

Practices Worthy of Attention

Agile Mind

Summary of the Practice. Agile Mind provides online and face-to-face instructional tools and supports to help secondary mathematics teachers improve student performance while supporting sustainable teaching practices.

Need. All teachers, whether expert or novice, can benefit from tools and strategies for improving their practice. This is a particularly acute need in mathematics and science, fields in which the expectations for student performance are rapidly rising and inadequate numbers of teachers have the mathematics background and teaching knowledge to successfully teach challenging secondary curricula to a large and diverse number of students.

Goal. Agile Mind's goals are to provide instructional and assessment materials and data to help teachers improve their practice and to increase the capacity of school systems to improve student access to and achievement in challenging high school mathematics curricula.

Description of the Practice

Agile Mind works to provide the tools and support that teachers need for improving student performance in mathematics and to support sustainable teaching practices.¹ Agile Mind's work in improving students' mathematics performance is built on four key principles:

- Intensify and enhance the pedagogical interaction between teachers and students in classrooms.
- Engage the support of district and school leaders to ensure that instruction can lead to improved mathematical learning for a larger and more diverse set of students.
- Support teachers and school/district leaders in regularly using student performance data to inform instruction.
- Foster collaboration among educators using common instructional materials, strategies, and assessments.

Agile Mind attends to those four principles in the three key components of its services: curriculum and instructional resources, assessments and data reporting, and professional development.

¹ Agile Mind is a commercial partner of the Charles A. Dana Center. The Dana Center developed the *Practices Worthy of Attention* profiles.

Curriculum and Instructional Resources

Agile Mind offers course support services in the form of online curricula and instructional resources for Middle School Mathematics, Algebra I, Geometry, Algebra II, Precalculus, Advanced Placement Calculus, and Advanced Placement Statistics. Each course support service has a scope and sequence aligned with the Texas state standards and National Council of Teachers of Mathematics standards, as well as with the standards of each of the states in which the services are used. All content is also aligned to various mathematics textbooks, so that teachers who are required to use certain textbooks can receive support specific to their needs.

The course support services provide instructional resources for teachers to use in planning and delivering instruction and assessment. Each “course” in the Agile Mind service—such as Algebra I—includes several “topics”—such as Algebra I linear representations. Within each topic, an online instructional guidance system provides teachers with specific resources for instruction planning, teaching, assessment, addressing various teaching challenges, and alignment to state standards and textbooks. Teachers can use all or select particular resources. Within each online resource, teachers have the option to add their own notes, which helps them customize their practice of education.

The resources for instruction planning are composed of six parts:

- Pedagogical goals and objectives of the lesson.
- Time management recommendations.
- Prerequisite skills students need to successfully master the concepts contained in the topic.
- Pointers to specific resources both within and outside of Agile Mind.
- Recommendations of offline, external resources that can be used in instruction (e.g., Algebra tiles).
- Customizable homework assignments.

Instructional guidance for teaching encompasses key strategies for enacting instruction. Every topic includes opening questions to enable teachers to introduce key concepts and to engage students in discussion. Framing questions support teachers in helping students apply what they are learning to real life, using the specific examples contained in the instructional support materials. Further questions are suggested to help probe students’ thinking and to uncover misconceptions. Finally, the services point to uses of suggested items within the assessments to assess students’ understanding of the concept.

Teaching tips are included to offer teachers strategies for dealing with possible challenges students may face. A set of content connections pinpoint how the topic has been addressed or prepared for in previous grades and how it will be used later in the curricula. Teachers are

shown possible mistakes that can be made when introducing students to a new topic as well as how they can model an abstract idea with concrete examples. “Common interactions” describe how previous mathematics experiences can impair or enhance students’ understanding of the new concept. Finally, as appropriate, other tools (e.g., calculators) that can be used to enhance students’ understanding of the topic are described.

The remaining parts of the instructional guidance system include alignment to standards and textbooks as well as scope and sequence. These provide the codes within state and national standards, as well as specific sections within various textbooks, to which the online materials relate. The scope and sequence link, for example, shows the scope and sequence of the course for a designated state, with the topic, amount of time spent on the topic, content standards, big ideas, and possible resources teachers can use across all topics.

Within each topic, several components are shared by teachers and students. Each topic starts with an overview of the central concepts to be mastered in the topic through a real-world scenario or example. Teachers, using a computer and projection device, walk students through this overview in a lesson, and then move students into “exploring.” Each topic contains two to four “exploring” opportunities, which represent the bulk of instruction, where students learn about the key concepts within the topic in an exploratory, participatory manner. In all course support services, the “exploring” sections are developed with visualizations—simulations, animations, tables, illustrations, and graphs—to help students visualize and otherwise master concepts. The end of each topic, designed to be enacted as a series of lessons, is the “summary,” where concepts are reviewed with specific mathematics vocabulary and the important concepts are summarized away from any real-world scenarios.

