Is $600 Billion Enough?

Today's new austerity may have an upside if it prods schools to embrace new technologies that cut costs and improve learning.

BY PETER W. COOKSON JR.

IT IS CRUNCH TIME FOR PUBLIC EDUCATION. Several storms are converging to create a hurricane of educational instability: sharply declining revenues, intense international competition, outdated approaches to teaching and learning, and a significant achievement gap between white students and their African-American and Hispanic peers. Seemingly unable to get to the root causes of what is plaguing the schools, we keep spinning our policy wheels while also spending a great deal of money—$600 billion a year.

The National Center for Education Statistics reports that the nation's per pupil expenditures have doubled in inflation-adjusted terms since 1970, while scores on standardized assessments of student achievement have remained essentially flat. In 1971 the average reading score for nine-year-olds on the National Assessment of Educational Progress was 208 (on a scale of 0 to 500); in 2009 it was 221, an improvement, yes, but still mediocre at best. Moreover, it appears that the longer students stay in school, the smaller the learning gains. Seventeen-year-olds averaged a score of 285 on the NAEP reading test in 1971; nearly 40 years later, they scored only three points better.

Today, the average yearly cost of educating a public school student is more than $10,000. Topping the expenditure scale is New York State, at $17,000, and at the bottom is Utah, at $6,000. Yet on average, Utah students do as well as their New York counterparts on standardized tests. To be sure, interstate and intradistrict funding inequities are sometimes glaring and very likely contribute to achievement gaps between whites and blacks and between other groups. Few policymakers advocate abandoning the goal of finance equity. But on the whole, simply spending more money is not likely to produce greater student learning.

In any case, money is going to be increasingly hard to come by. Nearly every state and school district is grappling with budget shortfalls, and there is little reason to expect much relief in the foreseeable future. Financial constraints have caused states and districts to experiment with a variety of cost-cutting strategies, including bigger classes, shorter school days, fewer school days per year, and reduced extracurricular and afterschool programs. We don't know yet how these measures will affect student learning, but we can be certain of one thing: They are not going to usher in the era of breakthrough achievement we desperately need.

Today's climate of austerity is forcing us to grapple with the reality that a good deal of our current education spending is ill directed. We keep investing in 19th-century classrooms even though today's students are 21st-century learners. One promising alternative

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to business as usual is the creation of cost-effective 21st-century classrooms in which new communication technologies are blended with traditional face-to-face instruction. Teachers will always be the key to unlocking students' imaginations, but standing in front of a 21st-century class and lecturing is neither pedagogically sound nor economically efficient.

Integrating technology into the classroom does not mean putting kids in front of computers all day or turning schools into academic call centers where

A School of One program in New York City is one of many efforts to find effective ways to bring technology into the classroom.

teachers are technicians and students are "end users." Technology can be a trap. In the 1990s, media scholar Neil Postman of New York University warned against "technopoly," a state of mind that "consists in the deification of technology, finds its satisfactions in technology, and takes its orders from technology." But if we treat technology as a partner, it can facilitate individualized learning and thus stimulate intellectual curiosity and academic ambition. We know that

students have different learning styles, skills, abilities, and dispositions, and that they progress and mature at different rates. Common sense and research tell us that if we can customize students' educational experiences, achievement will increase. Truly individualized instruction is the age-old dream of education; technology puts it within our grasp.

In the current industrial-era model of education, all students are exposed to the same (or nearly the same) educational treatment, as if they were identical units moving along an assembly line. At the end of the treatment, they are tested competitively in a yearly exercise of what passes for quality control. This is the system that is failing us, as well as the young people it is supposed to prepare for productive and meaningful lives.

Imagine a middle school student named Alicia. She is about to enter the eighth grade and encounter algebra for the first time. Algebra is not just another subject in Alicia's academic career; it is a gatekeeper course. Failure to master the subject means exclusion from advanced mathematics courses and reduces her chances of admission to a selective college.

Let's assume that Alicia is an average math student. In most situations, she would have only two possible pathways: placement in a "real" algebra class with other mathematically competent students or in a general math class, a kind of "algebra for dummies." Tests largely determine which path Alicia will find herself on. If she is placed in the "real" class, she has a good shot at succeeding in high school; if she is placed in the general class, there is a high probability that her academic career will go nowhere. And students placed in lower academic tracks can see the writing on the wall. That is one reason why nearly 50 percent of teenagers in urban areas leave school before graduation, choosing, however unwisely, to look for work rather than see their rather empty education through.

So the stakes are high for Alicia and for us, because in the era of global competition the wasting of talent is not only a personal tragedy, it is a national security issue. We cannot expect to successfully compete internationally if many of our students fail to complete high school while others fail to achieve their full potential even as they hang on to earn a diploma.

What if we had a different approach? It might look like this: When Alicia is about to enter eighth grade, she is given a battery of diagnostic tests to assess her preparedness for the conceptual thinking required by algebra. The results are not used to slot Alicia into column A or column B. Rather, a computer program is able to integrate data about her aptitudes and abilities to create a unique learning profile. Teachers, with the assistance of intelligent software, are then able to create a customized, individualized algebra curriculum for Alicia by drawing on a wide variety of digitized resources, some from online education companies, universities, and other outside sources, and some developed by teachers at her school.

