



**Testimony on
"NCLB Reauthorization: Effective Strategies for Engaging Parents and
Communities in Schools"**

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Thank you for the opportunity to testify. Texas Instruments (TI) is a company with a 76-year history of innovation. While our business portfolio has changed over the years, we have always been a company of engineers and scientists. TI is the world's third largest semiconductor company. Semiconductors are the enabling technology of the information technology industry and are responsible for unprecedented productivity gains across all sectors over the last several decades. Chips drive everything from computers to cell phones, to MP3 players, GPS systems, HDTVs, automotive safety, medical devices, and advanced weapons systems.

American innovation is a top policy priority for TI. The key elements needed for the U.S. to sustain its technology leadership are: investing in basic research, welcoming the world's brightest minds, extending the R&D tax credit—and perhaps most importantly—improving math and science education. The reauthorization of No Child Left Behind is an element in ensuring that our children have the skills to compete in the global economy.

History of Commitment to Education

The importance TI places on K-12 math and science education is due in part to our corporate culture and to the changing skills and levels of education we require of our technical workforce. TI founders understood the need for highly skilled engineering talent to support the company's growth and competitiveness. As a result, they founded what later became the University of Texas at Dallas in 1961 to help supply the North Texas region and the company with master's level graduates in engineering. Today, the vast majority of our investment in higher education is directed toward research or the development of a technical workforce in science, technology, engineering and mathematics.

Our hiring challenges and our involvement in public policy at the local, state and national levels, however, made it clear to us that in order to support long-term growth and improve our competitiveness in a worldwide marketplace it was imperative to invest in the K-12 education pipeline. And we have been doing so now for many years. In addition to the direct benefit of developing a highly qualified workforce, TI believes that having a high quality education system helps to strengthen the overall quality of life in our plant site communities. Today, TI's corporate

philanthropy is largely focused on education. Each year we make financial contributions totaling millions of dollars in grants and other gifts to schools, colleges and educational programs.

Our involvement in education advocates systemic reform on the local, state and national levels to close the achievement gap and improve student performance. Particularly in preschool and K-12 education, TI seeks opportunities for fundamental change by developing programs with measurable success that can be replicated elsewhere. In recent years, TI's educational K-12 philanthropy has placed increasingly more emphasis than ever before on core areas, such as math, science and engineering, to help foster our next generation of high-tech innovators.

TI has long been a leader in the effort to advance assessment and accountability processes in the Texas public schools, an approach that has been nationally recognized. TI served as a corporate co-chair of the business coalition to pass No Child Left Behind and is a member of the Business Coalition for Student Achievement supporting NCLB reauthorization. The BCSEA calls for making science, technology, engineering and math (STEM) education and readiness for college and the workplace priorities under NCLB.

While semiconductors are the key source of revenue for the company, TI's Education Technology business is also focused on improving math achievement for all students by fostering quality education instruction in mathematics education. I will also discuss some of its activities and the way in which it has embraced the letter and spirit of No Child Left Behind.

Workforce Challenges

TI hires employees with skills at different levels, but our needs are evolving. Because of the continuing complexity of the design process and other technological advances, more is expected from engineering graduates in terms of the breadth of their engineering coursework exposure and experiences at all levels of higher education—BS, MS and Ph.D.

Semiconductor manufacturing has migrated from the era of placing a high value on manual dexterity on the assembly line to one of mental dexterity on the clean room floor. A TI manufacturing specialist must have a basic knowledge of math and science skills. Our technicians must have an associates' degree in semiconductor manufacturing technology and pass a comprehensive test that covers basic electronics, applied physics and basic chemistry.

Finding individuals with the right skills set, particularly at the engineering level is a challenge. This will soon be exacerbated as the baby boomer retires. This one demographic change is expected to reduce the U.S. science and engineering workforce by half. Today only 17% of U.S. college students receive undergraduate degrees in science and engineering, compared to 52% in China and 41% in Korea.

The semiconductor industry depends on electrical engineers to design and develop the chips. In 2006, over half of the master's degrees and 71% of the PhDs in electrical engineering from U.S. universities were awarded to foreign nationals. The number of U.S. bachelor's degrees in electrical engineering has remained relatively flat and has declined since 1983. U.S. citizens and permanent residents enrolled in graduate degree programs in the physical sciences and engineering are only 2.7% higher than in 1983.

