An Assessment by Hoover Institution's Koret Task Force on K–12 Education

American Education in 2030

Equality and Technology

By John E. Chubb

Rasheed should never have graduated from the University of Pennsylvania; so the statistics said when he was born in 2009. Rasheed's mother had dropped out of West Philadelphia High—mere blocks from the prestigious university—as did more than half of her classmates. She gave birth to Rasheed when she was barely eighteen years old and single. Although she later completed a general equivalency diploma, her education left her unprepared for anything but low-skill, low-paying jobs. Rasheed was raised in the same dilapidated neighborhood as his mother, the norm in West Philly. Almost no one raised there—only 3 percent to be exact—finished college.

But finish he did, in four years, at age twenty-one. And Rasheed was not alone. Nearly a quarter of the kids he grew up with—like him, mostly poor and African American—earned college degrees in 2030. What seemed improbable when they entered the world was now attainable. High school graduation had also become commonplace; all but a tenth of the kids from his neighborhood earned regular diplomas.

What made this progress possible? West Philly remained a disadvantaged community. Parents were no better educated, to help their children learn. Public education had not benefited from a windfall of tax dollars. High school standards had not been dropped to make graduation easier. The University of Pennsylvania, like many American universities, remained the envy of the world and tough to get into. So, what happened?

Public schools finally improved.

Shaking Up the System

Rasheed attended the same schools as his mother, beginning with Samuel B. Huey, a once esteemed K-8 school that had educated some of city's leading citizens in the 1950s. By the 1990s, however, the school, like the neighborhood, had been declining for decades. Two-thirds of Huey's students regularly failed state reading and math assessments. When they attended West Philadelphia High School, most, like Rasheed's mother, dropped out. The School District of Philadelphia tried to halt the slide but to no avail. In 2001 the state seized controls—the largest state takeover of a school system at the time.

Although it would not become apparent until years later—about the time Rasheed began school—this was a turning point for public education in Philadelphia. The School Reform Commission, created by the state to oversee the schools, acted boldly to improve them. (Its most outspoken advocate for change, James Gallagher, had graduated from the Huey School and gone on to becomes president of Philadelphia University.) It hired a tough CEO—not a superintendent—Chicago's Paul Vallas, to get results. And it invited outside firms, reform organizations, and universities to run the

forty-five lowest-achieving schools in the district, creating unprecedented competition for district schools.

The takeover worked—not in the sense of improving schools overnight but in getting them moving in a new direction. By 2003 test scores district wide were up significantly. In some schools scores rose dramatically, of which Huey was one. Supported by a private manager, its failure rate on state assessments dropped from 80 percent to 20 percent. More than half its students scored proficient, satisfying grade-level standards. The gains were largely made the old-fashioned way: clear standards, high expectations, a demanding curriculum, and a principal willing and able to attract, motivate, train, retain, and hold responsible a team of dedicated teachers. But the progress laid the foundation for more fundamental change already under way. Philadelphia was suddenly open to new ways of doing school.

New Ways to Learn

As a kindergartner, Rasheed began school with the academic disadvantages of many children in his neighborhood. His home had few books, meaning he had little experience with them. His family was not well schooled and communicated with a limited vocabulary and nonstandard grammar. He would struggle to learn how to read. But Rasheed had something his mother had not. His family owned a computer. By 2010, the cost of computers had fallen to levels the disadvantaged could afford; half of all low-income homes had one. Rasheed had been playing with interactive toys and video games from the time he was a toddler. The computer was the next step up, and he naturally took to it.

Rasheed also had something different at school—really lots of things. Huey was changing steadily, as were city schools throughout the nation. Huey was improving because it had to. When the state introduced private providers into the Philadelphia school system, it was doing what other states had been doing since the early 1990s: providing competition for traditional schools and choices for families often stuck in schools that were failing.

Charter schools, public schools run independent of local school boards, were authorized by forty states and the District of Columbia. By 2009, more than 4,500 charter schools serving nearly 1.5 million children nationally had taken root, mostly in inner cities. Philadelphia was home to some sixty charter schools, alongside 280 district-run public schools. When Paul Vallas left Philadelphia to oversee the highest concentration of charter schools anywhere, in New Orleans, Philadelphia continued to embrace charters and the energy they brought to the system. Huey could either provide an attractive choice to parents or lose students and close down.

Huey chose to innovate, beginning with technology. Educational software, long relegated to supplementary roles in public schools, had begun sharply to improve. It

was a matter of supply and demand. Nationally, as schools were given incentive and freedom to innovate, more of them began to adopt software with the potential to provide core instruction. Internationally, rapidly developing countries, such as India and China, turned to technology to meet education needs that traditional methods could never hope to satisfy. With low development costs and lots of engineers (trained in the United States), overseas technology firms were introducing new and improved instructional technology at a pace literally foreign to American schools.