Assessments/Testing and Data Reporting

Four types of assessments that students complete online are built into Agile Mind for each mathematics topic. For instance, teachers can use a guided assessment—typically 10 or more items—to get a quick snapshot of how students are doing or as a homework assignment. Each item includes specific hints and feedback so that students have an opportunity to gain more guidance for their problem-solving strategies. A self-test, with 10 or more problems per topic, is available to students so that they have a relatively private space to assess their own learning. Teachers receive reports on whether students make use of self-tests, but only students see their own scores. Multiple-choice testing items enable teachers to embed test preparation in quick quizzes, in which students receive only one opportunity to answer items, with no hints or feedback. Teachers can also use constructed response items for an in-depth look at how students are answering a complex problem. Constructed response items are printed so that students can show their work.

The “exploring” and “assessments” components are designed to ensure that students have an opportunity every week to solve dozens of mathematics problems and to develop the ability to represent their understanding in words, formulas, tables, and graphs, consistent with state and national standards.

One of the key features of the online services is the data reporting on the instructional, assessment, and testing components. For any topic, teachers can receive reports at any point.

Since teachers can receive reports in real time, without having to take the time to score/grade papers, they can spend their time reviewing what students understand, as an entire class or with individual students.

Professional Development

Before teachers use Agile Mind online services, they receive face-to-face professional development seminars on the resources. At these seminars, teachers have the opportunity to explore the Agile Mind resources as a teacher and as a student. They learn how to use and integrate the planning and instructional tools and assessment materials. Teachers also receive face-to-face training in how to analyze student work, how to collaborate using common lessons and assessments, and how to enhance their strategies for providing equitable teaching and learning for all students while not sacrificing coverage of the syllabus.

Results

Agile Mind and the Dana Center have conducted formative evaluations of the partnership with schools in Region I of Texas for the period of 2003–2006. (Texas is divided into 20 education service center regions.) During this time, the number of students receiving Agile Mind services increased. Implementation of the services began in 21 schools (219 teachers and 13,000 students) in Region I in 2003–2004. Two years later, in 2005–2006, Agile Mind added 10 additional schools in Region I (bringing the total to 455 teachers and 26,900 students). Although use of services varies by teacher, implementation appears to improve and grow each year; for instance, among teachers who used Agile Mind for more than two years, 82% increased the intensity of their implementation in their second year. Also, 35% of schools using only specific course support services (usually Algebra I) expanded to the use of additional course support services (such as Geometry and Algebra II) the following years.

Rio Grande City High School, in Rio Grande City, Texas, is one of the longer-term users of Agile Mind services in Region I and has been a part of formative evaluations of the service's effectiveness. Table 1 shows the percentage of students passing the mathematics section of the Texas Assessment of Knowledge and Skills (TAKS) for grades 9, 10, and 11 for Rio Grande City High School, Region I, and the state of Texas. Satisfactory performance on the TAKS at grade 11 is required for high school graduation. Scores for all groups and all three grades have improved dramatically. In 2002–2003, Rio Grande City High School students were performing much lower than their Texas counterparts for grades 9, 10, and 11. Three years later, Rio Grande City High School students were performing on par with the average Texas student at these grade levels and were outperforming Region I students.

Table 1. Percentage of Students in Rio Grande City High School, Region I, and Texas Passing the Texas Assessment of Knowledge and Skills Mathematics Exam

Academic Year	Grade 9			Grade 10			Grade 11		
	RGCHS	Reg. I	Texas	RGCHS	Reg. I	Texas	RGCHS	Reg. I	Texas
2002–2003	16	*	44	17	*	48	18	*	44
2003–2004	32	33	50	28	37	52	42	60	67
2004–2005	38	43	56	41	44	58	60	65	72
2005–2006	57	44	56	58	53	60	75	70	77

Note: The asterisk (*) notes that data were not available.

Table 2 lists recent TAKS mathematics results for Rio Grande City High School. The only available data disaggregated by ethnicity are for Hispanic students. Since 99% of Rio Grande City High School students are Hispanic, the results of all students and Hispanic students are nearly identical. Students with limited English proficiency are performing significantly below most students, and, although those students show improvement each year, the improvement is not sufficient to close the achievement gaps in grades 9 and 10; however, in grade 11, the improvements among students with limited English proficiency are increasing in ways that appear to close the achievement gap. Economically disadvantaged students are performing better than students with limited English proficiency and about the same as all students in Rio Grande City High School.

Table 2. Rio Grande City High School Results on the Texas Assessment of Knowledge and Skills Mathematics Exam

Demographics	Academic Year	TAKS (Percentage Met Standard)		
		9	10	11
All Students	2002–2003	26	29	47
	2003–2004	32	28	58
	2004–2005	38	41	60
	2005–2006	57	58	75
Hispanic	2002–2003	26	29	47
	2003–2004	32	28	58
	2004–2005	39	41	60
	2005–2006	57	58	75
Limited English Proficient	2002–2003	14	9	15
	2003–2004	12	2	41
	2004–2005	16	11	32
	2005–2006	20	23	58
Economically Disadvantaged	2002–2003	27	30	45
	2003–2004	33	30	57
	2004–2005	39	42	62
	2005–2006	58	58	75

Rio Grande City High School has used Agile Mind services since 2003. When the school began using Agile Mind services, Rio Grande City High School had significantly fewer students passing the TAKS mathematics exam when compared with all Hispanic students in Texas and all students in Texas. Figure 1 shows that, since 2003, grades 9, 10, and 11 scores for Rio Grande students have increased more than grades 9, 10, and 11 scores for all Hispanic students in Texas and for all students in Texas. Rio Grande City High School students appear to have closed the achievement gap, as they are now performing just as well as all students in Texas and are exceeding Hispanic student performance for the state. Since the percentage of Hispanic students in Rio Grande City High School is over 99 percent, this finding shows that students in Rio Grande City High School are performing above the average Hispanic student in Texas.