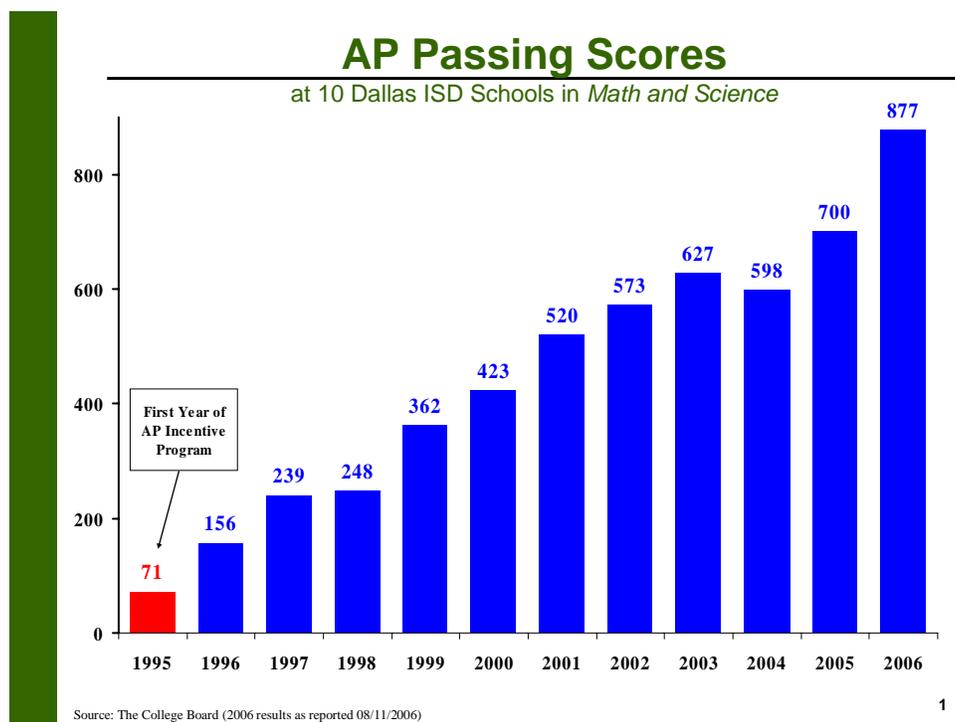
We need to address student interest and skills in these fields at all stages of the pipeline, from K-12 through university and graduate-level. Strong math skills are a gating factor for majoring in science or engineering.

Strategies for Driving Student Achievement

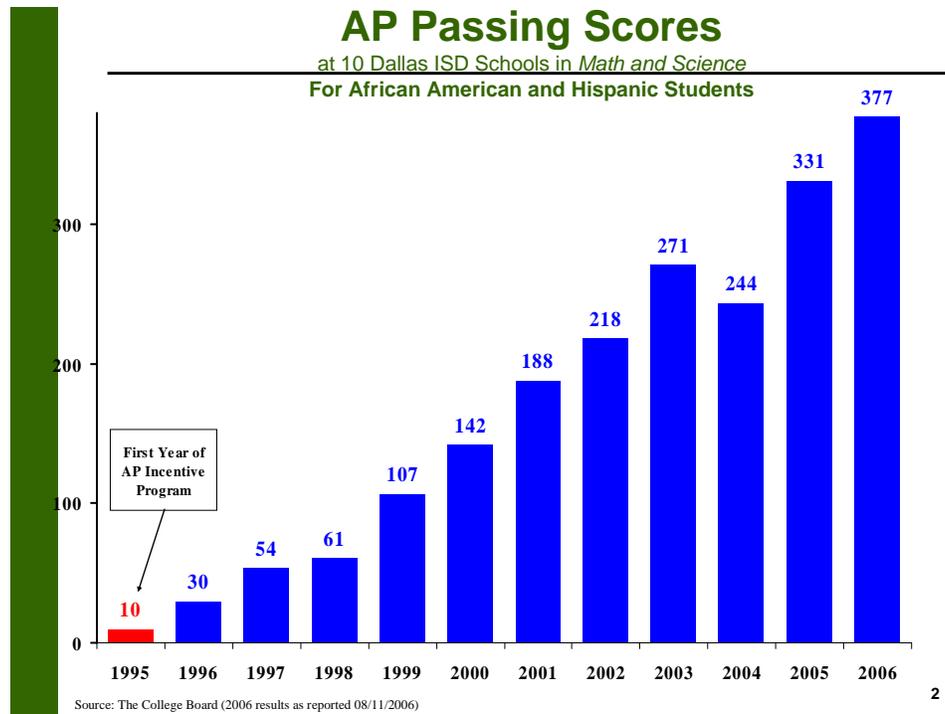
TI and its Foundation support several education programs, but I will discuss a few that speak most clearly to strategies that engage communities in improving education.

