. Continued support for these students in mathematics might continue to contribute toward closing the achievement gaps.¹”

Beaumont Independent School District

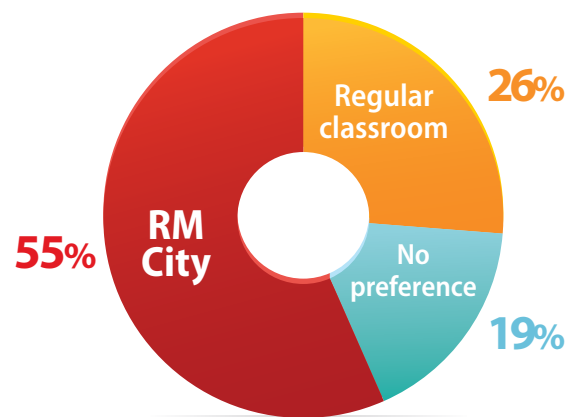
The independent evaluation of the Beaumont ISD 5th grade implementation was conducted by Drs. Houston (University of Houston) and Waxman (Texas A&M University). In this evaluation, schools chose to opt in to the program, forming the treatment group (n=637). The opportunity to choose to take part in the program may have led to greater administrative support and involvement at the school level. The comparison group consisted of the rest of the students in the district (n=777). The evaluation examined student performance on standardized tests, student attitudes toward mathematics, and student and teacher attitudes toward Reasoning Mind. Houston and Waxman drew the following conclusions:²

- ✓ Overall, the Reasoning Mind program was effective; 5th grade students who used the program in Beaumont ISD had significantly higher TAKS mathematics achievement scores in 2011 than those 5th grade students in comparison schools in Beaumont ISD.
- ✓ These findings are robust in that there are significant positive effects of the program even after statistically controlling for the prior year's academic achievement and students' socio-economic status.
- ✓ The Reasoning Mind program was equally effective for males and females as well as students from all ethnic groups.

How much do you like math after studying in RM City?



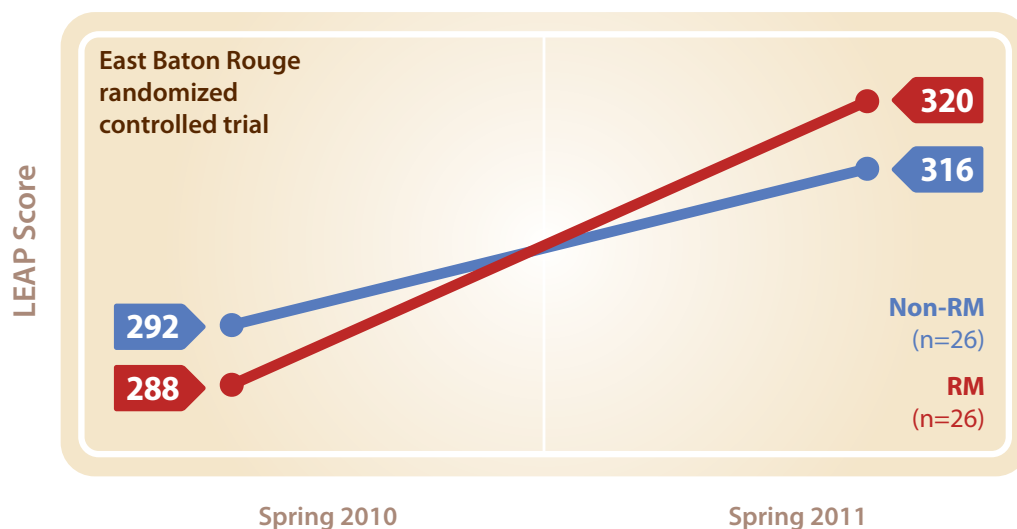
How would you like to study math next year?



Over 300 Reasoning Mind students took the anonymous survey to assess their views of mathematics and the program. The results show that 41 percent liked math a lot more and 21 percent liked it a little more after using Reasoning Mind. Of the students who had a preference, two times more (55%) wanted to study in Reasoning Mind than in a regular classroom (26%).

