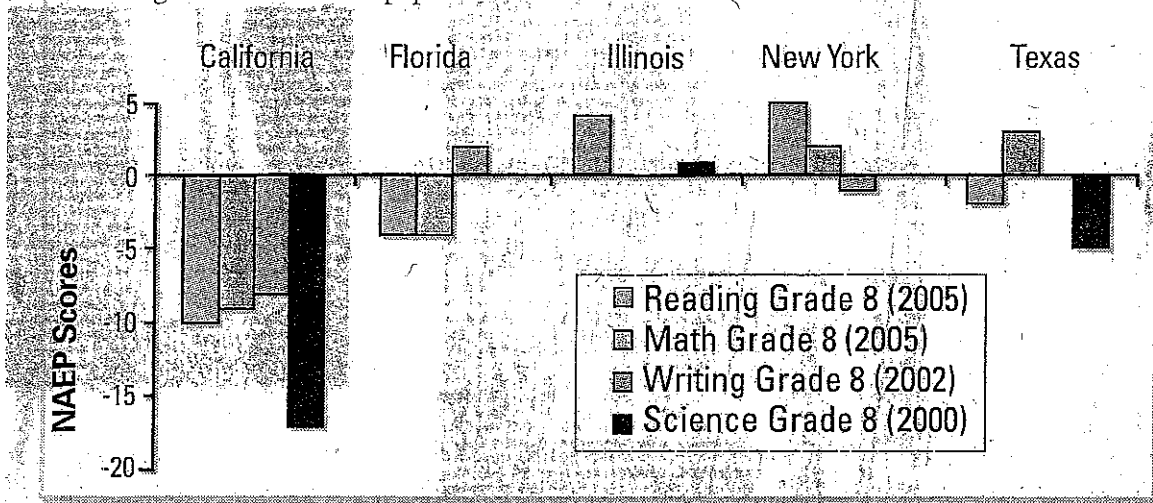


BUSINESS

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Student performance

California students average scores on the National Assessment of Educational Progress test are significantly below those of students nationwide. California's scores fell in tandem with the state's history of spending \$1,000 less per pupil on education, studies found. Here is how eighth-graders ranked against the four other populous states in 2005.



Staff

Low science, math education funding threatens state's tech leadership

By **Barbara Grady** | Business Writer

CALIFORNIA is home to one-fourth of the nation's billionaires, many of them software engineers who made it big in the tech boom. The state has the sixth-largest economy in the world — bigger than all other far West states combined. And Californians have higher incomes than people nationwide.

Yet California spends less on educating its students than two-thirds of the states — ranking 33 in spending per pupil. Its classrooms are more crowded than those in all but two states. And, not surprisingly given these other statistics, academic achievement among California kids ranks among the lowest in the 50 states based on standardized tests.

So why does the richest state and the technology capital of the world invest so much less in education?

More importantly, what will be the consequences?

Nothing short of California fading as the technology leader of the world, business groups warn.

"California has a window of opportunity to prepare the highly educated work force we need to maintain our position as an economic leaders," said Bill Hauck, president of the California Business Roundtable, at a press confer-

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PRESIDENT,
CALIFORNIA BUSINESS ROUNDTABLE

edge we now have over other states and international competitors."

The problem has captured the attention of numerous business groups from the roundtable to TechNet to the Silicon Valley Leadership Group, which have made education reform and spending a top issue this year. They are lobbying for more money for education, particularly for math and science, and for reforms and more teacher training.

In a year California claims three Nobel Prizes in science — won by Bay Area professors at Stanford University and the University of California, Berkeley — they worry whether this legacy will continue.

California's slide compared to the nation is happening even as U.S. students fall behind

► EDUCATION, from Business 1

peers in China, India, Korea, Japan and Europe in their mastery of math and other academic subjects

Maintaining a culture of innovation in the United States will require a larger homegrown pool of energized and creative mathematicians and scientists," warns the National Venture Capital Association, which puts education on the very top of its 2006 innovation initiative. The AeA, formerly the American Electronics Association, has pushed Congress to hold hearings on the education achievement of U.S. kids

Just this past week 60 industry executives and academic leaders sent a letter to California's gubernatorial candidates urging them to adopt the coalition's agenda, which calls for the state to spend more on hiring math and science teachers for California's K-12 schools and to help enroll more math and science students at California's public universities.

California has revised its curriculum standards in recent years — adding more stringent requirements in math and laboratory sciences, and a more hands-on approach to learning science — and the federal government has upped its requirements through No Child Left Behind. But the requirements have not been matched with significant increases in funding

The American Competitiveness Initiative started by the Bush administration this year recognizes the need for more math and science education, but assigns only \$412 million to its education effort for all of the United States. Also, it expands the college loan program by about \$800 million a year

In California, education organizations have long sought more state funding. This year the state education budget increased, but it still does not restore money cut early in this decade when education funding dropped precipitously.

Why does this matter?