Advanced Placement Strategies, Inc. is a non-profit organization that works with Texas schools and the private sector to plan and manage Advanced Placement (AP®) and Pre-AP® incentive programs for teachers, students and schools. The program was created by the O’Donnell Foundation and has been supported by the Texas Instruments Foundation for several years. Exxon Mobil recently provided significant new funding to this program which has garnered considerable attention. It also serves as the basis for the Administration’s request for an expansion of Advanced Placement funding. The program is designed to encourage students to take more rigorous college-level course work in high school, which prepares them for success in post-secondary education, as well as high-tech careers. The program provides financial incentives to teachers and students that are based upon achieving academic results, namely passing the AP test. Other program components include Pre-AP teacher preparation and support; student support, including tutoring, prep sessions and summer academies; and student exam fees for AP and PSAT® exams.

As a result of the AP Incentive program operated in the Dallas Independent School District, the 10 DISD Incentive Schools have seen the number of passing scores for all students in math and science grow 1135% from pre-incentive program levels (from 71 students passing in 1995 to 877 passing in 2006).



In addition the number of passing scores for African-American and Hispanic students in math and science have grown 3670 percent from pre-incentive program levels (10 students passing in 1995 to 377 in 2003).



TI Math Scholars – Underscoring our commitment to build tomorrow’s workforce through higher education, the TI Foundation just recently announced a \$1.1 million gift to establish the TI Math Scholars program at the University of North Texas Dallas Campus. The program’s goal is to encourage more students, especially underrepresented groups such as minorities and women to seek bachelor’s degrees in mathematics and teacher certification. Scholars must agree to teach in the Dallas ISD (priority) or other southern Dallas County school districts for a minimum of two years upon graduation. The TI Math Scholars program will provide a focused degree plan in mathematics with high-quality instruction combined with direct student support initiatives. Full tuition, fees and a book allowance will be awarded to full-time students enrolled in the program. Our goal is 30 students for the 2007 fall semester.

The Infinity ProjectSM is a math and science-rich engineering curriculum for high school students created in collaboration between the Institute for Engineering Education at Southern Methodist University and TI. It is achieving success by helping change student attitudes towards math, science and engineering by exciting students about real world technology applications that are relevant to their lives, such as cell phones, MP3 players, digital special effects in movies and much more. This full-year curriculum is helping both students and teachers answer the age-old question, “Why do I need to learn this math?” By linking fundamental mathematical concepts found in algebra 2 (like polynomials and matrices) to the fascinating and cool applications, students are better prepared and motivated to pursue higher level math and science courses and to consider pursuing engineering and technical degrees.

A hallmark of the program's early success has been the open communication between the Infinity Project and classroom teachers as the curriculum was developed and as it continues to be implemented. That two-way "give and take" has provided a deep understanding of student, teacher, principal and district administrator needs.

The Infinity Project is in its seventh year and has been introduced in several schools across Texas and in 33 other states. Today, the program has numerous corporate sponsors and enjoys support from the National Science Foundation, the U.S. Department of Education, and several universities across the country including George Mason, Purdue, Rose-Hulman, Santa Clara University, University of Michigan, University of Central Florida, University of Arizona, and the New Jersey Institute of Technology, as well as several Texas institutions. Early data indicates that 40 percent of the students who complete the course say they are interested in pursuing engineering in the future. Nationally only 2 percent of the graduating high school population goes on to receive an engineering degree. We hope that Infinity will help boost those numbers. In a pilot study conducted in 2006 in a large urban high school, students taking the Infinity Project course had a 20 percentage point gain in their passing rate on the state-mandated math assessment, versus a 7 percentage point gain in the student population.

Recently, at the urging of TI and other Infinity partners in Texas, the Texas State Board of Education recently voted to require students to complete successfully four years of math and sciences to earn a high school degree under the recommended "college prep" curriculum. And for the first time the board approved engineering as a course option which will fulfill one of the required science graduation credits.