Reasoning Mind shows positive results in a randomized controlled trial

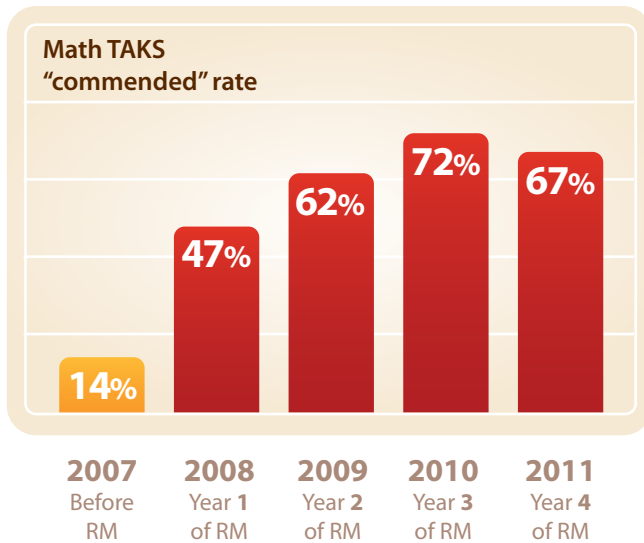
Randomized controlled trials in education are rare: Education helps determine a child's future, so school administrators are (understandably) often reluctant to randomly assign students to intervention or control groups. In the last academic year, however, Reasoning Mind was able to conduct a true randomized controlled trial – the gold standard of research.



Reasoning Mind's 2nd–4th grade curriculum is not intended as a test preparation program. Rather, it is a foundational curriculum, designed to give students higher-order reasoning skills and prepare them for success in future grades. Nevertheless, 2nd and 3rd grade students assigned to Reasoning Mind did just as well on district and state tests as non-Reasoning Mind students. Surprisingly, in 4th grade there was actually a large gain for the Reasoning Mind group (n=26). Although the students in this group started below the control group (n=26) on the state's mathematics exam (the Louisiana Educational Assessment Program, or LEAP), after a year of using Reasoning Mind, they were ahead.

Experience brings larger gains

It takes some time for teachers and administrators to gain experience with the program. Reasoning Mind's research suggests that schools begin reaching their full potential with Reasoning Mind 2-3 years into the project. For example, a small community school in Dallas (with approximately 40 students per grade level) began using Reasoning Mind in 2008 to try to remedy its low math TAKS "commended" rate. While the school historically had a strong passing rate, only 14% of 5th graders received a "commended" score in 2007.



With just one year of Reasoning Mind, the "commended" rate more than tripled, reaching 47% in 2008. In the following years, however, the school continued to see major gains with each successive cohort of students, ultimately reaching a "commended" rate of 72% in 2010 and a slightly lower one of 67% in 2011, when the state exam became harder. It is likely that Reasoning Mind's extensive teacher professional development, which focuses on best classroom practices, helped these teachers to become more comfortable and effective in teaching mathematics, allowing them to see better student results with time.

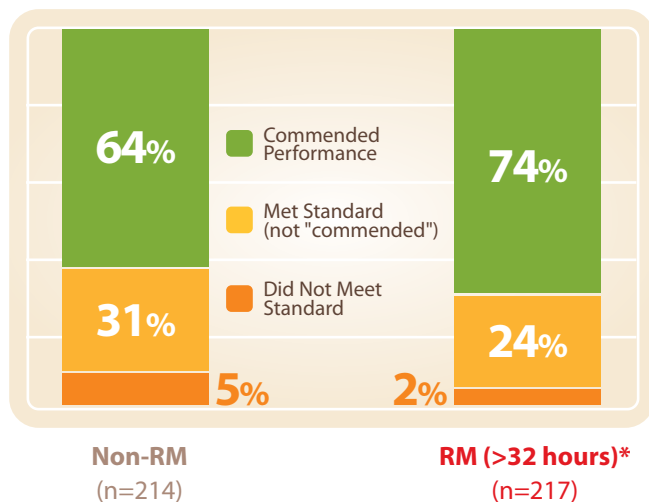
Teacher voices

“ I think RM is a great addition to our math curriculum and I would highly recommend it! ”

