HBR.ORG

Harvard Business Review

MARCH 2012
REPRINT R1203E

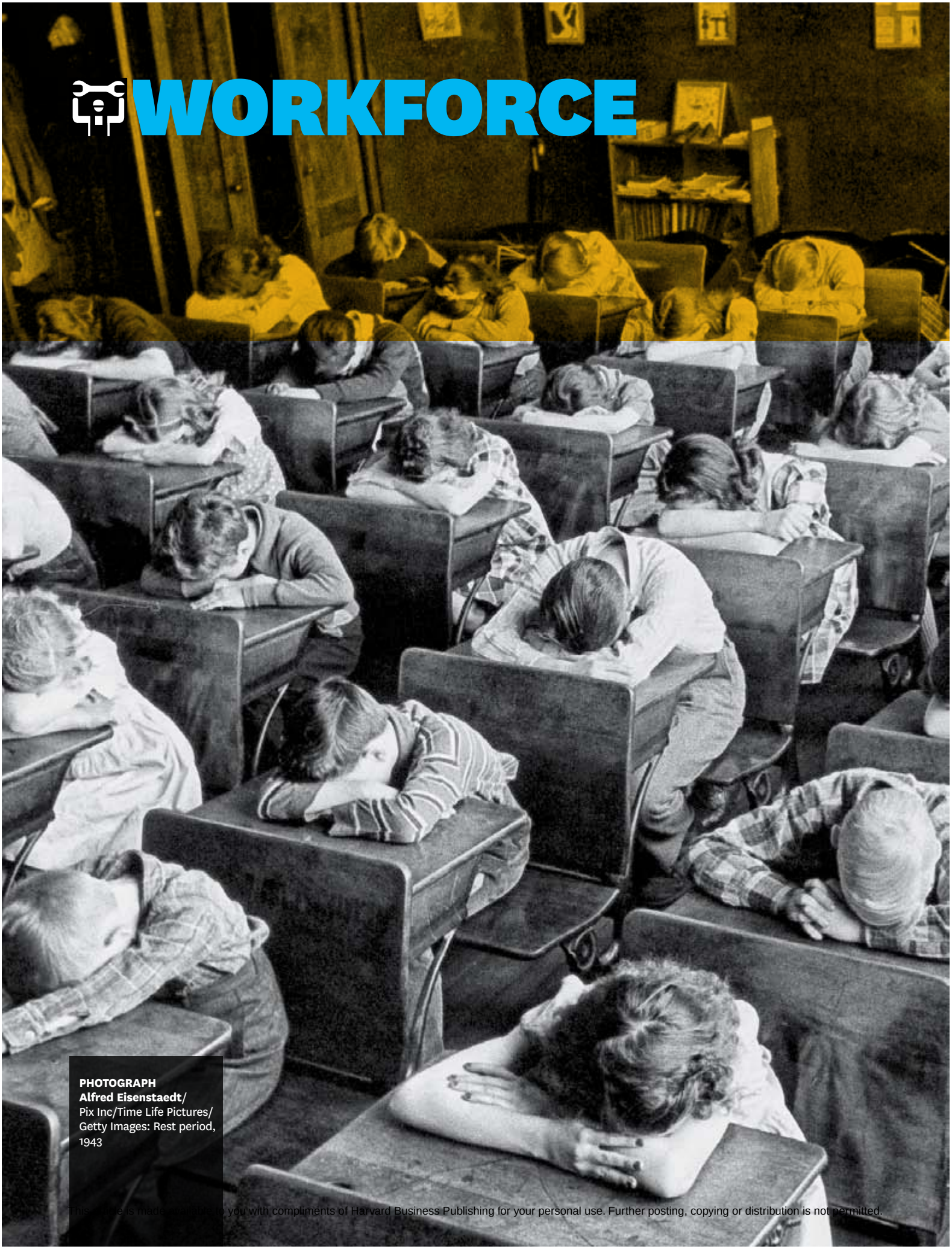
RESTORING U.S. COMPETITIVENESS

Rethinking School

For the U.S. to remain competitive, its students need to learn vastly more, much more quickly. New approaches prove they can. ***by Stacey Childress***

This article is made available to you with compliments of Harvard Business Publishing for your personal use. Further posting, copying or distribution is not permitted.

