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In This Issue...

CCSSO's *Innovation Quarterly* newsletter offers research and innovations from our corporate partners to inform work in states.

In conjunction with the Deputies Leadership Commission Spring Academy, this edition of *Innovation Quarterly* focuses on secondary school reform.

The articles in this newsletter include:

Focus on Secondary School Reform

For questions or comments about Innovation Quarterly, *please contact Carrie Heath at carrieh@ccsso.org or 202.312.6433.*

ADOLESCENT LITERACY: ISSUES AND SOLUTIONS

By Joseph Noble, Ph.D. & Barbara M. Calhoun, Ph.D.

Educators know that adolescence is difficult, with social, emotional, and physical stresses that seem to turn our children into creatures from another planet. With all these factors turning adolescents' worlds upside down, who thinks to look at whether or not they are reading well? Didn't the early grades take care of that? What about students who did not attain early literacy, or attained it with limited skills? What about the adolescent middle or high school student who possesses elementary school reading skills? An International Reading Association 1999 report indicates the prevalence of the problem by showing that many students' reading difficulties are bypassed in high school and continue in college: "13% of fall 1989 first-year higher education students in the United States were enrolled in courses devoted specifically to remedial reading."

The Middle and High School Years

The academic deficiencies of adolescents with language and reading difficulties begin in elementary school. Students develop compensatory strategies that help them through the elementary years, but eventually these stop-gap measures fail to work. For instance, students who compensate by taking more time to accomplish

(Continued on page 2, "Adolescent Literacy")

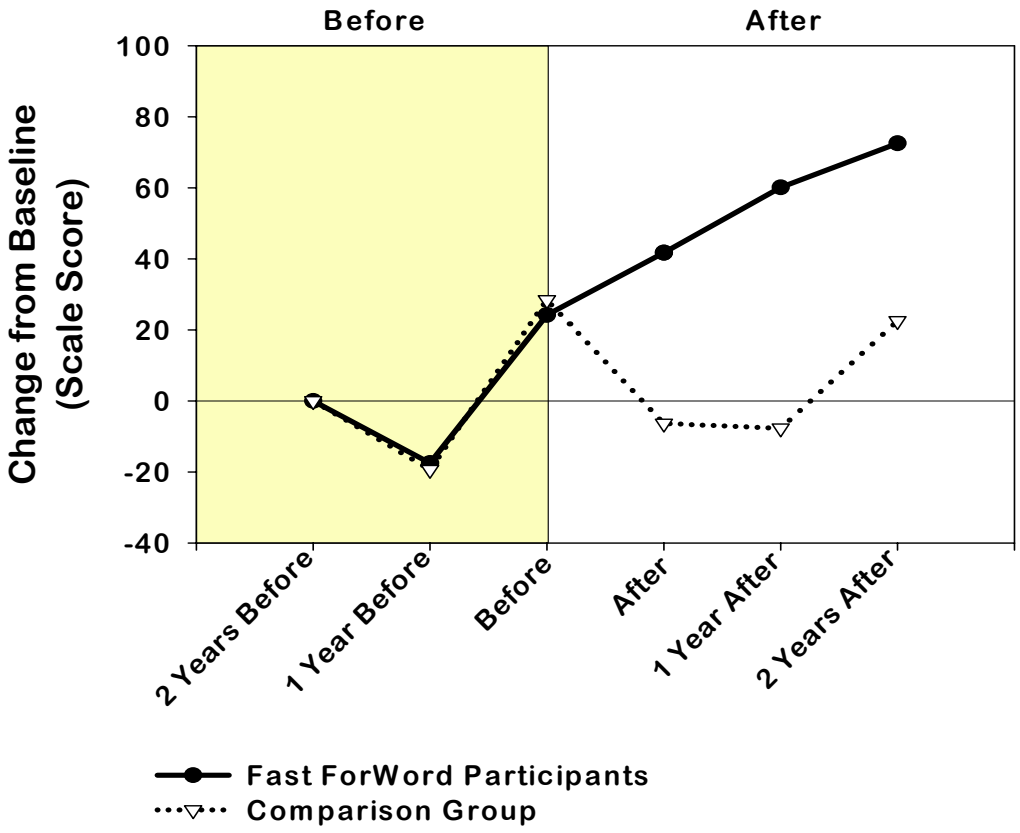

Figure 1. Five hundred forty-four students who used Fast ForWord closed the gap with their peers statewide. This closure was maintained for the two years of the study.