“ In my opinion, RM has given my students the opportunity to not limit themselves. They are allowed to make mistakes without feeling embarrassed. The Genie encourages them not to give up and [convinces them] that they will be successful. One student, who is extremely shy, with the help of the Genie has come out of his shell! He now has so much confidence in himself that he volunteers to be the "Genie Helper!" The RM program has allowed me to have more one-on-one sessions with my students who need that extra assistance. My hope and wish is that RM will become the standard in ALL schools!! My sidebar – Where was RM when I was in school? I sure could have used the Genie's help!! ”

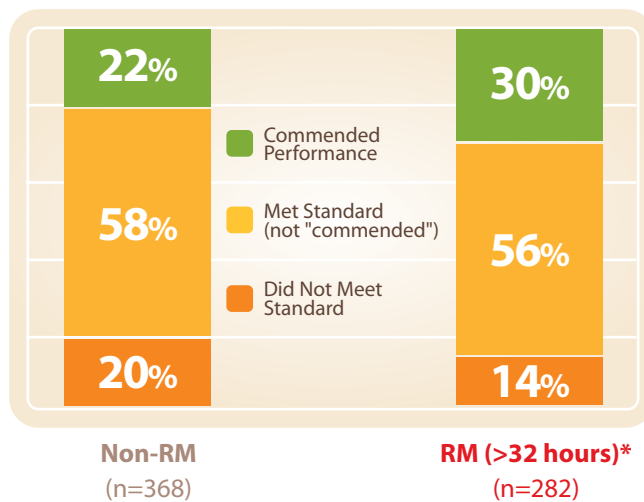
Reasoning Mind helps students reach their full potential

5th grade TAKS performance for students with “**commended**” scores in 4th grade



By providing an engaging curriculum, Reasoning Mind encourages more students to keep achieving at the highest level. In Beaumont ISD, a medium-sized district in Texas where 73% of students qualify for free lunch, 74% of the RM students who were “commended” in 4th grade stayed “commended” in 5th, compared to 64% for the non-RM group.

5th grade TAKS performance for students who **met standard** in 4th grade (but were not “commended”)



Similarly, the engagement provided by Reasoning Mind can help average students fulfill untapped potential.

Of the 4th grade students who passed the TAKS without receiving a “commended” score, 30% went on to become “commended” after one year of Reasoning Mind, compared to 22% for the non-RM population. Reasoning Mind students were also less likely to fail the TAKS in 5th grade (14% compared to 20% for the non-RM population).

* The group with 10-32 hours of RM usage had fewer than 10 students and is therefore not included in this analysis.

Student voices

“ It’s the best kid website ever. ”

“ RM city was the best way of learning new math, so RM city is awesome. ”

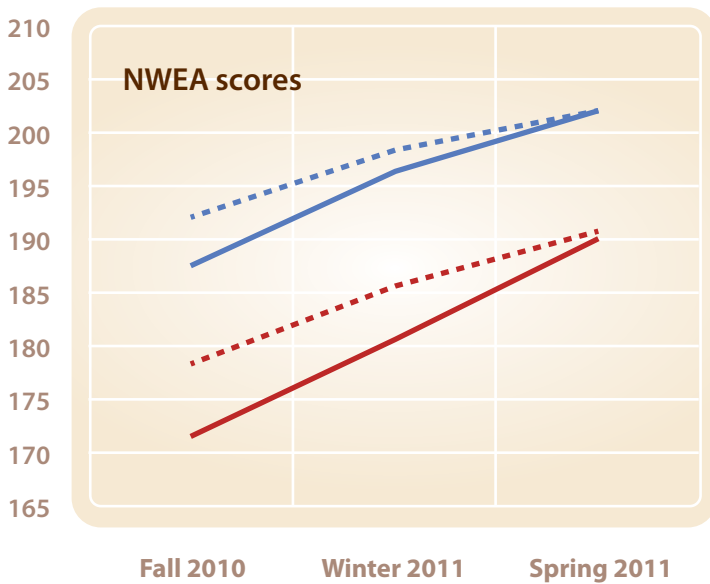
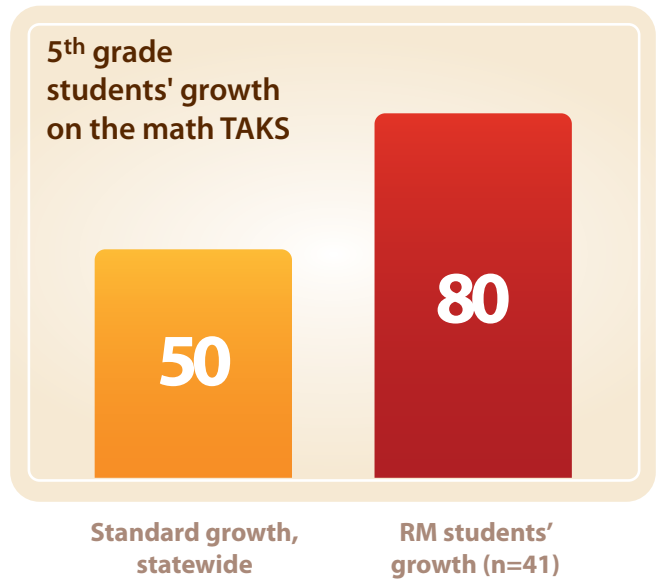
“ Thanks for helping me learn stuff I wouldn’t learn in just a [regular] classroom. ”

