It Isn't the Culture, Stupid

Barry Garelick

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Barry Garelick - The news last week that Shanghai students achieved the top scores in math on the international PISA exam was for some of us not exactly a wake-up call (as Secretary of Education Arne Duncan characterized it) or a Sputnik moment (as President Obama called it).

We've seen this result before. We've seen the reactions and the theories and the excuses that purport to explain why the US does so poorly in math. In fact, there are three main variations used to explain why Chinese/Asian students do so well in international exams:

- Version 1: They are taught using rote learning and then regurgitate the results on exams that test how well they memorize the procedures of how to solve specific problems.
- Version 2: They are taught using the reform methods of a "problem based approach" that doesn't rely on drills, and instills critical thinking and higher order thinking skills
- Version 3: The teacher or the culture produces the proper conditions for learning

It's hard to know where to start with these, so let's take them in order.

Version 1: In a letter to the N.Y. Times (http://www.nytimes.com/2010/12/09/opinion/l09test.html?scp=8&sq=PISA;%20math&st=cse) the writer asserts that low scores on PISA may be indicative of a system that rejects the traditional "drill and kill" and direct instruction approach to teaching math. Low scores are evidence that we are not using the educational techniques deemed to be ineffective by the education community. The letter writer also stated that our system focuses on critical thinking and "authentic" problem solving and—in a Patrick Henry-like liberty-or-death finish—argued that if it's a choice between higher test scores in basic skills and a "well rounded critically minded student", he would take the latter. Alas, he concludes that we aren't doing that very well either.

Version 2: This version is a backhanded way of saying that math education is bad in the United States because the various education reforms (e.g., differentiated instruction, inquiry-based learning, discovery learning, problem-based learning, student-centered learning, collaborative learning, small groups, the list goes on) were not properly implemented nor understood by teachers. They do this by talking about how they use student-centered, problem-based approaches. In fact, Jonathan Plucker, an education professor at Indiana University states this in an interview with CNN. (http://edition.cnn.com/video/#/video/bestoftv/2010/12/09/exp.am.intv.plucker.cnn?iref=allsearch) He states that the Chinese have a "vastly different curriculum; much more problem based. Not as much drill and kill as people seem to stereotype as the Chinese are having kids memorize things for tests."

It never occurs to the people posing these arguments that math education in the US suffers because of the reforms and the textbooks written for them. Nor does it occur to them that what they think they see being practiced in China are not the reforms that they bemoan are not being practiced here.

Version 3: This is the "It's the culture, stupid" argument that usually carries the warning "Don't try this at home." Dr. Plucker mentions culture as well, as does a paper I happened to find online the day the PISA results were announced—a paper by Chap Sam Lim that

focuses on how math is taught in Shanghai, the region which achieved the highest math scores of the 60+ nations participating in the PISA exam. (http://www.merga.net.au/documents/MERJ_19_1_Lim.pdf) The author states that "We need to take note of cultural differences, so that we know what to adopt, how to adopt and what we need to modify. Merely adopting foreign practices into our own culture may not necessarily work as well as we might hope."

This argument is based on the observation that the education-valued culture manifests itself in ways that are unlikely to happen here: long school days, after-school math "clubs" in which math facts and procedures are drilled (pointed to by some as evidence that students in China are engaging in rote learning), long hours studying and teachers who know the subject matter extremely well. The "it's the culture" argument, fails to acknowledge, however, that the Chinese/Asian value of education is not just about hard working and respectful students. The culture is also responsible for the adoption of a coherent and effective curriculum—one that requires well-written and logically sequenced textbooks and good solid instruction. Singapore's math program is an example of such a program that despite differences between US and Singaporean culture, has managed to work well where it has been implemented here. This doesn't mean the techniques and methods used in Singapore and China will be ineffective here. Nor does it mean that teachers here will be unable to teach it. The "culture argument" also paints a picture of U.S. culture as totally oblivious to educational values and ignores the subcultures that place a value equal to that seen in China and other countries. Those are the students whose goals are to enter the top universities in the US, who work very hard and take AP classes and exams. Some of the parents of those students have protested against the adoption of substandard math programs such as Investigations in Number, Data and Space, and Everyday Math. These are the parents who have been told by school boards that the traditional method of teaching math may have worked for some, but not for all. Those are the parents who have discovered that the traditional methods of teaching math (in the 50's and 60's) work very well indeed, and are similar in some respects to how it is taught overseas.

The Lim paper points to some of the techniques used in teaching math in Shanghai: requiring students to master proofs, providing a variety of mathematical questions rather than having students answering variations of the same drill repeatedly and teachers challenging their students by asking students questions such as "Why?", "How?", "What if?" The drills may not be apparent to observers (like Dr. Plucker who remarked that there is no "drill and kill") because they may not be held in class; they may occur after school in tutoring centers, or at the students' homes. The amount of time that students in China put in to studying and working problems is considered on the one hand to be an artifact of the culture, but is rarely seen as a form of drilling. But regardless of where the drills occur, the fact that they do occur does not undermine the effectiveness of the curriculum. Nor does procedural fluency take a back seat to conceptual understanding and problem solving.

What Will Happen Next

What will happen next is likely a call to look at how the top scoring nations are doing it and what we can be doing better. But the wake-up call and Sputnik moment has already happened. We've already looked. The Department of Education in 2005 contracted to have a report done on Singapore's math program. (See http://www.keysschool.com/Documents/SingaporeReport.pdf) And in 2006, a Presidential National Mathematics Advisory Panel was formed to examine how K-8 math education could be improved in the US (See http://www2.ed.gov/about/bdscomm/list/mathpanel/report/final-report.pdf). Let's hope we stop bickering about what's happening overseas and take a look at what we've already done. At the very least, it will save the taxpayers some money. And it might even help some kids learn math.

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