

POLICY Research Brief

EXAMINING KEY EDUCATION ISSUES

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Global competitiveness in the 21st century

Are our schools up to the challenge of preparing students for a rapidly changing world?

By *Chrisanne L. Gayl*

Educational opportunity and achievement have long been hallmarks of our nation—and key to the success of our democracy and economy. Yet, recent headlines stating that the United States is losing its competitive edge to international competitors, such as India and China, have led many to question our economic and political security and to worry that the next generation of Americans might not be as well off as the current one.

According to many policy-makers, business leaders, and analysts, the United States' economic future depends directly on our ability to raise our academic standing. Not surprisingly, a majority of Americans also share this view.

In a 2006 report, *Keeping Our Edge: Americans Speak on Education and Competitiveness*, the Educational Testing Service found 64 percent of Americans believe the nation's "ability to remain globally competitive will be compromised within the next decade" if we do not reform our education system now.

Such strong beliefs warrant a deeper look into the data underlying these assumptions, as well as a frank discussion

about what can be done to ensure that all young people are adequately prepared for the future. This policy brief examines the myths and realities about U.S. education in the current debate on global competitiveness and suggests ways for local school boards to improve their instructional programs to meet the challenges of

the 21st century. In addition, this brief offers policy recommendations on how the federal government can help support these efforts.

It should be noted that while this brief centers primarily on the impact of education on the nation's ability to compete in the global economy and the need to ensure future economic

prosperity for our children, preparation for the job market is not the only reason students need an academically rigorous education.

Education serves many purposes in society—to prepare children for citizenship, cultivate a skilled work force, teach cultural literacy, and help students become critical

Table 3
Where the U.S. Ranks Internationally in Math, Science, and Reading

Comparison of U.S. to Participating Countries		Math				Science			Reading			
		TIMSS 2003		PISA 2003	ALL 2003 (numeracy)	TIMSS 2003		PISA 2003	PIRLS 2001	PISA 2000	ALL 2003 (prose literacy)	ALL 2003 (document literacy)
		4th grade	8th grade	Age 15	Ages 16-65	4th grade	8th grade	Age 15	4th grade	Age 15	Ages 16-65	Ages 16-65
No. scoring above U.S.	All participating	11	9	20	4	3	7	15	3	3	4	4
	G8 only	3	1	3	1	1	1	4	1	1	1	1
No. scoring same as U.S.	All participating	0	10	3	0	5	4	10	8	19	0	0
	G8 only	0	1	0	0	2	0	2	3	5	0	0
No. scoring below U.S.	All participating	13	25	6	1	16	33	3	23	5	1	1
	G8 only	1	1	2	1	1	2	0	2	1	1	1

Source: Center for Public Education, www.centerforpubliceducation.com

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About NSBA

The National School Boards Association is the nationwide advocacy organization for public school governance. NSBA's mission is to foster excellence and equity in public elementary and secondary education in the United States through local school board leadership. Founded in 1940, NSBA is a not-for-profit federation of state associations of school boards across the United States and the school boards of the District of Columbia, Guam, Hawaii, and the U.S. Virgin Islands.

About the National Affiliate Program

The National Affiliate Program extends NSBA's services directly to local school districts. School districts are eligible to join provided they are members in good standing of their state school boards associations.

About the Advocacy and Issues Management Section

The Advocacy and Issues Management Section implements NSBA's Action/Advocacy Agenda and carries out NSBA's lobbying efforts at the national level. By lobbying the Congress, the White House, and federal agencies, the section helps increase federal funding for local school districts and reduces costly federal mandates; helps improve federal education programs by making legislative and regulatory changes local board members support; protects the governance role of school boards from congressional attack; and promotes the role of school boards as a key democratic institution in our country's education system.

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thinkers—as well as cultivate a skilled work force. Each of these outcomes has value on its own merits.

Myth v. reality

Recent publications, such as *Rising Above the Gathering Storm*, published by the National Academies Press, and Thomas Friedman's 2005 best-seller, *The World is Flat*, conjure an image of impending doom and suggest that America is falling further and further behind its global competitors.

