

## The Education Series: Why Can't We Teach Mathematics Properly?

David Kristofferson from *The Highlands* · 5 Mar 2016

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In the June 11, 2012 issue of the San Francisco Chronicle, Jill Tucker, the Chronicle's education reporter, wrote a front page article about the Common Core standards.

<http://www.sfgate.com/education/article/...>

In the article, she talked about the ongoing standards debate and quoted the following official:

““Is it still necessary for kids to learn their times table when they can pick up their iPhone and ask Siri what is 20 times 2?” asked Dan Domenech, executive director of the American Association of School Administrators.”

That was almost four years ago, but I have never forgotten this quote.

Wondering how people with such ideas rise to positions of influence, I looked up Mr. Domenech's resume on the web (<http://www.aasa.org/DanDomenech.aspx>) and found out that he had taught 6th grade before moving into school administration and eventually on to his national position. His work also included time working for McGraw Hill, a major textbook publisher and the force behind the Everyday Mathematics program. Once again we see the incestuous relationship between the publishing industry and the educational establishment...

In an earlier article in my series I described a similar situation in our local schools when the San Mateo Foster City School District (SMFCSD) decided to stop grading for spelling when my oldest daughter was in 5th grade (around 1996). The given reason was that everyone has spelling checkers on their computers and thus memorizing spelling words was no longer important! Clearly this kind of thinking is seriously impacting our education system.

When I taught in San Francisco, I remember catching a student using Google during a computerized math assessment test to look up the answer to  $5 \times 3!$

Clearly there is a perverse logic to Mr. Domenech's position as my San Francisco student demonstrated. It IS true that students can use calculators to do basic arithmetic. However, had Mr. Domenech ever taught algebra, he might have realized that the first method of solving quadratic equations, such as  $x^2 + 12x + 36 = 0$ , is called “factoring” and requires that a student be able to find two numbers that, for example, multiply together to give 36 and add together to give 12. At this point students who never learned their arithmetic facts are seriously hobbled. They can plink away on their calculator buttons for a long time to no avail, and thus they fail math. Thank you, Mr. Domenech, and thanks to similar people of influence in the education establishment.

But wait? Aren't there computer algebra systems that can solve these quadratic problems? Yes, there are. However, if we follow this line of reasoning to its end, we will end up learning nothing. Eventually machines will do everything for us, leaving us free to enjoy the pleasures of eating and procreating.

But that's too cynical! Won't machines free us from drudgery and allow us to do more creative work? Yes, if they are used correctly. But to be creative, one must develop \*new\* ideas or art forms. If one has no idea about what is already known or has already been done, then every kindergarten crayon drawing is judged to be the Mona Lisa. True creativity requires mastery of a body of knowledge. This has always been judged to be our uniquely human attribute, and we should not abandon it!

Besides perverse battles over technology such as the above, teaching methods also lead to educational battles. In math there is the ongoing struggle between frequent practice advocates versus "spiraling" used in Everyday Mathematics and the CPM high school math series. Instead of synthesizing the best from both approaches, these methods often turn in to either/or partisan battles. Practice is derided as "drill and kill" by spiraling advocates, and spiraling advocates ask for "patience" when students are not retaining newly learned skills using their methods. Students will supposedly learn the material later.

Once again, why can't we rely on common sense?? If students are immediately forgetting material, the teacher clearly needs to have them practice it more. However, it is always a good idea to reinforce previously learned material by coming back to it at a later time. We all know both of these issues from our own learning experience. The problems really result from trying to cover too much material during a school year. "Spiraling" lets one forge ahead with the promise that "students will get it later."

Unfortunately, advocates on both sides usually can not say when beneficial practice transitions to "drill and kill" or what is the best division of time between current topic practice versus spiraling back to older topics. This decision can \*not\* be codified much to the dismay of school administrators. It clearly requires a skilled teacher using their best judgment regarding the needs of the students in his/her class. In my opinion, understanding the material should have priority over sticking to a curriculum schedule.

Clearly we need to purge our education system of ridiculous ideas. If someone in authority advocates ideas such as those mentioned in the Chronicle article above, teachers reviewing the proposed curriculum changes AND parents \*\*\*need to speak up immediately\*\*\* and demand to see supporting evidence. Do NOT settle for vague references to "research," but demand that anyone advocating a new school program be able to back it up by presenting solid evidence of its effectiveness. As I have shown in this series, often these ideas have been promoted based on shoddy research which no one questions and which is often conducted by people with a financial interest in the outcome.

As an example, the "Research Brochure" for Everyday Mathematics ( <http://www.everydaymath.com/wp-content/t...> ) states,"The U.S. Department of Education What Works Clearinghouse™ recognizes Everyday Mathematics as the most effective core elementary mathematics program in the country." However, when one goes to the Dept. of Ed. website ( <http://ies.ed.gov/ncee/wwc/interventionr...> ) one finds that they reviewed 92 studies, none met statistical standards, only one was partially acceptable, but even it did not show a statistically significant improvement!!

Remember, if a proposal seems radical and disagrees with common sense, the burden of proof should be on the person proposing the curriculum change, but it seems that too often in education we bow to authority based on

the name of some School of Education that did the “research” without ever looking at the details of the study ourselves. We then reap the rewards of our laziness.

To be honest, I was not involved in the Everyday Mathematics program implementation in the SMFCSD, so I do not know for certain whether it is being abandoned due to defects in the program or due to problems with its implementation. Unfortunately, too often there is minimal time for professional development for teachers, so I would expect that implementation issues will \*always\* be part of the problem in any curriculum change.

(ASIDE - I would NOT advocate making room for more professional development by making the school year even shorter; we should raise teachers salaries by paying them to get this training \*\*during the summer.\*\*)

When I returned to teaching, I frequently collected high school teachers’ opinions on why so many students were struggling with math. High school teachers were often frustrated because, by the time the students were their responsibility, their math foundations were already shot. As in other professions, teachers are hesitant to criticize their colleagues, but, the opinion that I heard most often (usually expressed in hushed tones) was that they thought too many elementary school teachers did not have adequate training to teach mathematics properly.

Should we be surprised? I would think that most elementary school teachers choose the profession primarily because they enjoy working with young children, not because their passion is math and they have a burning desire to teach it to six year olds.

So how do we resolve this issue? I moved from Massachusetts to California in 1963 in 5th grade. In Massachusetts, we studied French, but Spanish was the foreign language taught in California’s elementary schools. Our 5th grade teacher did not know Spanish, so we had a daily lesson that we watched on TV (I still remember this lesson being interrupted by a news flash that President Kennedy had been shot in Dallas). There was also a roving native Spanish-speaking teacher who came to our classes every few weeks.

If we have trouble training all of our elementary teachers in mathematics education, why can’t we train roving math specialists who go into each class daily for the math lesson of the day? Of course, money is probably the objection. We always seem to approve bond issues for new buildings, but buildings do not teach our kids. I am not an expert in school finance law, but is the system so hog-tied that there is no way to raise money to pay for such people? Instead we seem to be caught up in a never-ending battle to find the next magic textbook that will fix the problem. Meanwhile the publishers keep laughing all the way to the bank.