(Continued from page 1, "Adolescent Literacy")
their assignments, by reading passages repeatedly and slowly, will find that, unless they work around the clock, that tactic will no longer work with the more accelerated work load they encounter in middle school and high school.

By the end of middle school, a student's inability to compensate for a lack of reading skills becomes even more problematic. As he or she struggles with academics and adolescence, adjustment problems grow. Should they fail to make the transition to high school, their prospects for receiving a high school education decline.

The transition from middle to high school is the time in adolescents' lives when they are not only going through physical, emotional, and mental changes—research shows that teenagers' brains change during adolescence in fundamental ways (*Newsweek*, May 8, 2000) — but social changes as well, including moving into what could be the final phase of their education. The pressures on adolescents at this stage of their educational career are great, and the demands are enough to try even the most exemplary student, often driving at-risk students to the breaking point. "The ninth grade is a particularly difficult time for at risk students, for they are both at a critical stage of adolescence, and facing a new, impersonal, and more challenging school" (Ascher, Schwartz, *Keeping Track of At Risk Students*).

Improving Foundational Learning Skills for At-Risk High School Students

New technologies introduced in schools since the 1980's have allowed individualized teaching of students. With the advent of computers, it's now possible to adapt lessons to the specific needs of a student, setting up an optimal learning environment where every student is asked to respond frequently and make decisions that result in various learning opportunities. Material is adapted to the strengths and weaknesses of the individual student so that each skill is simultaneously developed at the level most appropriate for the student. The Fast ForWord Family of Products is an example of this new kind of technology.

The software products strengthen students' foundational learning skills in the context of oral language and reading. They develop such critical skills as memory, attention, auditory processing, and sequencing skills by allowing students to work on phonemic awareness and phonics as well as oral and written vocabulary and sentence structure.

High schools in the Dallas Independent School District have used the Fast ForWord products for several years and participated in a longitudinal evaluation of the impact on the state's current high stakes tests – the Texas Assessment of Knowledge and Skills (TAKS). The district uses the Fast ForWord products with students reading below the 40th percentile or students who had a TAKS Reading score below 2100.

This longitudinal analysis looked at 544 students who had four years of TAKS data. The majority (92%) used the Fast ForWord products during their 9th grade year while the rest were in 10th or 11th grade. Average scores were calculated for two years before participation, one year before, immediately before, immediately after, one year after, and two years after. These averages were compared to statewide averages for students in comparable grades and years.

A comparison of the scores of the students in the study to average statewide scores for students in corresponding grades and years showed that students who used the Fast ForWord products were achieving improvements in their TAKS scores after participation and making progress towards closing the gap. The average gap size in the three years prior to Fast ForWord participation was 203 points while the average gap size in the three years after participation was 151 points, a decrease of 25% (Figure 1).

Joseph Noble, Ph.D. & Barbara M. Calhoun, Ph.D. are affiliated with Scientific Learning.

References

Ascher, Carol, and Schwartz, Wendy. "Keeping Track of At Risk Students." ERIC Digest Number 35. 1987.

Begley, Sharon. "Mind Expansion: Inside the Teenage Brain." *Newsweek*. May 8, 2000

International Reading Association Commission on Adolescent Literacy 1999-2000. "Adolescent Literacy: A Position Statement." 1999.

Students develop compensatory strategies that help them through the elementary years, but eventually these stop-gap strategies fail to work.

From Novice to Expert: Applying Research Principles to Promote Literacy in the Classroom

By Carl W. Swartz, Ph.D. and A. Jackson Stenner, Ph.D.