Reasoning Mind helps close the achievement gap

Growth on the TAKS

Because Reasoning Mind is flexible and self-paced, it is often used to help struggling students catch up. For example, a rural district in Texas assigned all the “bubble” students in 5th grade to the program for remediation. “Bubble” students are so-called because they are in danger of failing the state exam if they accidentally fill in one wrong bubble.

On the Texas state mathematics examination, 50 points of scaled score growth represents roughly one year of learning. After one year of Reasoning Mind, these students’ state mathematics test scores increased by 80 points on average, representing more than half a year’s gain against these students’ existing deficit.



Growth on the NWEA

Reasoning Mind experienced similar results in a Bay-Area school district in California, where the program was offered at struggling schools that were significantly below the county average in math performance. As demonstrated by their scores on the Northwest Evaluation Association’s Measures of Academic Progress, a nationally normed assessment, by the end of the year, these 2nd and 3rd graders had caught up to grade level.



“ I think RM city is the best math class I have ever been taught. ”

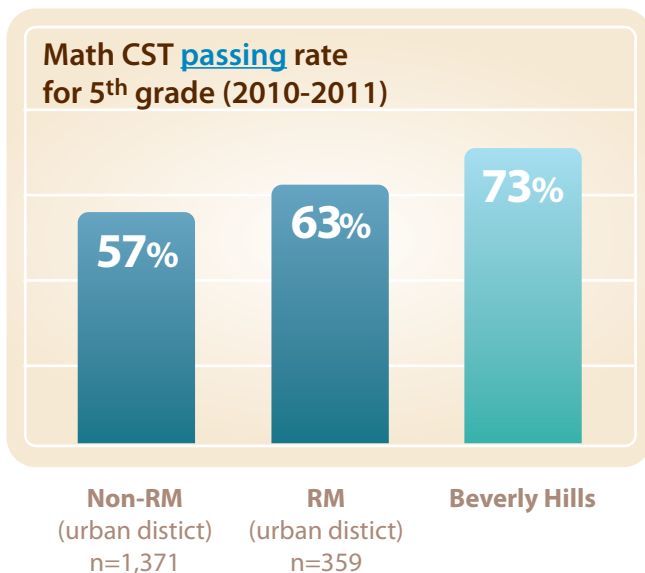
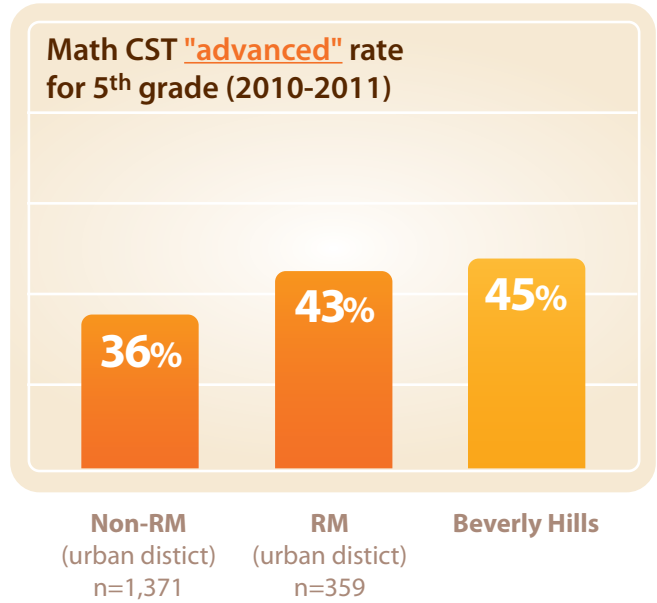
“ It was the BEST program in math I had EVER signed up to. ”

