Effective Schools are Stretching the Cognitive Limit

Students in high-performing schools are exceeding expectations, given their cognitive abilities

Martin R. West and Colleagues

One of the most exciting developments in U.S. education in recent years has been the emergence of highly effective urban schools that serve historically disadvantaged and low-performing minority students. A large proportion of these successful schools are charter schools. KIPP, Achievement First, Yes Prep, and similar “no-excuses” charters share a number of distinct pedagogical and cultural practices: an extended school day and year, data-driven instruction, and uniformly high expectations, for instance. The authors of this study ask if these practices, which are correlated with improvements on students’ standardized test scores, also improve students’ processing speed, working memory, and reasoning—a set of skills collectively referred to as fluid cognitive skills. Employing a sample of more than 1,300 8th-grade students in 32 Boston schools, the authors investigate whether the test-score gains that students in high-performing charters experience come as a result of improvements to their underlying cognitive capacities—these fluid cognitive skills—or if these gains on the state test are over and above what we might reasonably expect, given students’ underlying cognitive ability.

Cognitive psychologists recognize two separate yet correlated components of cognitive ability, both of which are associated with student academic performance. The first, referred to as crystallized knowledge, encompasses the acquired knowledge that is assessed by most standardized tests. Vocabulary is a good example of crystallized knowledge. The second, referred to as fluid cognitive skills, incorporates abstract reasoning skills and is termed “fluid” because it...
can be directed toward any problem, e.g., processing speed, indicating (under a time constraint) whether either of two symbols on the left side of a page matches any of five symbols on the right side. Until now, it was unknown whether schools that successfully improve one type of cognitive ability—students’ standardized test scores—also improve the second type of cognitive ability, fluid cognitive skills.

The study shows that effective schools improve students’ test scores but have no effect on students’ fluid cognitive skills. The effective schools explain 34% of the variation in math test scores but just 2.3% of the variation in fluid cognitive ability.

These findings speak volumes about the accomplishments of Boston’s high-performing charter schools, because they show that the schools propel their students to perform at a level much higher than otherwise occurs among students with the same underlying cognitive ability.

The full article by Martin R. West, Christopher F. O. Gabrieli, Amy S. Finn, Matthew A. Kraft, and John D. E. Gabrieli appeared in the Fall 2014 issue of *Education Next* and can be read online: [http://educationnext.org/what-effective-schools-do-cognitive-achievement/](http://educationnext.org/what-effective-schools-do-cognitive-achievement/).

Martin R. West, PEPG deputy director, is an associate professor at the Harvard Graduate School of Education.
The accompanying figure demonstrates that just 35% of students in the U.S. are proficient at math, putting the country in 27th place internationally. Apologists might argue that this average figure is skewed by the dismal performance of the many U.S. students from low socioeconomic backgrounds. Thus, the authors re-create the rankings, this time comparing U.S. students with high levels of parental education with similar peers abroad. The findings reveal that while it is true that American schools do a disappointing job of teaching students from less-well-educated families (just 17% are proficient at math), they also do a poor job of teaching students from well-educated families.

Striking differences in proficiency rates across states are evident. More than 62% of students from Massachusetts families with high levels of parental education are proficient in math. But Wisconsin, if ranked as a country, would come in 21st place, just below Ireland. California is large enough to be an OECD country in its own right, and educates 12% of U.S. students. If it were an OECD country, its 43% proficiency rating would place it 30th, just below Italy, and New York’s 40% rating entitles it to assume position number 31, just below Turkey.

When viewed from a global perspective, U.S. schools seem to do as badly teaching those from better-educated families as they do teaching those from less-well-educated families.
In June a California court ruled that the state’s tenure and seniority laws are unconstitutional in Vergara v. State of California. Minority students have filed a similar case in New York, with more to come elsewhere.

But where does the public come down on teacher tenure? Do they agree that almost all teachers are performing well—or at least satisfactorily? What do parents think? And how do teachers rate their colleagues?

Here are a few answers to those questions from the just-released eighth annual Education Next poll. The survey was administered to representative samples of the general public, parents, and teachers.

Respondents were asked to state the percentage of teachers in their local school district who deserve one of the five grades on the traditional A-to-F scale. To make sure the responses were consistent, the percentages had to add up to 100% before the respondent could move to the next question.

