NATIONAL CENTER FOR POLICY ANALYSIS

Innovative Teaching Methods Key to STEM Growth

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It is a great time to be a Science, Technology, Engineering or Mathematics (STEM) major in Texas. Dallas made Forbes' list of the top 10 cities for STEM jobs and has the second highest annual median wage growth for STEM workers, while Houston and Austin were named the top two metropolitan areas for STEM professionals in a Wallet Hub report.

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The U.S. Bureau of Labor Statistics projects Texas will have 758,000 STEM jobs by 2018, second only to California.

In order to fill the growing number of STEM openings, Texas must make a concerted effort to boost student engagement and performance in STEM subjects, starting with elementary school students. To achieve the improvements the state is seeking, schools across Texas must reevaluate not only *what* they teach, but *how* STEM subjects are taught.

Reasoning Mind and Computer-based STEM Curricula. At the Momentous School in Dallas, for example, students are actively, enthusiastically engaged in learning math concepts and applying those concepts to solve problems — thanks to a state-of-the-art online curriculum and teacher/classroom structuring program called Reasoning Mind. The program, which has rapidly expanded into many public school districts across the country, has generated positive results and high levels of student, teacher and administrative staff satisfaction.

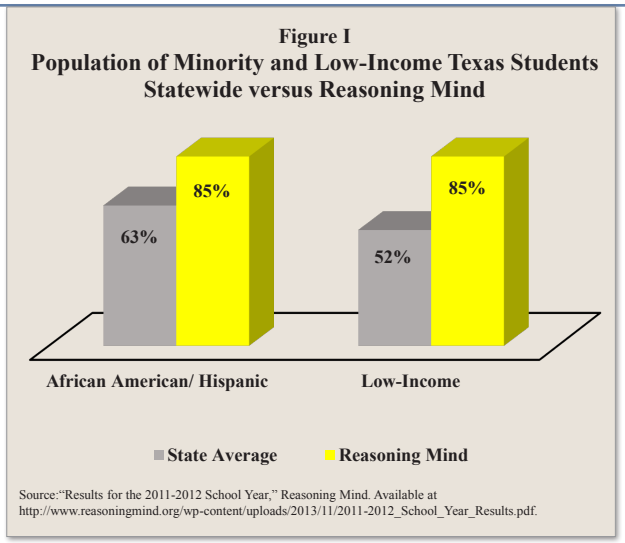
Momentous School's partnership with Reasoning Mind exemplifies many of the fundamental steps to engage students in STEM fields: challenging, interactive curricula; new and improved teaching methods; and partnering with outside organizations and businesses to offer the best opportunities to all students.

According to several evaluations, the Reasoning Mind program offers several advantages over outdated, lecture-based instruction:

- Reasoning Mind students are engaged and on task 89 percent of the time, on average. Compared to a typical classroom, that works out to an additional 40 hours of math instruction each year when Reasoning Mind is used as a core curriculum.
- Some 67 percent of students using Reasoning Mind say that their enjoyment of mathematics increased due to the program.

Flexibility is the key to Reasoning Mind and programs like it. These systems deliver effective instruction for advanced students and remediation for struggling students, and they perform successfully in traditional school, after-school and home environments. They get students out of traditional lecture-based classroom desks. And, in the case of Reasoning Mind, put them in front of a computer screen interacting with a virtual genie to learn basic concepts, build upon previously mastered material and get students thinking about how that material can be applied in other situations.

A state-of-the-art online curriculum and teacher/classroom structuring program, Reasoning Mind is rapidly expanding into many public school districts around the United States. A broad range of groups including the



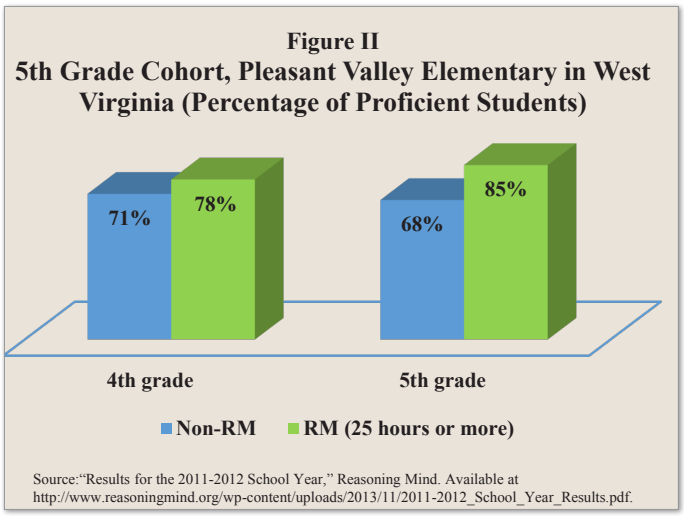
ExxonMobil Foundation, TechCorps Texas and more, provide the program strong financial support, which has paid off in positive results.

Reasoning Mind Achieves Results. Students in the schools that use Reasoning Mind performed significantly better than the average Texas student, even if they were considered "at risk" students. For example:

- After the J. Erik Jonsson Community School in Dallas began using Reasoning Mind, its commended scores on the State of Texas Assessment of Academic Readiness (STAAR) increased fivefold.
- In the Angleton (Texas) Independent School District, students who used Reasoning Mind in 5th and 6th grades are more than twice as likely as non-Reasoning Mind students to accelerate into Algebra I in 8th grade.
- The percentage of students who meet or exceed the STAAR standards in these schools increased an average of eight percentage points, while overall passing rates in the state were flat.

Similar results were achieved in other states:

- In Compton USD, fourth-grade students who used Reasoning Mind improved their scores on California's Standardized Testing and Reporting (STAR) exam by 214 percent more than the Compton USD average overall.
- Students in Cabell County, W. Va., took assessments based on the Singapore Math placement test at the beginning, middle and end of the academic year. Fifth grade Reasoning Mind students were behind control group students by 2 percentage points on the pretest, but by the post test the Reasoning Mind students outperformed the non-Reasoning Mind group by 10 percentage points.
- After just one year of using Reasoning Mind, a group of fifth-grade students at Pleasant Valley Elementary School in Marion County, W.Va., outperformed a control group on the WESTEST by a wide margin.
- The Reasoning Mind group saw an increase of 7 percentage points in the number of students achieving proficiency. The non-Reasoning Mind group, by contrast, finished 3 percentage points lower.



Teacher/Administrator/Student Satisfaction. By 2012, surveys at schools using Reasoning Mind found:

- Some 58 percent of students picked mathematics as their favorite subject, while 67 percent said that their enjoyment of mathematics increased due to Reasoning Mind.
- Eighty-six percent of students said they enjoyed Reasoning Mind.
- There is also broad-based support from educators, with approximately 90 percent of surveyed principals and teachers saying they would like to participate in Reasoning Mind again the next year.

Conclusion. Without a doubt, Reasoning Mind is having a significant impact on student achievement and satisfaction in the public schools where it is used. Public schools are a natural target for reform of our entire education system. Implementing charter school laws, equalizing school financing and teacher evaluations are some of the other popular reforms in many states. Public school students need all the help that they can get, and Reasoning Mind clearly improves the quality of education for those students.

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