“ It helps me more and when I’m at home doing nothing and I want to practice math, I can just get on my computer. I also really like how you can do your homework online. ”

Growth on the CST

In a large urban district in California, where more than 75% of the students qualify for free lunch, all of the students attending the after-school program used Reasoning Mind. When the students began using Reasoning Mind, their mathematics achievement was on par with that of the rest of the district's students.

However, after using Reasoning Mind for a year or more, these students experienced major growth in their "advanced" rate (the highest rating on the California Standards Test). While the rest of this district achieved the highest rating for 36% of the students, students taking part in Reasoning Mind achieved this rating in 43% of cases, on par with the 45% "advanced" rate of the nearby Beverly Hills Unified School District.



The bar for passing on the CST is set high ("basic" level does not count as passing), so even Beverly Hills has only a 73% passing rate. While the rest of the urban district has a much lower passing rate of 57%, students on Reasoning Mind made up nearly one-half of the gap in the passing rate between their district and the much wealthier Beverly Hills, with 63% of them passing. This analysis included every student who used Reasoning Mind for at least 10 hours in the course of the year.

“ I hope this program keeps on going and never stops because this is a really good program. ”

“ It's a program that a lot of kids should use. We're very lucky to have this program because not much kids get the chance to have this program. ”

“ Thanks to RM city math is really easy for me to understand in a regular classroom. ”

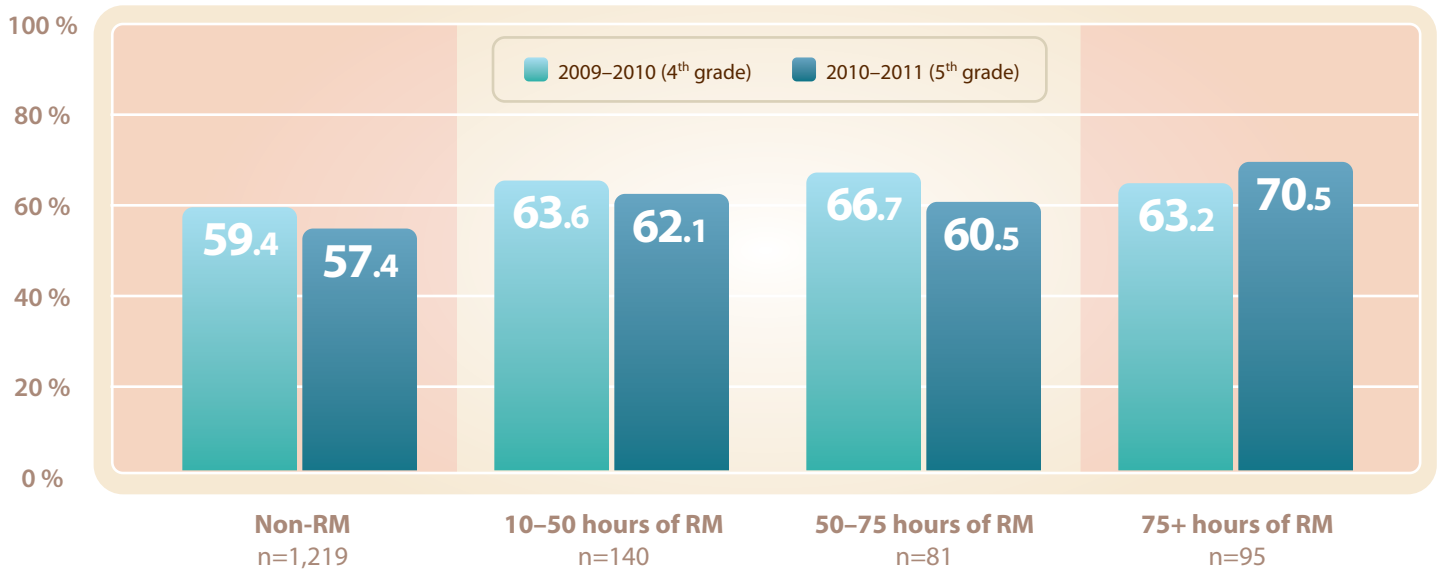
“ Thanks RM City, you helped a lot. I went from dumb to smart. ”