By the time Rasheed entered Huey, a quarter of every student's day was being spent learning via technology. For primary children, beginning with kindergarten, the norm was an hour a day of one-on-one time with computers. By the middle years, grades six through eight, two or more hours were standard. The more children were able to learn independently of direct teacher instruction, the more they did so. Independence facilitated differentiation. The biggest challenge to traditional whole-class instruction is meeting the needs of students with differing strengths and weaknesses. In the inner city, the differences are often vast, from the few students who exceed their grade level to the many who struggle, sometimes years behind. Even the very best teacher cannot meet all those needs when instructing an entire class.

Computerized instruction allows each student to be taught exactly what he or she needs, in a fashion that each best comprehends. Computers present lessons to be read, heard, visualized, and interacted with. Students proceed at whatever pace necessary to master a skill or concept. Rasheed loved the phonics programs that first helped him decode words and later improved his fluency. He could practice speaking sounds and words into a microphone and, by hearing a voice through his headphones, fine-tune his pronunciation. The extra practice enabled Rasheed to read at grade level by the end of third grade. Research has consistently shown that achieving this milestone is one of the best predictors of high school graduation. Once students can read fluently, they have a chance to master history, science, mathematics, literature, and the rest—all of which inevitably involve reading.

Some of Rasheed's classmates who did not catch up as easily as he did had issues that required more refined interventions. Technology also helped them. Some required cognitive training to help them make the nuanced distinctions between letters and sounds that the English language requires. Computerized exercises, disguised as games, developed their capacity to make these distinctions automatically. Other classmates, who were reading above Rasheed's level, received instruction customized by technology. They read increasingly complex texts and wrote essays online; teachers sent them comments online almost immediately. The escalating challenges, frequent feedback, and daily practice allowed their individual acceleration.

A New Kind of School

Technology not only changed instruction at Huey but changed the entire school. Children of Rasheed's generation, rich or poor, urban, suburban, or rural, embrace technology naturally and intuitively. From video games to home computers to cell phones to MP3 players to handheld devices that integrate all these, technology is where young people go for information, communication, and, of course, entertainment. Technology engages them in ways that conventional media—books, newspapers, and classroom instruction—simply do not. Schools once worried they would lose control if students didn't spend every minute of the school day in classes supervised by teachers. In fact, maintaining control in that fashion was the challenge—kids resisted it.

Huey knocked down classroom walls and built large multimedia rooms in which several classes of students could work individually or in small groups on computers—or use traditional resources. Students loved learning through technology and at their own pace because both were inherently engaging and well matched to their needs. Students, did, however, spend the majority of their time under the care and direction of teachers. In the primary and elementary grades, teachers provided core instruction and established the vital bonds with children that nurture their motivation. Technology provided the differentiation.

By the middle grades, teachers and technology shared core instruction. All students at Huey were taking Algebra I by the eighth grade; some began it in seventh or even sixth. All students took Algebra I online. All students also took their core science curriculum online in grades six through eight. Online instruction had come a long way from the early days, of lectures, Power Points, and textbooks delivered electronically. By 2020, online courses were rich, interactive multimedia experiences. The best teachers in the world presented lessons seen by children across the nation. Animation and video helped explicate concepts that textbooks and lectures could never do as well. Students could work "asynchronously," using only technology, or "synchronously," receiving direct help from teachers online. The mix of synchronous and asynchronous was determined student by student, optimizing the mix of teachers and technology that helps each student achieve.

Online education was also aided by important low-tech developments in public education. For years, public schools had been plagued by academic standards that varied state by state and, in most cases, were far below what students needed to succeed in the twenty-first century. Students were taught from textbooks that satisfied the lowest common denominator nationally and assessed with state exams that made it easy for schools to declare students "proficient."

About the time Rasheed was born, however, this situation had begun to improve. Most every state signed on to develop a common core of academic standards. By 2014, the nation had a credible definition of academic proficiency in the major subjects and

one set of (now higher) standards that most states embraced. With common standards to guide their work and a market including most of the nation, online education companies invested much of their resources in developing truly demanding instructional programs for core courses—once the sole province of textbooks.

Technology and online education helped Huey enormously. First, it brought directly to students high-quality content and instruction, the same quality students received online in the suburbs or other more-affluent areas. Second, technology reduced the number of teachers that Huey had once required: when students worked in large group settings with technology or took classes online, fewer teachers were needed for supervision or instruction. With fewer positions to staff, Huey could be selective in hiring and retention and thereby raise the quality of its teachers and their instruction. This was especially important in the fields of math and science, where top-notch teachers were hard to recruit, particularly to inner cities.

