

President Obama, FDR and the Math Dilemma

by Robert Sun

President Obama recently announced the White House proposal for investing \$1 billion to build a master corps of math and science teachers, 10,000 strong, over the next four years.

This clarion call to dramatically improve STEM (Science, Technology, Engineering and Mathematics) education demonstrates the president's fervent desire to meet 21st century demands. He believes that, to capably compete in the global economy, we must begin the process of training thousands of scientists, engineers and mathematicians, and quickly.

Will this plan succeed or fail?

To help answer this question we can take a page from history. Seventy years ago another Democratic president, Franklin Delano Roosevelt, faced a similar challenge—the urgent need to quickly produce 100,000 competent pilots to fight in World War II. FDR's dilemma was no less daunting, as early aviation schools had fatality rates as high as 25%. With that kind of abysmal failure rate, did it make sense to pour vast amounts of money into producing more flight instructors? Or was it better to ask the question: "Is there a better way to learn to fly?"

As Daniel Coyle recounts in his book, *The Talent Code*, "the answer came from an unlikely source: Edwin Albert Link, Jr., the son of a piano and organ maker from Binghamton, New York, who grew up in his father's factory." Link had a fascination for flying and took his first flying lesson at age 16. On his first training flight he spent an hour in the air, but landed without ever once getting his hands on the controls. He concluded there had to be a better way to learn how to fly. This idea gnawed at him, and he tinkered in his father's factory for seven years before building what later would become known as the "Link Trainer."

The Link Trainer was basically a flight simulator—a tool that enabled untrained youth to practice learning how to fly in a

low-risk environment. The Army Air Corps secured ten thousand Link Trainers and by the end of the war, more than five hundred thousand pilots had logged millions of practice hours. The Link Trainer, coupled with improved teaching methods, allowed us to meet the challenge.

We need the equivalent of the Link Trainer in mathematics if we are to meet the present challenge. I have been involved in helping children build a solid foundation in mathematics for more than two decades. My observation is that the problem we face is not on the teaching side. There is nothing wrong with the way the U.S. has taught math since the 1940's. Generations of American children, schooled over the past 70 years in math, have put men on the moon and invented the integrated circuit chip, among thousands of other innovations.

I believe our nation's fixation on teaching as the sole solution to building our children's math skills is misplaced. The U.S. ranks low internationally in math competency because our youth do not practice.

I don't know of any acquired skill, with the possible exception of breathing, that you can master without practice. Even learning to walk requires diligent practice. The average toddler will take three thousand steps and fall more than eighteen times in one day. Why should math be the outlier—the one skill you can master without practice?

According to the Organization for Economic Cooperation and



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Development's PISA study, the United States ranks 32 out of 65 countries in mathematics proficiency. Those at the top include the Chinese, specifically children in Shanghai and Hong Kong.

Do Asians have a math gene that accounts for this success? The answer is NO. In fact, more Asians lack rudimentary math skills than the entire population of the United States.

The reason Shanghai ranks number one is because practice is embedded in the Chinese culture. The Chinese word for learning/study is made up of two characters: The first character stands for "accumulation of knowledge" and the second character stands for "constant practice, as in little birds learning to fly."

If President Obama is to succeed, my belief is that he should follow FDR as well as top-performing Asian countries. Spending \$1 billion to build a corps of master math and science teachers is a laudable effort. But if we want real, tangible results, we must give our teachers highly engaging tools that inspire students to take ownership of their own learning process.

When kids are given a structured practice mechanism with realistic challenges, clear goals, immediate feedback and the freedom to make mistakes, no one needs to convince them to practice. In the majority of cases, interest, enthusiasm, proficiency, and success are the outcomes.

During the past decade, our political and business leaders have fretted over how to boost our children's math skills in order to maintain our nation's competitive strength. The response from the established educational community remains focused primarily on "teaching" as the solution to closing the achievement gap.

Instead, shouldn't we be asking ourselves, "Isn't there a better way to learn this complex skill?" All we need to do is look to history to solve the problem. As Edwin Link correctly reasoned in the 20th century—and as we must once again realize in the 21st—systemized, self-directed practice is the answer to one of our nation's most immediate and important learning challenges.