WORKFORCE



PHOTOGRAPH
Alfred Eisenstaedt/
Pix Inc/Time Life Pictures/
Getty Images: Rest period,
1943

This article is made available to you with compliments of Harvard Business Publishing for your personal use. Further posting, copying or distribution is not permitted.

FOR ARTICLE REPRINTS CALL 800-988-0886 OR 617-783-7500, OR VISIT HBR.ORG

RETHINKING SCHOOL

FOR THE U.S. TO REMAIN COMPETITIVE, ITS STUDENTS NEED TO LEARN VASTLY MORE, MUCH MORE QUICKLY. NEW APPROACHES PROVE THEY CAN.

BY STACEY CHILDRESS

IN 2008 THE STANFORD economist Eric Hanushek developed a new way to examine the link between a country's GDP and the academic test scores of its children. He found that if one country's scores were only half a standard deviation higher than another's in 1960, its GDP grew a full percentage point faster in every subsequent year through 2000.

Using Hanushek's methods, McKinsey & Company has estimated that if the U.S. had closed the education achievement gap with better-performing nations, GDP in 2010 could have been 8% to 14%—$1.2 trillion to $2.1 trillion—higher. The report's authors called this gap "the economic equivalent of a permanent national recession."

The implications could not be clearer: The United States must recognize that its long-term growth depends on dramatically increasing the quality of its K–12 public education system.

HOW BAD IS IT?

By practically any measure, the quality of public K–12 education in the United States is dismal. Of the high school seniors who in 2009 took the biennial National Assessment of Educational Progress (NAEP) tests, administered by the U.S. Department of Education, fully 74% scored below proficient in mathematics, 62% in reading, and 79% in science. Within those sorry aggregate scores lay the familiar disparities among black and Hispanic Americans, who lag behind their fellow students on the exams by as much as 20 to 30 points. Poor K–12 achievement has a direct impact on success in higher education. Even though U.S. students have been getting into college in ever increasing numbers over the past 20 years, the college graduation rate has not risen. Over the past 30 years, nearly every labor-intensive service industry in the U.S. has seen dramatic increases in productivity, while public education has become roughly half as productive—spending twice the money per student to achieve the same results.

While the U.S. stagnates, other countries are pulling ahead. For instance, in 2009 the latest round of comparative international exams administered by the Organisation for Economic Co-operation and Development (OECD), American 15-year-olds ranked 25th in math, 17th in reading, and 22nd in science among its 34 member nations. Chinese students took the tests for the first time in 2009 and blew everyone away, ranking first in all three subject areas. More than 50% of China's students scored in the top two levels (out of six) in math, while less than 10% of U.S. students did.

In 1990 the U.S. was first in the world in the percentage of 25- to 34-year-olds with college degrees. Today it is 10th and dropping. Meanwhile, the need

This article is made available to you with compliments of Harvard Business Publishing for your personal use. Further posting, copying or distribution is not permitted.

AMERICA'S REPORT CARD

MANY NATIONS OUTRANK THE U.S. ON TESTS

U.S. students' scores on recent tests are mediocre by comparison with those of many other students worldwide. China enters the race at the top.