To be fair, education is just one factor that determines a country's competitiveness. Other factors, such as tax policy, use of capital, and worker training, also contribute to a nation's ability to compete successfully in the global marketplace. To focus exclusively on it is unrealistic and ignores the larger, more complex context in which our economy operates. For the purposes of this brief. However, we narrow our focus on K-12 education.

So, what does the data say? Is America really losing its competitive edge in the world, or is all this talk simply a manufactured crisis to scare the American public into caring more about what a select group of corporate leaders think is important?

According to a report released by NSBA's Center for Public Education earlier this year, the answer is somewhere in the middle. "American students aren't 'failing' as some overwrought headlines would suggest," states *More than a Horse Race: A Guide to International Tests of Student Achievement*. "But we don't win, place, or show on any international test of knowledge and skills, either. In the vast space in between, our performance varies considerably depending on the subject area being tested and the age of test-takers." Data indicate that U.S.

fourth-graders do relatively well in math compared to their international counterparts, but their scores become mediocre in the eighth grade and fall behind in high school.

Compared to similar countries, like those in the G8, the results are less positive in the early years, with U.S. students ranking near the middle of the pack and declining as they age. (The G8—Group of Eight—is an organization of the eight most industrialized countries in the world, which includes Japan, England, Germany, Italy, France, Russia, and Canada, as well as the United States.)

In science, U.S. high school students are significantly outscored by their peers, with scores that are below the international average, according to the 2003 Programme for International Student Assessment (PISA).

However, younger cohorts of students—both fourth and eighth-graders—scored above the international average on the 2003 Trends in International Mathematics and Science Study (TIMSS). In fact, only three countries' elementary students did significantly better than U.S. students. [See the table on page 1.]

When it comes to reading, international data show that American students are doing very well compared to their peers across the globe. Only three countries significantly outscored the United States at the elementary and high school levels, reports the 2001 Progress in International Reading Literacy Study (PIRLS). The reading performance of fourth-graders was particularly strong.

While overall U.S. student performance on these benchmarks has improved in the last decade, the achievement of students in other countries is rising as well. This means that the United States' relative standing has been for the most part

unchanged since the mid-1990s. While this information is not reassuring, it also does not paint as bleak of a picture as some would suggest.

Performance on international assessments, however, does not reveal the whole picture. Equally important is how students are able to apply their knowledge to real-world settings and problem solving. To compete effectively in the 21st century requires much more than knowledge of subject matter content; students need a host of skills that involve the ability to analyze, create, and communicate effectively. Unfortunately, adequate and reliable international measures of these abilities are scarce.

Competition from abroad

Much has been written about the threat that students from countries such as India and China pose to the economic future of those in the United States. While these countries are not represented in international assessment data, it is no secret that they have been ramping up their education systems to compete globally for skilled jobs.

As such, many high-profile reports have sounded urgent calls for more college graduates in science and math-related fields with claims that the U.S. is falling behind.

One statistic that is often cited is that China is graduating 600,000 engineers every year and India, 350,000—numbers that some say are six to 10 times that of the United States.

Given the level of education (postsecondary and above) that it takes to become an engineer in the United States, one might question if this is necessarily a problem for our K-12 education system to address.

Nonetheless, these figures are also misleading, given the varying definitions of what con-

stitutes an “engineer” in China and India. Researchers at Duke University pointed out in a 2005 report, *Framing the Engineering Outsourcing Debate*, that the actual numbers might be just half of what has been reported, given these differences.

Furthermore, the combined school-aged populations in India and China are 10 times greater than that of the United States. This demographic difference has an obvious impact on the number of graduates that a country is able to produce. Even if only a small fraction of Indian and Chinese students go into math and science-related fields, these countries are still likely to produce more individuals with this specialized training, given the sheer size of their populations. Therefore, to compare such numbers is like comparing the population of Connecticut to California.

What students need to know

Perhaps more fundamental to the competitiveness debate is the question of what students need to know to be successful in the global economy. The answer to this question will have a strong impact on what schools should be doing to prepare their students for the realities and challenges of the 21st century.

