Urban Students Have the Grit To Succeed In Math

by Robert Sun

One of the great ironies of the digital age is that, at a time when the world is more driven by technology than ever before, math—the very foundation of technology—has become one of the most daunting subjects to teach.

Why does a wall exist between students and math achievement? Have attention spans become shorter? Are online entertainment and social media making math irrelevant in kids' minds? Do texting, mobile apps and smartphones numb students to the need for applied, focused learning?

The chasm between math and students is widest in our urban schools, where changes brought about by the Internet and mobile devices are compounded by broader social and economic challenges children face outside the classroom. Furthermore, the speed at which the world is embracing technology often puts urban youth on the defensive. Math, as an integral part of this changing world, can be intimidating—even frightening—for many inner city kids, regardless of age or grade.

And yet, these same children have inherent traits that, if leveraged correctly, can be an immense help in mastering math. Chief among these is grit—the courage and persistence to quickly get back on one's feet after a setback. Having grown up in inner-city Philadelphia, I can attest to the fact that urban kids have grit by the boatload, and this gives them a leg up on their non-urban counterparts.

Another key trait urban students have is the need to prove themselves. Many have an unquenchable desire to show others that they are capable and can succeed in a meaningful endeavor or activity. Those who are most deprived of opportunities actually demonstrate the greatest need to succeed. Give them the chance to release this passion and the results are often remarkable.

Finally, the importance of self-affirmation cannot be discounted. Self-affirmation is an essential ingredient for personal achievement. Children growing up in smaller communities have many opportunities for self-affirmation through extracurricular activities: soccer, piano, swimming lessons and the like. Urban youngsters often lack this important link in the developmental chain. Without it, it's nearly impossible to generate the effort needed to acquire difficult skills.

Extracurricular activities acquaint kids with a 'feedback loop' that makes learning satisfying. Without feedback, learning is not only difficult but also a source of frustration. Imagine putting a child on the foul line of a basketball court, blindfolding him, and then asking him or her to learn to shoot foul shots. With no way to judge their efforts, what would be the result? "This is dumb. What's the use? I'm bored."

These are the very same responses teachers hear when students practice math.

Conversely, when children are provided a feedback loop in a format that is meaningful to them, the rate at which they adopt new skills can jump significantly. Researcher Mihaly Csikszentmihalyi, in his landmark work *Flow: The Psychology of Optimal Experience*, proposed the three conditions that mark optimal engagement in an activity: clear goals; a balance between the perceived challenge and the perception of one's own skills; and an immediate feedback loop that allows the person to make adjustments. If we give our children the chance to experience flow, they will push their skills right to the edge. They will mess up frequently—but in making all those mistakes and immediately correcting them, they will get faster and more competent.

In an optimal learning environment, flow can often be achieved in what we call "deep practice."

(over)

Deep practice does not occur in the classroom—it's both impractical and misguided to think prolonged practice will happen in the midst of a busy school day. Instead, instruction needs to be supplemented by deep practice at home, at the library, or through before- or after-school programs. In today's schools, math proficiency is expected to occur through intense instruction and minimal practice, when just the opposite is true. The ratio must be reversed—with engagement and feedback at the core of the deep practice environment.

And that's where technology returns—this time to facilitate, rather than inhibit, math proficiency. Kids will lose themselves in a game-like environment where progressively, new skills and improvement in math are recognized.

Numerous examples of this phenomenon exist. In Philadelphia, for example, the First In Math® Online Program was first introduced in more than 2,600 third- through eighth-grade classrooms. Students took it upon themselves to practice, logging over 216,000 hours in a progressive journey of learning that encompassed simple addition, decimals, fractions, exponents and complex algebra. One year later, the School District of Philadelphia reported a 7.4% increase in fifth-grade students scoring at the proficient and above level, compared with a 5.2% increase for students statewide. Improvement for eighth graders was even more impressive: an 11.1% increase in students scoring proficient and above, versus a 6.1% increase statewide.

In the district's Northwest Region, where the program was most diligently implemented, fifth-grade scores increased 15.1%—double the school district's broader increase and three times the state average. In one school, eighth-grade results jumped nearly 42% in a single year.

Over the past nine years, Philadelphia students have correctly solved about 948 million math problems using the First In Math® Online deep practice program. The result was a district-wide increase in the percentage of students scoring proficient and above on the Pennsylvania System of School Assessment (PSSA) tests every year, for a total gain of 39.5 percentage points.

Philadelphia is not unique. In Pittsburgh, where the First In Math® program is being deployed district-wide, three schools ranked among the lowest in the district surged to second, third and fourth place within two months after a targeted effort. The students' incentive was simply a trophy that travelled from classroom to classroom on a weekly basis, giving them a common goal to work for.

A Pittsburgh math coach reported that one student who had won "player of the week" honors—a child living in adverse circumstances—was so inspired he would go to the local community center and practice for hours, without direction, simply to get continued recognition. He had the grit to go somewhere and do something he had never done before in order to reach his goal.

"Technology can let kids see math in a very different light. It takes the edge off," says Dr. Walter Amprey, President/CEO of educational consulting firm Walter Amprey & Associates and former Superintendent of Public Instruction for the Baltimore City Public Schools. "When students are provided a solution where they can practice privately, it helps them grow their confidence. Then they can show it off to other people in an open competitive situation and improve even further," he states.

We live in a technological age. Instead of allowing the Web, social networks and instant digital communication to drain our children's capacity to learn, we need to leverage technology—not to replace teachers, but to stretch dollars by optimizing the conditions for learning. When we recognize our childrens' natural interests and abilities and complement them with the tools necessary for deep practice, we will have taken an important step forward not just in math, but in every aspect of education. ■

Robert Sun, CEO of Suntex International Inc., is an engineer and inventor who holds numerous copyrights in the field of educational games. During the past 24 years, Sun has created innovative educational tools, such as the First In Math® Online Program, that are helping a new generation of students become critical thinkers and problem solvers.

Suntex international inc.