It's easy to think of a field of endeavor and list at least one expert. You might consider Bobby Fischer to have been the world's best chess player, Joshua Bell the best violinist, and Isaac Asimov the most prolific author. A more difficult question to answer is how did each of these individuals develop expertise in his field? Research suggests that a novice develops into an expert through an intricate process that includes the following components (Glaser, 1996; Kellogg, 2006, Shea & Paull, 1996; Wagner & Stanovich, 1996):

- *targeted practice* in which one is engaged in developmentally appropriate activities;
- *real-time corrective feedback* that is based one's performance;
- *intensive practice* on a daily basis that provides results that monitor current ability;
- *distributed practice* that provides appropriate activities over a long period of time (i.e., 5–10 years), which allows for monitoring growth towards expert performance; and
- *self-directed practice* in an activity for times when a coach, mentor, or teacher is not available.

An important question for teachers and policy makers to address is: How can this intricate process be applied in the classroom to promote the development of expertise in reading and writing?

"Impossible," may be one response to this question, even though each K–12 student is provided with daily opportunities to practice reading and writing for 13 years. But how would a teacher provide each student with activities targeted to his or her individual ability *and* provide real-time feedback? One solution with potential is to apply technology to best practices in assessment and instruction. This technology would relieve teachers both from the burden of finding or developing activities targeted to each student's ability and then subsequently scoring the activities. Instead, it would allow teachers to do what they do best—teach.

Two new technologies that apply these principles to support growth from novice to expert performance in literacy are MetaMetrics®' MyReadingWeb and MyWritingWeb. These Web-based applications provide each student with activities that promote expert performance. Classroom teachers, administrators, and policy makers use the applications' results to make informed decisions about curricula, instructional strategies, and the individual student's progress in achieving standards.

MyReadingWeb leverages the ability of the widely adopted Lexile Framework® for Reading to provide developing readers with text targeted to their abilities *and* topics being taught in the classroom. One of the most important features of this application is that each student's reading ability is constantly monitored using his or her answers to auto-generated cloze items. Cloze is a test of reading comprehension in which the test taker supplies words that have been systematically deleted from a text. Each student receives immediate feedback about the words chosen to complete the cloze. The correct count is used to update the student's Lexile® reader measure.

Educators can be confident about the precision and utility of each student's measure of reading ability while not decreasing the amount of instructional time to provide more testing time. Students in grades 2–12 in one school district have used MyReadingWeb everyday during the 2007–2008 school year. To date, these students have dedicated approximately 11,000 hours to reading 98 million words from over 116,000 articles targeted to the students' individual abilities that they would NOT have read otherwise.

MyWritingWeb, another classroom-based system, integrates monitoring each student's growth in writing ability with targeted writing activities. The writing instruction in MyWritingWeb is designed to enhance (1) writer ability (use of words and how they are combined), (2) convention ability (use of grammar, spelling, capitalization, and punctuation rules), and (3) device fluency (use of a keyboard). Currently, more than 15,000 students use MyWritingWeb to enhance their writing ability. In one district alone students have written over 10,000 essays, corrected more than 46,000 passages, and taken almost 4,000 typing tests that would not have been written, corrected, and scored without technology.

Developing expertise in any field of endeavor requires immersing people in activities targeted to their abilities with opportunities to receive feedback and independent practice over long periods of time. Applying these principles in the classroom, so that each student has an opportunity to develop expertise in literacy, will require using technology that supports the teacher. MyReadingWeb and MyWritingWeb are two such technologies that through research will help to validate the potential to use technology to meet those goals.

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Transforming the Learning Continuum

By Mostafa Mehrabani

Education today is undergoing a profound transformation. To prepare students to participate in the global economy, new ways of teaching and learning are evolving, aligned to accountability measures, technology advances, and the availability of new resources for students and parents as well as educators. McGraw-Hill Education, with a portfolio of research-based educational tools, is leveraging advances in technology to create a more dynamic, transparent form of education – more individualized and efficient, delivering true data-driven instruction.

