

The Role of Instant Feedback in Education

by Robert Sun

Imagine putting a Little Leaguer at home plate, having held a bat in his or her hands only once or twice before, and asking the budding athlete to hit a pitch—blindfolded. For many children, this is pretty much what they experience every day as they attempt to learn math.

Math is an acquired skill, one that requires repetition and positive feedback to achieve proficiency. Yet unlike sports or music, where our physical senses give us the immediate feedback we need to stay engaged, those senses are useless in the mental realm of practicing mathematics. Unfortunately, many inner city school systems are ill-equipped, in either time or physical resources, to provide children the opportunities they need to master basic math skills.

This is more than an academic problem. Math proficiency is a fundamental component for success in a world increasingly driven by technology. Both as individuals and as a nation, we cannot ignore the importance of math skills for our next generation. And let's not fool ourselves with the notion that only a portion of our society needs to know math. Every individual, from every walk of life, simply must have a working knowledge—and appreciation -- of math in order to advance and be successful in life.

Why is it so hard to create an environment where math becomes a pursuit to be enjoyed, rather than a nightmare to be avoided? Let's go back to the Little League example. Most youngsters love to acquire skills in sports if given the right combination of instruction, practice and encouragement. Our teachers are wonderfully prepared to instruct. But without the opportunity for kids to receive immediate feedback and be encouraged, the result is boredom at best, and total abandon-

ment at worst. And there is simply not enough time in the typical school day for each child to receive the supervised practice time they need to improve in math.

Mihaly Csikszentmihalyi noted in his book *Flow: The Psychology of Optimal Experience*, that three conditions must be in place to achieve optimal engagement in any 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. Give anyone, child or adult, these kinds of conditions and they are likely to be "in the zone," "dialed in," or in Csikszentmihalyi's words, "in a state of flow."

Most students are anxious about math because of the imbalance that exists between their challenge and skill levels. Typically, the challenges are extremely high and their skills are low. When their skill levels are increased through focused practice, they begin to achieve the balance between their abilities with the challenges they face. This balance enables them to enter the state of flow where the activity itself becomes the reward. Once they take ownership, practice becomes enjoyable and self-sustaining.

So, how do we create this environment of math success? While there usually isn't enough time in the school day to set children on a path to "flow," it can be achieved by other means.



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The best and most efficient means available is technology. By creating conditions where students are given clear goals, receive immediate feedback in real time about their progress, and affirmation in the form of rewards that are linked to mastery of appropriate skills, flow can be achieved during independent study time, before or after the school day—virtually anywhere a computer is available.

At our company, Suntex International, we see countless instances where urban children become so energized that they seek out any opportunity they can to practice. Public libraries, churches, and

community centers become extensions of the classroom as children practice their evolving skills on the nearest computer.

Every teacher has experienced the moment when a child's face lights up as he or she suddenly grasps a new and previously baffling concept. It's one of the true joys of being an educator. We need to do all we can to increase these moments of self-affirmation that are brought about when math students are in Csikszentmihalyi's "state of flow." The technologies and techniques to create them are here; as educators and as a society, we must ensure that they occur much more often.