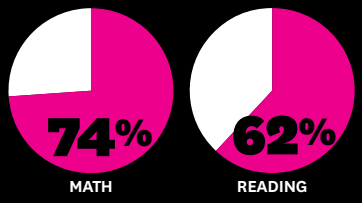
OECD COUNTRIES IN BOLD

MATH	READING
CHINA	CHINA
FINLAND	**KOREA**
KOREA	**FINLAND**
HONG KONG	HONG KONG
LIECHTENSTEIN	**CANADA**
SINGAPORE	SINGAPORE
MACAO	**ESTONIA**
CANADA	**JAPAN**
JAPAN	**AUSTRALIA**
ESTONIA	**NETHERLANDS**
TAIWAN	**NEW ZEALAND**
NETHERLANDS	MACAO
SWITZERLAND	**NORWAY**
NEW ZEALAND	**POLAND**
AUSTRALIA	**DENMARK**
ICELAND	TAIWAN
DENMARK	LIECHTENSTEIN
NORWAY	**SWITZERLAND**
GERMANY	**ICELAND**
BELGIUM	**IRELAND**
UNITED KINGDOM	**SWEDEN**
SLOVENIA	**HUNGARY**
POLAND	LATVIA
IRELAND	**UNITED STATES**
SLOVAK REPUBLIC	**PORTUGAL**
SWEDEN	**BELGIUM**
HUNGARY	**UNITED KINGDOM**
CZECH REPUBLIC	**GERMANY**
FRANCE	**SPAIN**
LATVIA	**FRANCE**
AUSTRIA	**ITALY**
UNITED STATES	**SLOVENIA**
PORTUGAL	**GREECE**
SPAIN	**SLOVAK REPUBLIC**
LUXEMBOURG	CROATIA
ITALY	**CZECH REPUBLIC**
LITHUANIA	LITHUANIA
RUSSIAN FEDERATION	**TURKEY**
GREECE	**LUXEMBOURG**
CROATIA	**ISRAEL**
DUBAI (UAE)	RUSSIAN FEDERATION
ISRAEL	**AUSTRIA**
SERBIA	**CHILE**
TURKEY	DUBAI (UAE)
AZERBAIJAN	SERBIA
ROMANIA	**MEXICO**
BULGARIA	ROMANIA
URUGUAY	BULGARIA
MEXICO	URUGUAY
CHILE	THAILAND
THAILAND	TRINIDAD AND TOBAGO
TRINIDAD AND TOBAGO	COLOMBIA
MONTENEGRO	JORDAN
KAZAKHSTAN	MONTENEGRO
ARGENTINA	BRAZIL
JORDAN	TUNISIA
ALBANIA	ARGENTINA
BRAZIL	INDONESIA
COLOMBIA	ALBANIA
PERU	KAZAKHSTAN
TUNISIA	QATAR
QATAR	PERU
INDONESIA	PANAMA
PANAMA	AZERBAIJAN
KYRGYZSTAN	KYRGYZSTAN

SOURCE OECD PROGRAM FOR INTERNATIONAL STUDENT ASSESSMENT OF 15-YEAR-OLDS, 2009

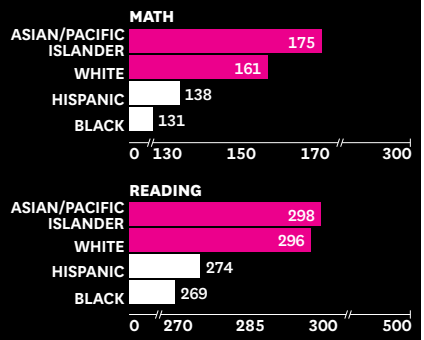
LOW NATIONAL TEST RESULTS

A shocking percentage of American 12th graders score below proficient.



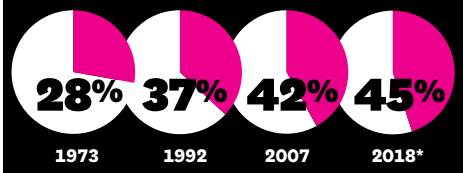
MINORITY GAP

Hispanic and black students persistently lag behind on tests, as reflected on national assessments such as this one of 12th-graders.