These next-generation tools include a range of formative and predictive assessments, individualized study guides, customized reporting options, and a variety of supporting resources, all available in both print and online formats. These are the types of tools that not only capture data on student performance, but are fundamentally changing the way teachers teach, students learn, and parents engage. Two examples that span the range from assessment to individual student guidance are the Acuity™ assessment platform, and the MyGuide™ Personal Learning Program.

To prepare students to participate in the global economy, new ways of teaching and learning are evolving, aligned to accountability measures, technology advances, and the availability of new resources for students and parents as

Acuity Assessments

Acuity represents one example of a solution which promotes student success with robust, technology-enabled interim and formative assessments. Acuity embodies a new generation of comprehensive assessment programs that changes the way educators perceive assessment – a critical learning and teaching tool. Acuity contains all four elements of a comprehensive formative assessment: ongoing measurement, in-depth reporting, analysis of performance data, and resources for targeted instruction.

A recent white paper *"Promoting Student Achievement Using Research-Based Assessment with Formative Benefits,"* delves into several independent research studies to demonstrate that formative assessment is a practical, powerful solution that supports educators in their efforts to accelerate student performance and meet achievement goals. It also discusses how technology can improve educators' ability to deliver formative assessments in the classroom. The white paper can be downloaded at www.AcuityForSchool.com.

The studies conclude that quality technology-based assessments should include the following features:

- An easy-to-use platform for delivering assessments and communicating results
- Instructional resources to enable teachers to reinforce concepts and provide opportunities for intervention
- Alignment to relevant standards, to provide a framework to monitor student progress
- Timely tracking of student progress before critical high-stakes assessments

(Continued on page 5, "Learning Continuum")

(Continued from page 4, "Learning Continuum")

- Data that can immediately impact student progress toward achievement
- Support for customization of local teaching efforts
- Flexible tools that can accommodate and integrate with varying levels of technology in classrooms, schools, and districts

***MyGuide*™ Personal Learning Program**

Educators can make the best use of the detailed Acuity assessment results through the *MyGuide* Personal Learning Program. *MyGuide* allows teachers to respond directly to a student's results to provide individualized instruction customized to the student's assessment profile.

An independent evaluation confirms the role that the *MyGuide* Program can play in improving achievement for high school students in Arizona. The study, conducted by Hezel Associates, evaluated the effectiveness of the Personalized Study Guide Program, as measured by performance on state assessments. The study evaluated data for high school students in three diverse Arizona districts who failed to meet passing levels on the exit-level Arizona Instrument to Measure Standards in spring 2007 and then retook the tests in fall 2007.

A rigorous statistical evaluation of students' performance in three subjects demonstrated that students participating in the program experienced higher score growth and pass rates than students who did not participate.
Key findings include:

Comparison of Passing Grades for *MyGuide* Users vs. Non-users

	Reading - ns	Writing *	Math - ns
Used Study Guide	53.2%	69.1%	38.5%
Did Not Use Study Guide	46.0%	57.0%	30.8%
Difference Between Users and Non-users	7.2%	12.1%	7.7%
Percent Advantage After Use of Guide	15.7%	21.2%	25%

*** p<.05, ns=non-significant**

- For students who took retests in all three subjects, students who used the Personalized Study Guides passed significantly more retests than comparable students who did not use the Guides. 46% of Guide users passed at least two of three retests, compared to 19% of nonusers.
- Across all students taking one or more retests, students reporting moderate or high use of the Guide achieved 69% better score growth in math and 50% better score growth in writing compared to students reporting no or low use.
- Significant results were shown among Hispanic students, as Hispanic participants passed reading and writing 33% more often than Hispanic non-participants.
- Substantial qualitative effects were seen as well, with more than 90% of student participants reporting that the program helped increase their understanding of Arizona standards.