“ I think RM city is really helpful and it makes things funner than they are. ”

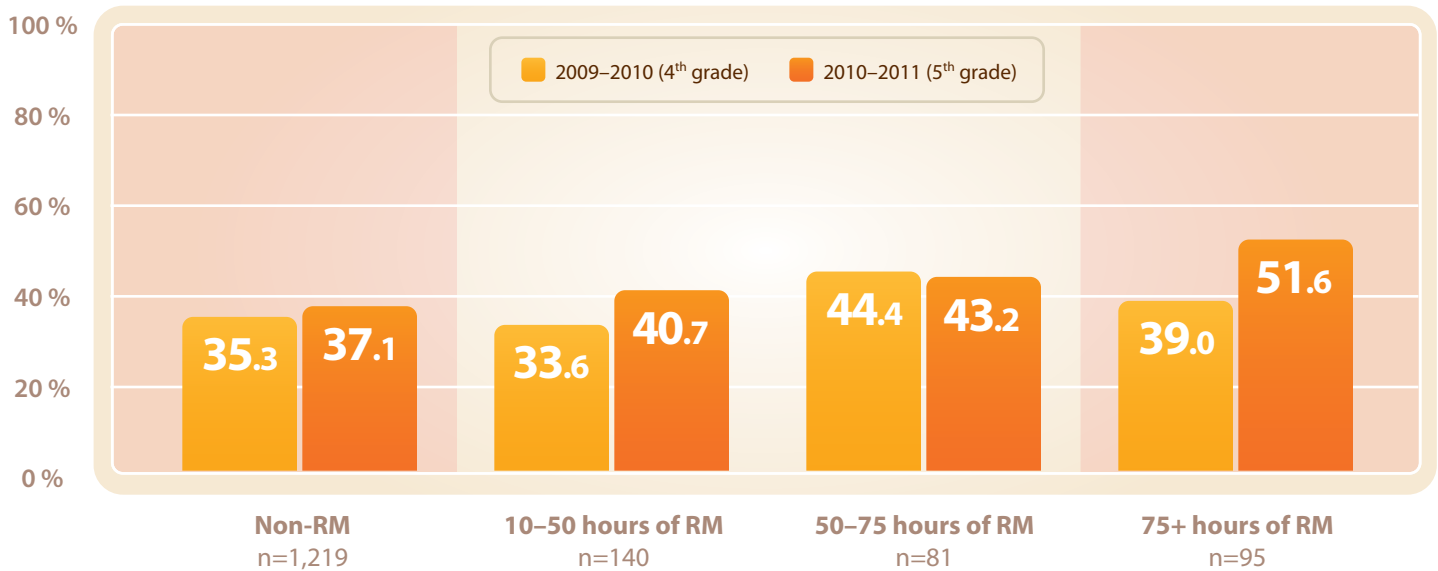
Students with more time online show more growth

If we break down the results by hours of usage and compare two years of performance on the mathematics CST (4th and 5th grades), we learn that the hours students spend online have a very strong correlation with their growth on the test. For example, students who spent 10-50 or 50-75 hours online in 5th grade are not statistically different from their non-RM peers, when compared over the two-year period. However, students who spent at least 75 hours online (approximately 3 hours/week) showed remarkable growth and were statistically different from their non-RM peers.

