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Is Competition The Cure For Mediocre U.S. Math Scores?

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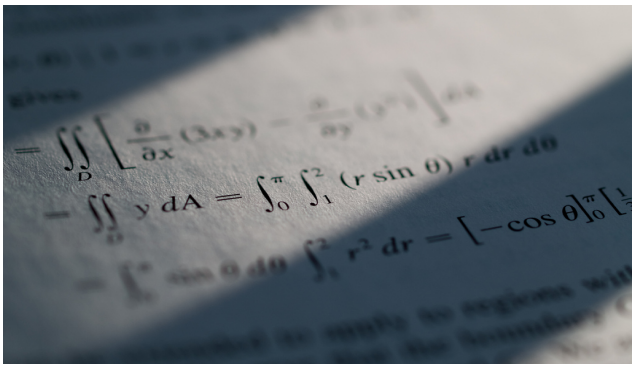

The Beauty of Mathematics
(Photo: Peter Rosbjerg)

Even though the U.S. lags in international tests of math competency — as my previous post, 'The Cause of Mediocre U.S. Math Scores', made clear — recent assessments of math proficiency at the national level suggest that the U.S. is slowly gaining traction. According to the National Assessment of Education Progress, 36 percent of 8th-grade students showed 'Proficient' or 'Advanced' comprehension of mathematics in 2013, compared to 15 percent in 1990.

4th-graders showed similarly promising statistics, increasing in mathematics comprehension from 13 to 42 percent between 1990 and 2013. Forty-one percent of public school students at grade 4, and 34 percent at grade 8, performed at or above the 'Proficient' level in mathematics in 2013.

So, what has suddenly changed? While state-to-state, proficiency in mathematics varies widely — between 19 and 59 percent — it seems that some district outliers have found strategies that drive home math comprehension much more effectively. And their success has bolstered the U.S. national math average.

As just one of several examples, take Baldi Middle School, situated in one of Philadelphia's poorer districts. Despite its low economic status, Baldi Middle School excels at mathematics.

In a nationwide online math competition involving 6,000 schools in 45 states, Baldi ranked fifth, with students solving more than 17 million math problems correctly in just 10 months. Baldi has consistently ranked among the top ten schools in the nation for this type of competition for the past five years.

All this because, according to Huffington Post columnist and Suntex International CEO Robert Sun, Baldi's 1,200 students are "engaged, empowered and energized" by the school's high-performance "culture."

Sun writes.: "It begins with a concept known as Deep Practice. In sports, when we swing a bat and miss the ball, we receive instant feedback through our senses. Players learn easily and naturally through a practice loop where proficiency is attained through immediate awareness of success or failure."

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To create this environment, Sun conjured up the First in Math Online Program, a software package where students feel like they're playing a video game, even as it requires students to exercise math skills in a kind of immersive, brute-force approach. One of the statistics First in Math tracks is the number of math problems students solve. Since 2002, the number has climbed into the hundreds of millions.

The game itself, 24 Challenge, is nested within a nationwide network of schools that compete against each other, so students also have an additional, and more elemental, urge to do well.

One year after adopting the game, the Philadelphia School District showed 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.

Philadelphia students continue to show success, solving 948 million math problems in the past nine years and increasing the percentage of students scoring Proficient and Above on the Pennsylvania System of School Assessment tests every year, for a total gain of 39.5%.

Sun attributes the success not to the game itself, but from the learning philosophy of Deep Practice that the game was built on. The lesson: if you create a system of instant, non-judgmental feedback, math becomes less intimidating, and students will be more willing to independently engage with it.

Gildo Rey Elementary in Auburn, Wash., shares success similar to Baldi, but from more of a hands-on approach taken by teachers.

The Seattle Times reported earlier this year that Gildo Rey Elementary, despite a poverty rate of 88 percent, saw students' test scores ascend to a 95 percent passing rate, up from the 30's just ten years before. To restructure a system accused of "teaching to the test," teachers at Gildo Rey now jointly plan lessons, pore over student work, test students frequently, and adjust the curriculum weekly — sometimes daily.

The Seattle Times reports: "Teachers conduct class at a quick clip, starting sentences that students promptly finish, or telling them to raise their hands when they know an answer or whisper it to their neighbor." This system, built on a framework of "explicit instruction", fosters deep concentration and intense engagement from the students, creating an environment that psychologist Mihaly Csikszentmihalyi calls "Flow."

Csikszentmihalyi described the meaning of "flow" to Wired in 1996: "[Flow is] being completely involved in an activity for its own sake. The ego falls away. Time flies. Every action, movement, and thought follows inevitably from the previous one, like playing jazz. Your whole being is involved, and you're using your skills to the utmost."

To achieve flow, a balance must be struck between the difficulty of the challenge and the skill of the performer, and both must be set equally high. If skill and challenge are low, the result is often apathy.

Apathy can also stem from a lack of goals, says Csikszentmihalyi. Goals, or competition, can help "turn a random walk into a chase … Competition is an easy way to get into flow." Just ask Michael Jordan.

The goals and rewards in a rigorous mathematics education should be implicit in the education itself. But, that's admittedly a hard sell to a population where, according to a Raytheon survey, 44% of students "would rather take out the trash than do math homework."

If the goals of mathematics are simply too vague or out of reach for US students, maybe a competitive approach is a solution this nation — which is highly competitive in other spheres (sports, commerce, political and military might) — should take a closer look at. I certainly found competition to be highly effective in getting otherwise recalcitrant learners to fully engage in the rigors of debate research and argument, as my documentary Crotty's Kids makes clear.

Perhaps if we made Math more like a high-stakes academic sport, my experience, and now anecdotal evidence, suggests that US math test scores might start to go up dramatically.