These types of integrated solutions are examples of the way benchmark assessments and robust reporting systems work together to diagnose learning gaps and build on data with resources and action plans that students and educators can use to improve achievement and reach their goals.

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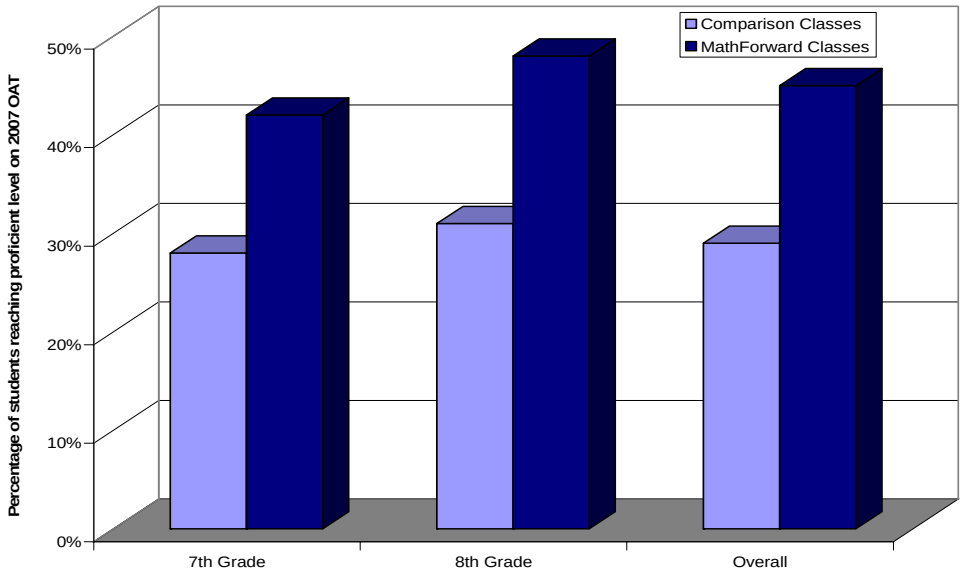
(Continued from page 8, "Teacher Performance")

- Common Aligned Assessments
- Common Planning Times
- Coaching and Professional Development
- Use of Technology to Motivate Students
- Curriculum Integration
- Administrator/Parental Support

The program's main goal helps districts work most efficiently with struggling mathematics students by bridging learning gaps and preparing these students for the demands of high school mathematics. The program should be viewed as a comprehensive

Percentage of Euclid City SD Students who were not Proficient on 2006 OAT who attain Proficiency on OAT 2007: MathForward versus Comparison Classes



school reform model rather than a remediation program because the program changes the school's entire mathematics instructional system; all students benefit, even those performing at higher levels. The components of the model are implemented together. Support is given to teachers, administrators and parents to help increase achievement.

For most schools, perhaps the program component requiring the biggest change is MathForward's required block schedule for math. As students transition into secondary campuses, they are typically moved into a mathematics class that is 45 minutes in length. MathForward requires the campus to block two periods of mathematics together so students have an opportunity to spend more time with their teacher, engaged in problem solving and mathematics dialogue. The school breaks class period into sections in which students work on application-based problems, participate in the district's curriculum, and use technology to think deeply about complex mathematics. Teachers have more time to cover the state standards and to ask questions and promote dialog involving many students.

Three additional components of the MathForward program were created to improve teacher capacity – an important requirement because many teachers entering secondary campuses to teach mathematics lack the content and pedagogical knowledge to teach diverse students successfully. In MathForward, mathematicians work with teachers to help them build their content knowledge and to prepare for the units they will be teaching. Implementation specialists and presenters train the teachers using personal coaching and classroom modeling of how to engage students, have high expectations for them, and use questioning strategies that elicit multiple responses. Common planning times provide opportunities for teachers to work as teams to prepare for upcoming lessons, discuss student work, and support one another by developing a collaborative community that prepares together for the work of teaching.

TI technologies (the TI-Navigator classroom network with the TI-73 or TI-84 graphing calculator) are an additional component.