About 22% of public-school teachers are not performing adequately in the public eye, if one assumes that satisfactory work requires at least a C grade. Citizens do like a majority of the teachers in their local district, saying, on average, that 51% of them deserve an A or a B. But 13% earned a D, and no less than 9% of teachers were given an F.

Teacher ratings are perhaps the most telling. Educators tend to be the most generous in giving high marks, saying that 69% of their colleagues in the local school district deserve an A or B. Not everyone scores so well. Teachers report that 8% of their colleagues deserve a D, and that 5% deserve an F. Union leaders could argue that the public is too harsh in its assessment, and that parents blame teachers for their children’s faults, but they may find it difficult to explain away the fact that even teachers identify a sizable percentage of their colleagues as woefully inadequate.

Teachers themselves say that as much as 13% of the educating force is performing at an unsatisfactory level, with 5% failing outright.

You can’t have good schools without good teachers, and improving the lowest-performing segment of teachers would go a long way. Good teachers are so important to student learning that if roughly the lowest-performing 5% of all teachers were replaced with merely average teachers, Stanford economist Eric Hanushek estimates that it would increase the annual growth rate of the U.S. by 1% of GDP. Student performance in the U.S. would also catch up with that in Canada, Finland, Germany, and other high-performing countries.

The public seems to agree that something needs to be done, and that is where tenure laws come in. Survey respondents favor ending tenure by a 2-to-1 ratio. By about the same ratio, the public also thinks that if tenure is awarded, it should be based in part on how well the teacher’s students perform in the classroom. Only 9% of the public agrees with current practice in most states, the policy of granting teachers tenure without taking student performance into account.

Courts have yet to reach a final verdict on teacher tenure and seniority rights, but the court of public opinion has already made a clear determination.

Calling for more spending is a political no-brainer. In the recently released Education Next poll of a nationally representative sample of the public, 60% of Americans say they want to spend more. But if one drills down, much of that enthusiasm evaporates in a cloud of confusion and inconsistency. We discovered this by dividing respondents to our survey into three randomly selected, equally representative groups.

The first group was asked whether they thought school spending "to fund public schools in your district should increase, decrease, or stay the same?" The second group, though asked that same question, was first told the levels of expenditure per pupil in their district for 2011. The third group was given that same information but was asked whether they thought "taxes to fund public schools in your district should increase, decrease, or stay the same?"

Support for more spending fell to 44% from 60% when respondents were given information on current amounts of spending. Levels fell further to only 26% favoring more spending among the group asked if they favored tax increases to fund higher spending.

Political debates over school spending take place in a fog because the public has the illusion that the rest of the nation's schools are expensive but their local schools are a bargain. When asked to estimate per-pupil expenditures nationwide, the public makes an average estimate of $10,155—almost exactly the $10,615 per-pupil expenditure level estimated by the Bureau of the Census for school expenditures in 2012. But when asked about costs locally, on average, they say the cost is only $6,486 per pupil in their district. The wide disparity in these estimates of national versus local expenditures is bizarre, as the sum total of all local expenditures is equivalent to those nationwide.

The differing estimates may be partly due to differences in news coverage. National school expenditures are a regular part of the debate. Local school costs per pupil do not get the same coverage. The public may also believe other school districts waste money but their local one does not. More generally, the public may suffer a delusion that for lack of a better phrase might be labeled "buyer's delight," the tendency for people to think they "got a deal" even when an objective observer would conclude otherwise.

Parents, teachers, and the public at large all think that local schools are giving them more for less—even when that is unlikely. That's why transparency in spending should be part of the school-reform conversation.

This is an abbreviated version of an op-ed that appeared in the Wall Street Journal on September 21, 2014. The full opinion can be read at: http://online.wsj.com/articles/paul-peterson-how-the-education-spendthrifts-get-away-with-it-1411339685.
Matt Chingos of Brookings and Guido Schwerdt of the University of Konstanz are out today with a new working paper that provides, to my knowledge, the first credible evidence on the effects of online courses on student achievement in K–12 schools. The bottom line is that Florida high-school students taking algebra or English I online perform at least as well on state math and reading tests as do students taking the same courses in a traditional format. The results should be encouraging to proponents of the potential for online learning to open up new, high-quality educational options for American students.