According to some, high school graduates will need additional training in mathematics and science if they are to have a choice of good jobs in the future. The U.S. Department of Labor’s *Occupational Outlook Quarterly* projects that employment in occupations requiring education in computer and mathematical science will grow more than twice as fast as other occupations. Employment in the life, physical, and social sciences is anticipated to increase by 16 percent.

The Bureau of Labor Statistics estimates that the

U.S. economy will add 1 million scientists, engineers, and technicians (of varying levels) between 2002 and 2012. This is a small percentage, however, of the 21.3 million jobs that are forecasted to be created.

Furthermore, in looking at the overall number of jobs forecasted in the United States, openings in retail, sales, food preparation, and customer service will make up a larger portion of the job market than those related to science, engineering, and math. This is because employment prospects depend on more than just job growth. Openings for new workers occur not only when jobs are added to the economy, but also when current workers leave an occupation permanently. In fact, the need to replace workers who leave an occupation is expected to create more openings than job growth.

The reality is that not all students—not even the majority of students—will go into math and science-specific jobs. Of the nearly 150 million jobs in the U.S. economy today, only a fraction are dedicated to science, engineering, and math fields. While this number is expected to grow over time, it will not account for the majority of job openings in the future. Nevertheless, as responsible stewards of our children’s future, our education system should be designed to provide students with the skills they will need if they choose to pursue these career paths.

In addition, evidence does suggest that employers are requiring more mathematical knowledge of their employees than in the past. An unpublished survey conducted for the American Diploma Project indicates employers place high value on high school-level competencies, such as probability and statistics, and want their employees to be competent problem solvers.

There is also strong consensus among employers regarding the importance of a college-prep mathematics curriculum that includes algebra 1, geometry, and algebra 2. According to the survey, employers value this math sequence for its content, but they also note that individuals with this background stay in the math and science pipeline longer and are thus able to use higher levels of mathematics as their jobs demand it.

Many studies suggest that employers also value employees with strong reading, writing, and English-speaking abilities. On a purely practical level, workers need to be able to read and comprehend documents that are pertinent to their work. They need to be able to synthesize information from various sources and write about it coherently and concisely. But employers also believe a basic understanding of literature is important, suggesting that it helps to develop empathy with people of all cultures, which is necessary when interacting with diverse customers and co-workers around the globe.

One thing is certain—businesses of all types are encountering a need for employees with higher-level skills. A 2006 empirical study by ACT Inc., which compared the knowledge and skills needed to be “college ready” with those required to be “work force ready,” found that high school students need to be educated to comparable levels in reading and mathematics, regardless of the path they choose after graduation.

Such data suggests that in order to remain relevant in the 21st century economy, continued success will require that our educational system adopt rigorous standards and curricula for all students—regardless of their career path. To do any less ignores the fundamental transformation that has taken place in the workplace.

21ST CENTURY SKILLS

The Partnership for 21st Century Skills recommends that all students be taught the following skills:

- **information and communication skills (including media literacy);**
- **thinking and problem-solving (critical thinking and systems thinking; problem identification, formulation, and solution; creativity and intellectual curiosity);**
- **interpersonal and self-direction skills (collaborative skills, accountability and adaptability, social responsibility);**
- **global awareness;**
- **financial, economic, and business literacy (including entrepreneurial skills to enhance workplace productivity and career options); and**
- **civic literacy.**

Today’s world is also more global, innovative, interactive, and dynamic than ever before. As a result, students must possess not only specific content knowledge, but also skills that are adaptable and flexible. To be productive workers in a rapidly changing economy, individuals will need to have the skills and competencies to make effective and innovative use of what they know throughout their lives.

To address these challenges, representatives from business, education, and government have come together through the Partnership for 21st Century Skills to identify a basic rubric of cross-disciplinary “real-world” skills that students will need to successfully engage in 21st century workplaces and

communities. These include communications, problem solving, interpersonal, and self-direction skills, and global awareness.

What can school board members do?

At the core of their mission, all school districts are working to provide students with the highest-quality instruction to promote student achievement. In order to do so well, school board members should not focus on perfecting the past but instead prepare for the future. Today's world is vastly different from the one when they went to school; therefore, they must bring a fresh mindset to the task.