(Continued on page 7, "Math Education")

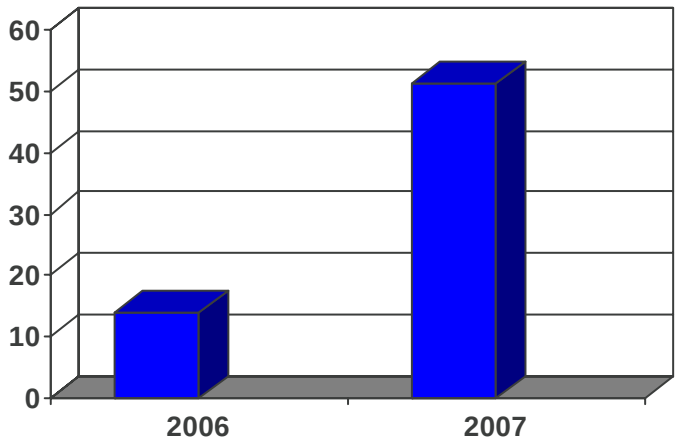
(Continued from page 6, "Math Education")

Teachers use these technologies to engage students in the mathematics, and to provide daily formative assessment. Student thinking becomes transparent and teachers can modify instruction based on students' needs. In addition, common assessments, given between units of study, allow teachers to gauge readiness for learning and to evaluate success following instruction. Special MathForward learning activities supplement the district's curricula, rather than replacing it. As a result, the data collected through the use of common district assessments (benchmarks or unit tests) provide a valid measure of students in the program when compared to other students in the district.

Administrator support is also a critical component of MathForward. Instructional specialists work with administrators to help them successfully implement the MathForward program. Administrators are trained to look for specific teacher and student behaviors in the classroom and are informed weekly about teacher progress.

Communication with parents is another essential component of the model. Teachers are required to correspond with parents frequently to inform them about their child's mathematical progress. Sharing constructive comments about learning with parents helps them understand how the mathematics their child is learning contributes to the goals of the district and state standards, and helps with their child's success after graduation.

Percentage of West Palm Beach MathForward Students who were Proficient on the FCAT 2007, compared to their previous year proficiency (District analysis)



Given the rise of state accountability measures and the number of states increasing mathematics requirements for graduation, it is critical to change instructional approaches to help all students succeed. We need scalable and sustainable systemic interventions. MathForward has provided, across a range of states and districts, students at varied achievement levels with the skills they need to succeed on state assessments and to be ready for high school math courses. Because of its comprehensiveness, the commitment necessary for success of MathForward is substantial, but for those schools which are able to make the commitment, the benefits are substantial.

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The following full reports are available from Texas Instruments on request.

Winick, M. and Lewis, J. (2007)"TI-RISD MathForward Intervention 2007 Year End Report". Redlands, CA: Winick & Lewis Research, LLC., August 15, 2007

Winick, M. and Lewis, J. (2007)"TI-Euclid MathForward Intervention 2007 Year End Report". Redlands, CA: Winick & Lewis Research, LLC., August 15, 2007

Winick, M. and Lewis, J. (2007)"TI-DISD MathForward Intervention 2007 Year End Report". Redlands, CA: Winick & Lewis Research, LLC., August 15, 2007

Winick, M. and Lewis, J. (2007)"Texas Instruments MathForward Intervention 2007 Overall Year End Report". Redlands, CA: Winick & Lewis Research, LLC., August 14, 2007

Stroup, Walter, Pham, Vinh and Alexander, Celeste (2007) "Richardson *MathForward* Project Second Year Final Report: Math TAKS Results." Austin, TX: The University of Texas at Austin

