

It's time to take a new approach to math

When many otherwise successful students need to hire tutors for a subject, something is wrong

BY STEPHEN HUME, VANCOUVER SUN APRIL 6, 2009



Math education specialist Carole Saundry works with Grade 1 and kindergarten students at Tait elementary.

Photograph by: Ian Lindsay, Vancouver Sun files, Vancouver Sun

Everybody seems to be weighing into the great mathematics discussion, so permit me my two-bits worth.

For the most part, it's not about the math, or the kids -- it's about our collective obsession with treating miscalculations as failures rather than embracing them as the true learning opportunity that every error should become.

In science, business, sports, the arts, it's always the mistakes that teach us the most. Knowledge and skill advance by trial and error. I sense that getting it wrong is an essential part of learning. Sometimes, it takes many wrong answers to discover a way to the right one.

Yet when we teach math, we obsess slavishly about wrong answers. In the classroom, on examinations, for entrance to university, true success means getting all the answers precisely right. Failure means having wrong answers exceed some arbitrarily predetermined threshold.

It's not necessarily even about wrong answers. I know kids who have been marked down for having arrived at the right answer but by some unorthodox method instead of what's prescribed. In other words, thinking laterally and outside the box is wrong, too.

Provincial and national statistics demonstrate convincingly that kids like and enjoy math in the elementary grades. It's only as they progress through high school that interest wanes and many come to fear, loathe and detest math.

So we have a system which takes students who enjoy math and then, in a few short years, grinds the pleasure and sense of creative play out of most of them. But the kids' responses are not innate; they come from somewhere else. If it's not from them, it must be from the system and its propensity to humiliate and marginalize.

I empathize. As a kid, I, too, went through the agonies of trudging to the blackboard to get my long division wrong. Was public shame an incentive to improve? Not at 13. I developed an elephant-sized case of math anxiety. I fled math at the first opportunity; took the minimum required to matriculate; did

the minimum amount of work to scrape through with the minimum grade that permitted me to go on; joined my classmates in self-fulfilling ridicule of what we feared; never took another math course and, in university, avoided courses with math components.

So I was shocked when, holding down a management job responsible for budgets in the tens of millions, the standard psychological evaluation required of senior executives reported that my math aptitude was on the high end of the bell curve rather than the low.

Recently, I watched my daughter go through the same process in high school. Let me say that this is not a young woman who shies from challenge. At university she takes on difficult subjects she's never before studied and does well at them.

In Grade 7, she'd ranked near the top of the national math test she'd taken for fun; by high school she'd walked out of her math class never to return, preferring to complete her university entrance requirements by correspondence -- and I watched in astonishment as her grades suddenly shot up by 25 per cent when she was left to work on problems by herself.

When I interrupted an animated discussion with her mother over some fine points of Latin syntax to ask her what had happened, this is the gist of what she said:

If math is ultimately the language of relationships, we never seem to get beyond the grammar and basic punctuation in the classroom. We reward students with innate aptitudes and marginalize those without at a time when adolescents are most self-conscious and their self-esteem is most vulnerable to a sense of public humiliation.

Imagine teaching English literature, she said, by requiring students to memorize the Oxford Unabridged Dictionary, grading them only on their ability to correctly spell the words they are required to memorize and on whether they can parse the sentences. Imagine teaching Romeo and Juliet by counting Shakespeare's use of bilabial fricatives and ignoring the big themes of passion, pride, love, jealousy and betrayal with which teenage readers most identify.

Some time ago, writing a short piece I'd been asked to contribute to the Victoria-based magazine *Island Parent* on the subject of math anxiety, I called a dozen friends and acquaintances who either have teenagers now in high school or whose kids have just passed out of the system.

I had one question: Did your kids require the help of an outside tutor to get through the final few years of math in high school? Every parent I called said yes, they had, indeed, felt compelled to hire a tutor to help otherwise academically proficient teenagers get through math. The response was corroborated by a 2007 report from the Canadian Council on Learning, which found that about 30 per cent of Canadian parents had hired tutors to assist their kids with math. Those students averaged B or higher in their general academic performance.

According to a 2004 report from the B.C. College of Teachers, almost half of secondary school math classes were being taught by teachers without a background in mathematics. It seems that even the teaching profession is affected by the compounding uninterest that afflicts the subject.

Perhaps, however, there are significant lessons to be learned from the fact that somewhere near a third of our brightest high school students need outside help in math.

The first lesson is that once they begin studying the subject one-on-one outside the classroom, most math students do well enough to meet post-secondary requirements. The second is that the system as it now exists unfairly penalizes students whose families can't afford to hire a tutor.

The mantra of technologically advanced society is math skills. If that's the case, why do we persist in an educational model that doesn't appear to work?

Should we be completely reinventing the classroom environment when it comes to math?

Should we be training, hiring and providing financial incentives to more teachers while moving to much

smaller math classes where there's a sense of collegiality and one-on-one instruction is genuinely possible?

Should we be teaching math in shorter periods but teaching it every day and in a gaming atmosphere?

Should we be looking at greater use of online resources where kids can progress at their own rate without constant comparison to those who are more advanced in their skills?

I don't pretend to know the answers here, but I do know that one classic definition of stupidity is to keep repeating the same mistake.

shume@islandnet.com

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