Middle School Math Intervention: Middle school is a critical time for math instruction. TI believes strongly that all students must be prepared to take and pass algebra as a basic skill.

TI's Education Technology division has developed a systemic intervention with the Richardson Independent School District that has yielded promising results of a scalable, replicable program for improved student math performance and decreasing the achievement gap. Richardson school district is highly diverse with roughly with 35% of the student body Caucasian, 31 % African American, 26% Hispanic and 8% Asian. Over 91 languages are spoken by the students.

The RISD/TI middle school mathematics intervention identified and addressed the key components of the overall math education system, relying on research-proven math teaching methods, increasing teacher training on both math content and technology, increasing instructional time and implementing technology in a way that increases student engagement and gives teachers real-time feedback on which math concepts their students have mastered and those concepts the teachers need to spend more time on that students don't yet understand.

The first year program was targeted at students who had failed the 2005 Texas Assessment of Knowledge and Skills (TAKS). Independent evaluation research showed a very large effect size and a 33% pass rate on the TAKS vs. a 19% pass rate in a comparison group.

As a result of this promising first year experience, Richardson ISD is now working with TI to scale the model to more schools and more grade levels, and we are working with additional districts in Texas, Ohio, and Florida to further bring the model to scale.

As an education technology provider to schools, TI has taken the requirements and prescriptions of No Child Left Behind to heart, recognizing that technology used in the classroom must contribute to student achievement. TI recently provided testimony to the National Math Panel (which is scheduled to release its report later this year) that includes independent effectiveness research on the use of graphing technology in the classroom. Specifically, a meta-analysis of eight individual studies addressed the impact of graphing calculator use on student achievement and found strong evidence that student use of graphing calculators increased performance in algebra. TI is now conducting a three-year randomized controlled trial study to further determine the effectiveness of various TI technologies and professional development in Algebra 1. It will be completed this year.

Recommendations

First and foremost, we urge that Congress remain committed to and protect the integrity of the original law – with high standards, assessments aligned to those standards, greater accountability and highly qualified teachers as the formula for continuing to drive improvement. NCLB is making progress. Is it perfect? No. But it is fundamentally sound policy and should be retained.

Second, we must expand high-quality professional development opportunities for current teachers and create opportunities and incentives to draw more qualified people into the teaching profession. Teacher quality is a huge determinant in student achievement.

Third, Congress should support programs that would improve elementary, middle school math instruction, such as MathNow and the Math and Science Partnerships at the Department of Education and National Science Foundation. Effective programs such as the one I described in Richardson, for example, could be scaled under MathNow.

Fourth, at the high school level, we should create opportunities and incentives for more high school students to take and pass Advanced Placement and International Baccalaureate courses.

Finally, we in the private sector must also help by doing our part and ensuring that we are contributing positively to the goals of NCLB and math/science excellence. In that vein, we would like to suggest criteria for ramping public/private partnerships that we feel would help drive student achievement.

1. Require that the program demonstrate how it supports and/or builds upon state standards in mathematics and/or science. Programs that do not support or enhance state standards can be a distraction to schools trying to comply with the requirements of No Child Left Behind, particularly in low performing schools. Mike Moses, the former Superintendent of Schools for the Dallas Independent School District called unaligned programs “random acts of kindness” that while well-intentioned, do not move the ball any closer to the ultimate goal.
2. Require programs that involve professional development to tie into the No Child Left Behind requirement ensuring that teachers are highly qualified. Study after study demonstrates that teacher quality is a key determinant of student success. Private sector efforts should support that goal.

3. Require that programs be replicable and identify the key elements for successful implementation.
4. Ensure that programs demonstrate some clear result, i.e., increased test scores, students taking tougher courses, etc. Soft metrics on the number of “students touched” or “teachers given professional development” are not sufficient.

America is at a crossroads, both in terms of how it responds to the competitive pressures of a worldwide economy and in terms of the focus and priority it gives to ensuring that all students are prepared with the math, science and literacy skills needed to succeed in that economy. Business, government and the academic establishments need to work together, now more than ever, to ensure that we are achieving the right goals and that we are equipping our children with the world-class education they need. This legislation can be an effective tool in aligning private sector resources around this objective.

I want to commend the Committee for its tireless work in support of education excellence. I am happy to answer any questions you might have.