SOURCE NATIONAL ASSESSMENT OF EDUCATIONAL PROGRESS, 12TH-GRADERS, U.S. DEPARTMENT OF EDUCATION, 2009

PERCENTAGE OF JOBS NEEDING A COLLEGE DEGREE

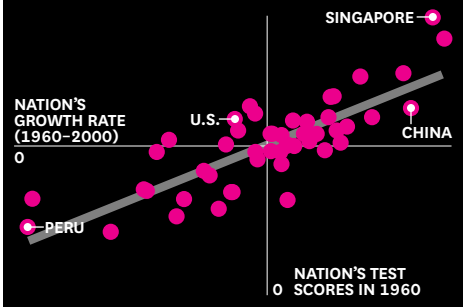


*PROJECTED

SOURCE GEORGETOWN UNIVERSITY CENTER ON EDUCATION AND THE WORKFORCE, JUNE 2010

INFERIOR TEST SCORES ARE A DRAG ON U.S. GDP GROWTH

Economists have found that countries whose students scored high on tests in 1960 had better growth rates for the next 40 years than countries whose students scored low.



SOURCE ERIC A. HANUSHEK AND LUDGER WOESSMANN, *JOURNAL OF ECONOMIC LITERATURE*, 2008

for those degrees in the workplace continues to intensify. In the recession year 1973, 28% of jobs in the workplace required a college degree. By 2007 the percentage had grown to 42%. By 2018, the U.S. Department of Education estimates that it will be 45%. Where will these degrees come from?

Forty years of education research confirms that the quality of a student's teacher is the biggest factor in boosting that student's performance. Good teachers make so great a difference that the lag in black and Hispanic children's test scores disappears when they have teachers who, four years in a row, perform in the top quartile of teachers in their school or district. There are 3.5 million K–12 classroom teachers in the United States, according to the U.S. Bureau of Labor Statistics, making them the second largest workforce after retail clerks. They are employed by more than 14,000 separately governed school districts. Needless to say, incremental efforts to improve teacher effectiveness, while important, are complex and slow going.

Even in those places that have gone the furthest, progress has been nowhere near fast enough. New York City is a sobering example. The administration and unions there negotiated a contract that ended seniority preferences and gave principals broader hiring power. Years of investment in building a stronger applicant pool have paid off in some six applicants for every open teaching position. The city has invested tens of millions of dollars in better data systems, calculates the value each teacher contributes to student performance, and grades each school relative to other schools and its own past performance. These and other reforms have resulted in NAEP scores that rose 3% annually in math and reading between 2003 and 2011, even as national rates remained flat. But at that pace it will take more than 40 years for 80% of New York City students to reach math and reading proficiency, let alone the level of excellence that Chinese students are already achieving. For the U.S. to remain competitive, its students must go further faster.

WHAT CAN BE DONE NOW

U.S. public schools have been largely impervious to the productivity gains that other sectors have realized from technology, for two main reasons. First, until recently, they hadn't widely adopted technology: Education ranked dead last, a 2002 Commerce Department study reported, in deployment of technology relative to number of employees. Second,

COPYRIGHT © 2012 HARVARD BUSINESS SCHOOL PUBLISHING CORPORATION. ALL RIGHTS RESERVED.
This article is made available to you with compliments of Harvard Business Publishing for your personal use. Further posting, copying or distribution is not permitted.

when technology was deployed, it wasn't being used to do anything differently—a problem many industries have long since confronted and resolved.

But a number of entrepreneurs and public school leaders have been experimenting with new technologies and new ways to apply them (which I have been studying for six years at Harvard and now at the Bill & Melinda Gates Foundation) that show real promise of delivering the kinds of productivity gains that so many other sectors have achieved. A new generation of sophisticated adaptive courseware and schools that blend the best of teacher- and computer-delivered instruction are making personalized-learning approaches feasible and affordable, not as a replacement for teachers but as a way to give them the tools they need to become dramatically more effective.