Florida Virtual School (FLVS) is the nation’s largest statewide virtual school. Indeed, its 462,000 course enrollments in 2013 represented more than half of all enrollments in state virtual schools nationwide. More than 95% of FLVS students are part-time students who take their other courses in another school.

The increased choice created by FLVS has enabled students to access educational content that would not otherwise have been available to them. In 2008–09, for example, at least 1,384 FLVS Advanced Placement courses were taken by 916 students attending high schools that did not offer the same course.

In this respect, their analysis follows the logic of Clayton Christensen’s theory of disruptive innovation, which posits that new technologies first gain a foothold by offering a product or service to consumers who would not otherwise have access to the same product or service. That is, rather than competing directly against existing technologies, the new technologies compete against non-consumption. This provides space for the new technology to improve in quality to the point where it matches or even exceeds the quality of existing technologies.

Chingos and Schwerdt zero in on algebra and English I—courses that are available in both formats to nearly all Florida students. First, they compare the 10th-grade test scores of students with similar 8th-grade test scores and demographics, some of whom took the algebra and English courses online with FLVS and others who took the same courses in person at their local public school. Their strongest evidence comes from analyses that identify students who took one of those courses online and the other in person, and ask whether a given student’s 10th-grade test scores were higher or lower in the subject he or she took online. Both analyses show that students do as well—and perhaps a bit better—in courses taken through FLVS as those taken in a traditional format.

The data Chingos and Schwerdt examine only ran through 2008–09. On the one hand, this means that their results tell us about the effectiveness of virtual courses for “early adopters,” who may be particularly well suited for online learning. On the other hand, it also means that their results do not capture the effects of any more recent innovations at FLVS.

From a blog post by Martin R. West that appeared on educationnext.org on September 9, 2014 (http://educationnext.org/first-hard-evidence-virtual-education/).
A common criticism of private-school choice programs is that the introduction of market-oriented reforms can have harmful side effects for existing public schools. An alternative hypothesis is that the introduction of a financial incentive via a voucher program might lead public schools to rise to the challenge—by motivating schools to innovate, to rethink staffing and curricular decisions, and to deploy resources in ways that might measurably impact student performance.

This study takes advantage of the introduction of two statewide voucher programs to test the effects of competition on public school math and English language arts achievement in Louisiana and Indiana, showing that public school performance was either unaffected or modestly improved as a result of private school competition.

The Louisiana Scholarship Program (LSP) is a targeted school-voucher program that provides public funds for low-income students in under performing public schools to enroll in participating private schools. The Indiana Choice Scholarship Program (ICSP) also provides state-funded vouchers to assist with the payment of tuition and fees at private schools. During its first year—the 2011–12 school year—around 4,000 students were awarded ICSP scholarships. That number approached almost 20,000 students by 2013–14.

Using geocoding software to map public and private school addresses in both states, Egalite created four separate measures of private school competition: distance, density, diversity, and concentration.

Louisiana public schools have had a modest positive response to private school competition, with the largest impacts observed in the lowest performing schools.

In Indiana, meanwhile, there is a null impact on math scores but some evidence of a modest positive response to competition on English language arts performance. Overall, it appears that the private-school voucher threat has a negligible to small positive impact on those public schools that experience the threat of competition.
The Common Core Takes Hold
- Robert Rothman
The level of activity states are engaged in...suggests that the common core standards might generate some real changes in classroom instruction.

Beyond the Factory Model
- Joanne Jacobs
Testing whether “blended learning” can personalize instruction in eight Oakland schools yields optimism after one year. Blending more and spending less propels the schools into their second year.

Choosing the Right Growth Measure
- Mark Ehlert, Cory Koedel, Eric Parsons, and Michael Podgursky
Comparisons among similarly circumstanced schools send more useful performance signals to educators...than alternative approaches to measuring growth in student achievement.

“No Excuses” in College [Spring 2013]
- Robert Pondiscio
Tackling the challenges of college faced by low-income students graduating from the most notable high schools in the charter movement as they matriculate through college. The article won first place for a stand-alone feature in the “education organizations and experts” category in 2013, awarded by the Education Writers Association during the 2014 annual meeting.