MATH EDUCATION INTERVENTIONS

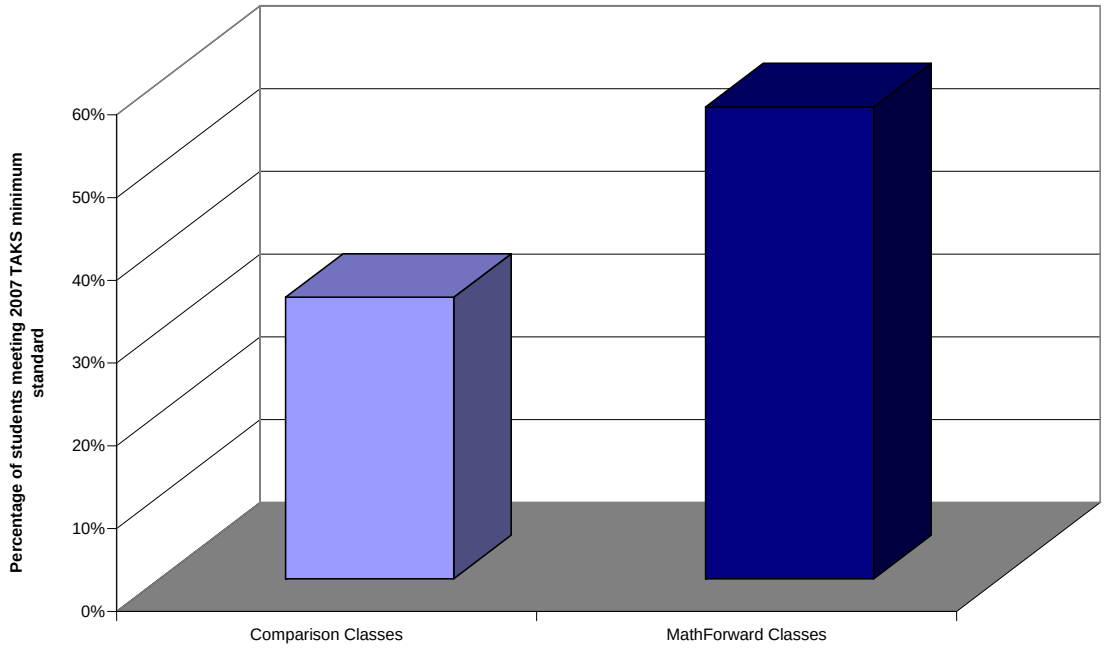
By Paula Steffen Moeller, Ed.D. and Rob Foshay, Ph.D.

All states face a common imperative: to close the achievement gap between student groups. Many states have responded by issuing requests for proposals for mathematics intervention programs: programs that help local education agencies increase achievement of all students, but especially those struggling in mathematics.

Jim Nelson, superintendent of Richardson Independent School District was concerned about performance gaps between student populations. He challenged Texas Instruments leaders to help. In 2005, Texas Instruments and the Richardson ISD initiated a collaboration to increase achievement for all student groups in mathematics. What began as a pilot experiment on one middle school campus grew quickly into a program known now as TI MathForward™. Now in its third year, the district has expanded the program to all of its secondary campuses and is delighted with achievement gains on the Texas Assessment of Knowledge and Skills (TAKS) test in 2006 and 2007.

In 2006, Texas Instruments elected to expand the program to other states, to see if student achievement gains would be significant on their state assessments. Results so far are promising. TI collected data in Texas (2006, 2007), Ohio, and Florida (2007), to determine if the number of students who had not passed the state assessment increased at a greater rate than similar comparison students. Significant gains were observed in all three states [*see figures on pages 6, 7, and 8*].

Percentage of RISD High School Students who failed to meet TAKS Minimum Standard in 2006 who met 2007 TAKS Minimum Standard: MathForward versus Comparison Classes



Based on these results, all participating districts elected to continue in the current school year, with additional district or service center area administrators in New York, California, Rhode Island, Ohio, and Texas electing to pilot either the full version of the program or a modified one. Findings from these projects will be released in September of 2008.

MathForward is a school-level systemic intervention which integrates eight key research-based components:

- Increased Instructional Time
- Increased Teacher Content Knowledge

(Continued on page 6, "Math Education")