Alicia's individualized algebra course is dynamic; after she completes her assignments every day she takes a short quiz, perhaps in the form of a game, which gauges her level of comprehension. This allows her teacher to adjust Alicia's next lesson in order to address those areas where she needs more work or a different approach. Her teacher has a large library of digitized alternatives from which to choose, and Alicia's program allows her to make certain choices herself. She is participating in the creation of her own education.

Unlike weekly tests that have little diagnostic utility, Alicia's daily quizzes and games are adaptive; that is, they adjust themselves to her strengths and weaknesses and prescribe a course of study to address her specific learning needs. None of this means that students like Alicia are no longer part of a classroom community or that their only learning comes through a computer. Teachers in "blended" classrooms such as these, like police officers using modern community policing methods, do spend more time than their counterparts of old managing and analyzing data, focusing on problem areas, and carefully charting progress. This is what enables them to use their time more effectively on the "street," talking and listening to flesh-and-blood students and guiding them in their education.

Recently I visited Intermediate School 228 in Brooklyn, New York, where an experimental blended math program called the School of One is being implemented. Just outside the big white doors that lead to the School of One wing, an old-fashioned classroom with battered chairs and heavy desks has been preserved as a kind of case study of what the School of One is not. It is a bit unsettling, since such traditional classrooms served generations of earlier students well, and indeed some of their principles still animate places like the School of One.

Beyond the white doors, however, is a classroom that would have been unrecognizable to a teacher or student of 50 years ago. I.S. 228 students come to this classroom only for their math classes. Kids move around, talk, listen to teachers, occasionally talk back to teachers, and, yes, even hack around a little in the open and airy space. Gone are the rows of desks facing the teacher and blackboard. Movable bookshelves create flexible spaces where students can work together or with instructors in groups of various sizes. Some students collaborate, others work alone on computers. A teacher circulates, spending a few minutes with one student, perhaps a larger block of time instructing a group.

Journalist Ta-Nehisi Coates wrote about his visit to a School of One campus in the Bronx in *The Atlantic* last year, remembering his own experience as

a young man who had struggled mightily in school. "By the time I was in high school, we were using the computer lab once a week for math. But we were using it the same way we used pen and paper—a teacher at the front of the class and all of us following along. The computer lab bored me as much as the chalkboard.... I thought I was lazy (and maybe I was) and lacking the will to learn. But as I watched the kids at I.S. 339 working at their own pace and in their own way, I wondered if all I had ever really needed was the equivalent of a warm hug from a cold algorithm."

One of the notable experiments in blended learning is Rocketship Education, a nonprofit charter school network that opened its first school in San Jose, California, in 2007. The five Rocketship elementary schools were designed from the ground up to support customized learning. They are hardly enclaves of privilege. Ninety percent of the students qualify for free or reduced-price lunches, and 75 percent speak English as a second language. With an explicit mission of closing the achievement gap, Rocketship has already seen two of its sites ranked among the 15 top-performing schools serving high-poverty areas in California.

Experiments in blended learning have caught the eye of policymakers and private-sector innovators. President Barack Obama paid a highly publicized visit earlier this year to TechBoston Academy, a blended curriculum public school for grades 6–12 in Boston. The U.S. Department of Education's 2010 National Education Technology Plan calls for bringing "state-of-the-art technology into learning to enable, motivate, and inspire all students." Education entrepreneur Chris Whittle and his partners are planning to open the first in a planned international network of private schools using a blended curriculum in 2012.

Integrating technology into classrooms will be no easier than it has been in offices and factories. Finding the right ways to shape human-computer interactions is a delicate task, especially when the humans are children. Different approaches will be needed for children of different ages. There will be—and already have been—disappointments and mistakes.

No comprehensive research exists on the impact of computers on education, and those studies that have been conducted yielded conflicting results. That is no surprise. We are only in the early stages of learning how to create effective blended classrooms, and there are many pitfalls—from techno-utopianism and our weakness for thinking that complex problems can be solved with easy technological fixes, to the challenge of identifying the useful technologies amid the mountains of ill-conceived and simply shoddy software and edu-gadgets being peddled by eager companies.

Can we afford such experiments in a time of increasing austerity? Up-front investments will be needed. But over the longer term, blended schools can produce considerable economies. Textbooks are an obvious place to begin. They cost billions of dollars every year—Texas alone budgeted more than $800 million for textbooks in 2010. Information technology, meanwhile, gets radically cheaper every year. Additional savings can be realized through the use of open-source curricula, shared lesson plans, online tutoring, and other measures. In time, fewer teachers will be required as large, unmanageable, industrially organized classrooms disappear. Even in today's classrooms, research shows that teachers with the right training and support can lead quite large classrooms without diminishing student achievement. (Reducing class size, a perennial favorite reform in public opinion surveys, does not automatically improve student performance. The only consistent evidence of a positive effect indicates that kindergarten and primary-level students do better in classrooms that do not exceed 15 students.)

Exploring how blended classrooms can individualize teaching and learning while saving money is a reform strategy that has several virtues. New technologies coupled with new thinking about education can expand students' opportunities to learn, enable implementation of new forms of teaching more in keeping with the learning styles of today's students, and squeeze much better results from our education funds. Six hundred billion dollars is a lot of money; cutting back spending on nonessentials and investing in innovative teaching and learning may be one way to reduce costs and boost achievement at the same time. Perhaps we can turn the energy of the hurricane that is engulfing public education to positive ends by redirecting that energy toward the future. ∎