Rasheed and his classmates benefited from the wholesale changes at Huey. Nothing is more important in traditional instruction than teacher quality—and Huey's teachers were now much better. A close second is a challenging curriculum, and Huey was able to keep the content demanding by raising teacher quality and supporting the toughest material technologically. Finally, Huey met the individual needs of each student, from learning how to read to mastering the academic subjects, via technology. As students left Huey for West Philadelphia High, most were on grade level.

A New Future

For inner-city kids, high school was once a source of frustration and failure, an institution that they entered unprepared and left without finishing. For suburban kids, high school was like a shopping mall—to borrow a famous analogy—a place to hang out and get as much or as little you pleased, biding your time until college. For very few kids did high school provide an effective transition from the basics of middle school to the sophisticated knowledge and skills necessary in college or in a productive career.

By 2030, high school was the most changed institution in public education. Some of this was planned. National efforts, spearheaded by the administration's of both George W. Bush and Barack Obama, yielded new national standards for high school—as they did for the earlier grades. Schools were directed to help students achieve demanding objectives across a range of traditional and new fields—including technology—that were proven valuable to success in college and careers. High schools were given a clearer purpose for educating all students for a productive future and then held to account.

But there the planning stopped. High school was reshaped by the forces of technology and competition. Students become better able to learn independently as they mature. By high school, students have the capacity to master whole subjects

through media other than a teacher. Entrepreneurs, recognizing this, began investing heavily in online high school instruction. In the beginning, high schools turned to online teaching largely for courses--advanced placement, subjects with low student demand, summer school courses for students who failed the regular course, dropouts who needed an alternative to the classroom—that they could not easily or successfully offer the old-fashioned way. Students liked the technology, appreciated the opportunity to move at their own pace, and enjoyed the newfound flexibility of learning at times that suited their schedules—for online can be done at home as well as school.

But what drove online instruction into the mainstream was competition. Nowhere was this more evident than at West Philly High. Pennsylvania was not only an early adopter of traditional charter schools but was also *the* leading state in developing charter schools online. By the time Rasheed was born in 2009, Pennsylvania had eleven online charter schools, serving all grades, and ten thousand high school students enrolled in them. The city of Philadelphia lost four thousand high school students to cyber charters annually—a loss of nearly $50 million in revenue. All kinds of kids were flocking to online high schools: kids with jobs, kids who had been bullied, kids who were bored by the slow pace of traditional schools, kids with special needs, all types. The exodus to online schools only accelerated in the ensuing years, in Pennsylvania and elsewhere, as the schools gained acceptance and the technology and online teaching advanced.

Traditional public schools had to fight back or go under—and they fought back. Most kids still liked having a high school to attend: to socialize, play sports, perform in plays, and even learn with one another. Online social networks in cyber schools are great but so is face-to-face interaction. Traditional high schools steadily evolved into hybrid institutions. Kids took some classes led by teachers but more often their core instruction was online. Their work with teachers occurred for individual tutoring, group projects and seminars. Teachers also worked online, during school hours and evenings, honing new skills and meeting student needs in new ways. Schools required fewer teachers and their quality consequently rose. University faculty also taught high school online—for college credit. High school became more engaging, individualized, and most of all more effective.

The Nation

Rasheed is a prime beneficiary of the forces that reshaped the schools of Philadelphia: accountability, competition, and technological change. His schools were driven to improve substantially, made all the more possible by technology. He learned to read fluently; earlier he would not have. He was taught more successfully, with technology meeting his needs in ways regular classrooms could not. His teachers were of increasingly high caliber. He not only graduated from high school but achieved at a level that gained him college admission to a highly selective institution.

When he was born, the odds were very much against Rasheed. But in Philadelphia, as in American cities everywhere, the probabilities were beginning to change. The public schools were being held accountable for student achievement for the first time in American history. Public education was being opened up to new providers, and competitive pressures were beginning to stimulate innovation and improvement. Achievement had begun to improve, especially for students who had historically achieved the least.

But none of this change, fundamental as it was, could have predicted the innovations that were to come, as technology made truly new forms of teaching, learning, and "going to school" possible. Technological progress took the opening that accountability and competition provided and drove unprecedented improvements in public education. Because technology is blind to income, race, and location—the historical dividers in public education and so much of American life—the benefits of technology have been greatest in cities such as Philadelphia, where poverty has long ruled. But wherever children live today—cities, suburbs, or rural expanses—their school experience is vastly different from what it was not long ago and far better too. Their schools are finally taking full advantage of the twenty-first century.

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