The most immediate consequence is a shortage of sufficiently trained workers

Homegrown talent is becoming a scarce resource," warns the Silicon Valley Leadership Group in a 2006 study. Noting "an alarming decline in the number of American students training to be scientists," it says that "Silicon Valley and the state are at a crossroads in how we prepare our children and train our workers."

Among California's 18- to 24-year-olds, only 40 percent are enrolled in college according to the National Report Card on Higher Education, and only 25 percent of that age group actually graduates from college

Those are the people expected to replace a good part of California's current work force as baby boomers begin to retire. But today's work force consists of 42.6 percent college graduates according to Census Bureau statistics

The California Business Roundtable and Campaign for College Opportunity see a severe shortage of knowledge workers hitting California over the next 16 years, as demand for college-educated workers grows 48 percent at the same time fewer Californians are graduating from college and more

"The number of kids taking AP classes and calculus at Berkeley High School is large and growing. The state, in terms of standards, has moved everything up significantly."

Neil Smith

ASSISTANT SUPERINTENDENT, BERKELEY UNIFIED SCHOOL DISTRICT

than 1 million baby boom workers are expected to retire

Already, technology companies have a hard time finding skilled workers

Job postings from such Bay Area tech companies as Intel Corp., Sybase Inc., Juniper Networks Inc. and Oracle Corp. show dozens of unfilled job openings for software engineers, computer scientists and the like

Companies are going to creative means to find them. Dublin-based Sybase identifies and mentors college students studying computer science, keeping them up to date on technologies Sybase uses while they are in school so they'll be ready for hire when they graduate

Some companies find recruitment such a sensitive business competition topic that they refused to talk about it for publication.

With such demand for good-paying tech jobs, why aren't more students interested in studying math and science?

Sixth-graders Krystal Swan and Caley Keene of Albany Middle School say math comes easy to them, but they have mixed reactions as to how interesting it is. For Swan "math has been my best subject since kindergarten," and she is so good at it she helps older kids with their algebra homework. For Keene, "I'm good at it but I don't like it." Why? "Because you get the same things all the time."

Educators and policy observers say something happens between fourth and eighth grade that leads to declining interest in math and often declining ability. Standardized tests given to all students in fourth and eighth grades and high school exit exams trace a deterioration in California kids' absorption of math

Across California, 71 percent of fourth-graders met a "basic" or "proficient" measure of knowledge in math in 2005 on National Assessment of Educational Progress tests. But by eighth grade, only 57 percent of California eighth-graders met the basic or proficient standards

Our belief is that it really starts early on. Part of the reason we see a flattening in number of kids with science and engineering degrees is because when kids go into college they are not prepared for those majors," said Josh James, senior research and policy analyst at AeA.

Mae Jemison, a medical doctor and astronaut who was the nation's first African-American woman in space, is the national advocate for Bayer Corp.'s Making Science Make Sense educational program. She says the answer lies in introducing students, particularly minorities and girls, to the applica-

tions of math and science early on. Bayer, which employs 1,500 people in Berkeley, is among several companies that have pushed for programs to encourage science and technology professionals to consider teaching

"These individuals have a real wealth of information to contribute," Jemison said. A new state law makes it easier for people with certain skills to become certified as teachers

The California Department of Education has revised the curriculum for K-12 public schools and has pushed districts to meet standards based on the new curriculum. These curriculum and standards adjustments are beginning to enlarge the number of kids in math and science

"The number of kids taking AP classes and calculus at Berkeley High School is large and growing," said Neil Smith, assistant superintendent at the Berkeley Unified School District. "The state, in terms of standards, has moved everything up significantly," such that algebra is now an eighth-grade course instead of ninth-grade and laboratory sciences are taught earlier

High school students in San Mateo, Berkeley and other school districts are now required to have three years of math and two years of lab science to graduate

In the San Mateo Union High School District, a revision of the math and science curriculum came not only from state nudging but also parents and teachers looking at the reality of the job market

"It grew out of our district's strategic plan to up the achievement level of our kids and close the achievement gap," said Mark Avelar, deputy superintendent for instruction. "Look at job market surveys," he said, noting that even those jobs that do not require a college degree require technical knowledge in math and science

New curriculum requirements are a step in the right direction

UC Berkeley runs a summer Academic Talent Development Program for K-11 students introducing them to higher level science and math curriculums. UC Berkeley as well as Santa Clara University also run summer institutes for teachers to learn the latest in math and computer sciences

What's missing is the money

Science textbooks were so old in Berkeley's three middle schools that parents launched a fund-raising campaign to buy new science textbooks to go with the new curriculum. Yet providing textbooks is a constitutional requirement of the school districts and the state

If California's tech firms cannot find enough qualified workers among people raised and educated in California, there is always the out-of-state and international labor pool

But the California Business Roundtable notes, "It is risky for the state to depend on outside migration" to make up for California's "weakness in producing college graduates." For one, talent in other U.S. states and from India, China and elsewhere are starting to stay home

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