As a starting point, school board members should make sure that they are familiar with the course-taking patterns and achievement levels of their students. This includes disaggregating the data by gender, race, and other factors to determine if all students are receiving a genuine opportunity to succeed. Today, all students must take rigorous coursework to be successful in college and the workplace—these two paths are no longer mutually exclusive.

School districts must use modern methods and new strategies to remain effective and relevant in the 21st century. The classrooms of today must be equipped to prepare students for the high-tech environments they will face upon graduation. This means districts need to integrate new technologies, online learning, and interactive software to enhance student achievement and personalize instruction.

And there is much more they can do. School board members might want to consider the following questions to guide their thinking in assessing the competitiveness of their districts:

- What are our goals for enhancing the competitiveness of our students? What assumptions, data, and comparisons are we using to set these goals and how do we achieve them?
- Is the breadth and depth of our curriculum sufficient to teach our students what they need to know? Are our textbooks up to date?
- How are we integrating 21st century skills into core subject matter curricula?
- Do our math and science teachers possess specialized training or expertise in the subject areas that they teach?
- How many Advanced Placement courses do we offer? What are the scores of the students who take AP exams?
- What are we doing about students at risk of dropping out? Are we able to identify them?
- Do we have connections with the university community that can help to enrich our curriculum?
- What opportunities, both in class and extracurricular, do we offer to engage students in STEM (science, technology, engineering, and mathematics) fields? Should we be offering more?
- Are we working with our business community to ensure that what students are learning is relevant and applicable to the work force?

Such questions can help school board members identify areas for improvement and develop policies that will ensure that their students are prepared for the world of tomorrow.

Federal policy

Providing students with the knowledge, skills, and technical expertise that they will need to be successful in the 21st century, requires a collaborative effort among all stakeholders—local, state, and federal. NSBA urges Congress to take the following actions to help local

school districts prepare students to be competitive:

- **Create programs and incentives to increase the supply of knowledgeable math and science teachers**, especially in rural and low-income school districts where shortages of qualified teachers are most acute. These may include post-secondary programs that allow students to master subject expertise while simultaneously earning a teaching credential, student scholarships, or differential pay for teachers of various subjects.
- **Provide resources for substantial, subject-based professional development** to support teachers in their efforts to teach rigorous content to all students. Research shows that professional development can have a profound impact on student achievement when it is school based, ongoing, and focused on high-level curriculum.
- **Increase AP, pre-AP, and International Baccalaureate opportunities for students** by providing resources for school districts to develop and sustain curricula, hire qualified staff, expand professional development, supply the necessary instructional materials, and offset students' costs for taking the exams.
- **Encourage partnerships between school districts and institutions of higher education** to expand foreign language and STEM opportunities for students. Exposure to these subjects can have a significant impact on generating student interest in these fields, and will help prepare students to be more competitive in the global marketplace.
- **Provide resources to acquire, integrate, support, and evaluate the use of technology in the classroom** to modernize teaching and learning and to provide students with the most up-to-date skills needed in the workplace.

- **Support efforts to expand high-quality, voluntary prekindergarten programs.**

Many of our global competitors begin investing in their citizens much earlier in their educational lives, which might give them a competitive advantage in preparing their students for future economic success.

- **Provide assistance to states and school district to develop multiple ways of assessing student performance** in high school to encourage greater diversity in the courses that students take and a more personalized learning approach.
- **Develop alternative certification models and programs** to allow career professionals to enter the teaching field so students are able to benefit from their real-world experiences.

Conclusion

While recent reports that the United States is falling behind its international competitors might be exaggerated and overly pessimistic, the underlying focus of these studies is well founded.

If the U.S. economy is to remain strong in the 21st century, the education system must do its part to produce the type of workers that will be globally competitive. To meet this challenge, we must educate our students with the fundamental knowledge and essential skills that will allow them to excel in and adapt to an ever-changing workplace.

Research tells us that today's students must possess more advanced knowledge and be more innovative, creative, and flexible than ever before. But school districts cannot succeed in this task alone. It will take a national commitment to ensure that all stakeholders—education, business, and government—are working together to provide students with the tools and resources that they need. ■