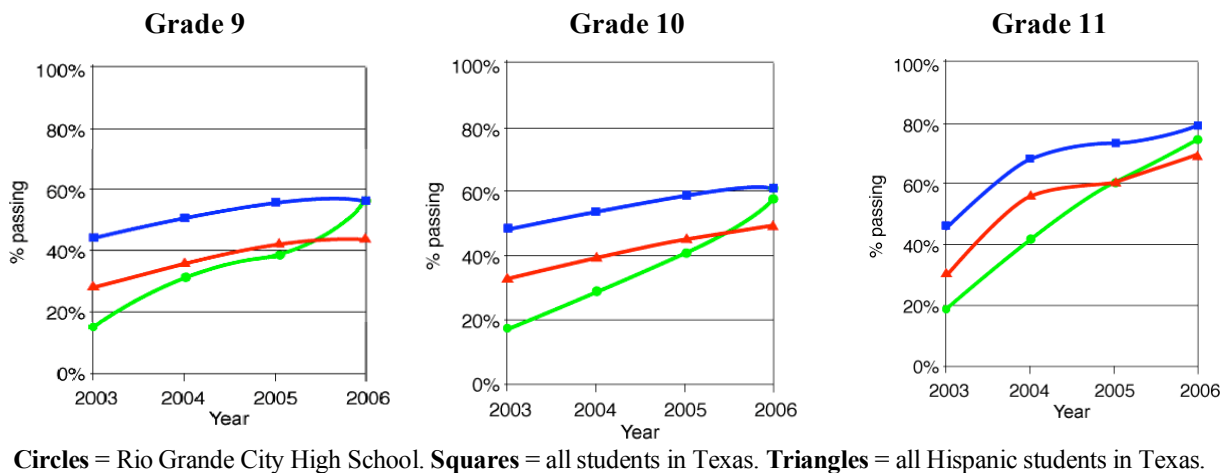


Figure 1. Percentage of Students Passing the Mathematics Portion of the TAKS

Conclusions

Agile Mind services are being used in several states and is used in increasing numbers of classrooms, schools, and districts. The Rio Grande City High School information is one set of data compiled to measure the promise of this practice. The incorporation of Agile Mind services at Rio Grande City High School seems to have changed the way the high school mathematics staff are working together, using a common planning period and integrating the curricula into their district scope and sequence. Given that Rio Grande City High School has a higher rate of teacher mobility than both Region I and the state of Texas, it is promising to see such progress in teachers' collegiality. According to Rio Grande City High School teachers and administrators, Agile Mind is their only new secondary mathematics improvement practice. Agile Mind is currently working with an external evaluator to analyze the last few years of data for all users with two years of experience in Texas, to better understand the implementation and usability of the service across sites.

About *Practices Worthy of Attention: Local Innovations in Strengthening Secondary Mathematics*

Practices Worthy of Attention is a joint initiative of Achieve, Inc. (www.achieve.org), and the Charles A. Dana Center at The University of Texas at Austin (www.utdanacenter.org). The initiative is led by Pamela L. Paek, a research associate at the Dana Center, who, in 2006, examined 22 program, school, and district practices that showed promise—based on early evidence and observation—of strengthening secondary mathematics teaching and learning.

Our goal was to document practitioners' descriptions of *what is really happening* in the field to strengthen secondary mathematics education around the country. Thus, while the practice highlighted may be common, the specific structures and strategies used to implement the practice are worthy of attention. These initial investigations set out to mark these practices for future rigorous scientific inquiry by Dana Center and other researchers.

Ultimately, we hope to create a community of inquiry made up of university researchers working with administrators and teachers from featured schools and districts to more rigorously research how effectively these practices improve secondary mathematics learning for all students.

Reports and practice profiles. An executive summary details the methods for this initiative and analyzes themes. Two cross-case analyses discuss specific strategies for raising student achievement and building teacher capacity. Brief profiles describe each practice. All of these publications are available on our website at www.utdanacenter.org.

Data. In all cases, data about the practice were provided by the program, school, or district studied as part of a description of their practice. We did not independently analyze data gathered through a consistent assessment tool, and we did not evaluate their uses of data for measuring effectiveness. Thus, the data in the practice profiles are intended not to prove the practice's effectiveness from a research perspective, but to paint a detailed picture of the practice and what data were used by the program, school, or district to gauge how well it was working.

Theoretical frameworks. In some cases, district staff mentioned specific literature on theory or practice that they used when they developed the practice we highlight. In those cases, we cite that literature in our discussion of the practice.

How to cite this profile

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