Personalized learning is not a new idea, and its value is well established: Research shows that individually tutored students perform two standard deviations higher than (or better than 98% of) their traditionally taught peers. Adaptive software makes personalized learning practical through a combination of data analysis and pattern recognition technology—something like a more sophisticated version of Netflix's recommendation engine—which tailors instruction by offering up different content and exercises depending on how students did on the previous one.

DreamBox Learning delivers math lessons for kindergarten through grade three in this way, allowing students to work alone at their own pace while providing their teacher with a dashboard of granular diagnostic information about what they're mastering, what they're missing, and why. Armed with this knowledge and freed from the demands of large-group instruction, a single teacher can tailor his or her efforts to the individual needs of dozens of students. Students who work with DreamBox and Reasoning Mind, a similar program for grades three through seven, are outperforming their peers on both state and independent assessment tests. And teachers report that they have more time for individualized and small-group instruction and for critical-thinking projects.

What's more, a growing number of free resources are becoming available online, the most prominent of which are the 2,700 short video lessons produced by Khan Academy, which the MIT graduate Sal Khan began to record in 2004 in response to requests for math tutoring from his family. Three million unique users access Khan Academy every month, and teachers in 10 school districts are piloting Khan Academy content in classrooms this year, assigning the video lessons for homework and thereby freeing students to focus on deeper learning in the classroom.

Rocketship Education, which runs five charter schools serving 2,500 students in San Jose, California, takes this approach much further in comprehensive programs that blend such software with teacher-facilitated instruction in both math and reading. Its students, 90% of whom come from low-income backgrounds and start out two or three grades behind their more affluent classmates, are now outperforming those in every elementary school in the area and performing at the same level as students in affluent Palo Alto.

And in New York City, some students and teachers have participated in a similarly comprehensive math program called School of One, in which each student receives a unique daily schedule, called a playlist, based on his or her academic strengths and needs. Students in the same classroom receive substantially different instruction every day, often from several teachers, both in person and online. More than 600 NYC sixth-graders of varying academic achievement in three middle schools attended School of One as their sixth-grade math class for the last two months of the school year in 2010. Results were astounding. Students learned 60% more than their traditionally taught peers, which if annualized would come out to about the equivalent of a year and a half's worth of learning. In other words, they did as well as students taught by the top 2% of teachers. The program has spun out into an independent nonprofit to expand the model around the nation. Other districts are beginning to explore ways to launch similar efforts.

SUCH PROGRAMS offer promise, but they are just a start. By 2018, if today's college graduation rates hold as steady as they have for decades, the U.S. will be short at least 3 million college-educated workers for the projected 101 million jobs that will require a degree. We must give our teachers and students the breakthrough tools they need so that the next generation of Americans will be better prepared to take advantage of those jobs and contribute to a stronger economy.

HBR Reprint R1203E

Stacey Childress leads the Next Generation Learning group at the Bill & Melinda Gates Foundation and was formerly a senior lecturer at Harvard Business School.

WHAT CAN BE DONE?

To support the vision of a more effective and practical education...

LOCAL AND STATE GOVERNMENTS CAN

Allow students to earn credit on the basis of mastery of skills rather than attendance.

Amend textbook adoption rules and spending policies to allow schools to use high-quality digital materials, not just printed curricula.

Resist locking in teachers' roles in teacher-effectiveness policies.

Eliminate fixed limits on class size and charter schools.

THE FEDERAL GOVERNMENT CAN

Resist specifying traditional teaching approaches in any reauthorization of federal education law.

Rather than create mandates, use the bully pulpit to focus attention on opportunities for personalization and encourage states to innovate.

BUSINESS LEADERS CAN

Advocate for personalized learning in their communities.

Participate in programs that explicitly connect skills to careers.

Direct philanthropic funds and volunteer time to such programs.

This article is made available to you with compliments of Harvard Business Publishing for your personal use. Further posting, copying or distribution is not permitted.