Math CST passing rate for 5th grade cohort



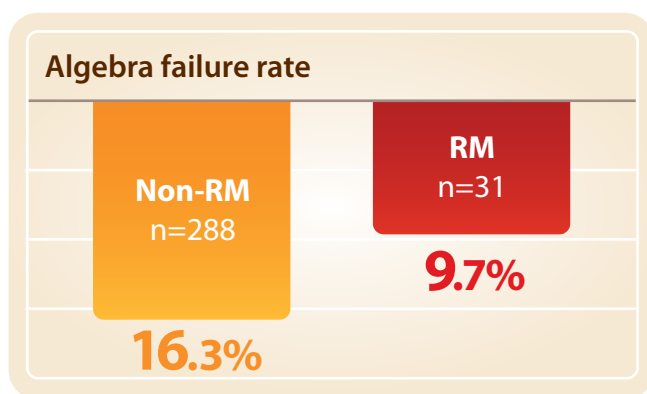
Math CST "advanced" rate for 5th grade cohort



Reasoning Mind prepares students for success in algebra

Even though some students say that they “want to stay with RM forever,” the truth is that Reasoning Mind’s goal is to help students do well in Algebra I and beyond by giving them a solid mathematical foundation in early grades. In order to assess Reasoning Mind’s progress against that goal, it is useful to look at Reasoning Mind students’ performance beyond the academic year in which Reasoning Mind was used.

Ultimately, the best true measure of success for a program that aims to prepare students for higher level mathematics is the Algebra I passing rate. Algebra I is widely considered a gatekeeper course for college; according to a 2006 study,³ students who fail Algebra I are over four times more likely to drop out of high school. With Algebra I failure rates in major urban areas exceeding 40% in the worst cases, preparing students for algebra is a critical need.



The difficulty of tracking high-mobility students makes it challenging to follow student cohorts. A rural Texas district with relatively low mobility, where RM was introduced early on, has acted as a laboratory for measuring how well Reasoning Mind is preparing students for algebra. These students used Reasoning Mind only in 5th and 6th grades, as Reasoning Mind does not yet offer curricula for higher grade levels. Three years later, at the end of 9th grade, Reasoning Mind was able to measure how well these students did in Algebra I compared to their peers.

Of the students who were enrolled in a district school by the end of 9th grade, students who had RM were 6.6 percentage points less likely to fail Algebra I, showing that years after the students used the program, Reasoning Mind was helping these students succeed in mathematics.

Conclusions

Reasoning Mind offers a math program modeled on the Russian curriculum, which shares its roots with curricula used by many countries that lead the world on international assessments of mathematics achievement. The Reasoning Mind program is delivered via a blended learning model, which combines online instruction with instruction delivered by the classroom teacher. In grades 2-4 Reasoning Mind is given as a supplement, while in grades 5 and 6 it is generally used as a core curriculum.

The goal of the program is not to help a student simply do better on the current year's state assessment, but also to help students understand math on a deep level, become better at math, and develop an appreciation for the subject. When this happens, students become more likely to do well not only on the current year's state test, but also in their future math courses, including Algebra I. This report solely concerns standardized testing data. Therefore, if anything, it understates the case for Reasoning Mind's impact on student achievement.

The report highlights positive results in Texas, California, and Louisiana districts based on independent and internal evaluations, as well as a randomized controlled trial. In the future, as Reasoning Mind expands to reach larger numbers of students, it will be important to follow their progress all the way through Algebra I in order to accurately gauge the program's impact. There is already one strong indication that the students are learning more deeply based on their increased algebra passing rate as measured in one Texas district; Reasoning Mind hopes to identify many more in the coming years.

¹ Holmes, V. (2011). *Reasoning Mind Program Evaluation 2010-2011*.

² Houston, R., & Waxman, H. (2012). *Reasoning Mind Evaluation 2010-11*.

³ Orihuela, Y. R. (2006). Algebra I and other predictors of high school dropout. Retrieved March 19, 2012, from <http://gradworks.umi.com/32/49/3249717.html>