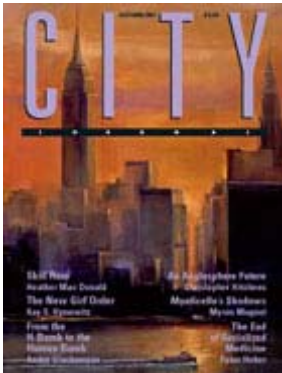




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How Not to Teach Math

New York's chancellor Klein's plan doesn't compute.

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It wasn't working. We'd gone through six straight wrong answers, and now the kids were tired of feeling lost. It was only October, and already my fourth-grade public school class in the South Bronx was demoralized. Day after day of going over strange, seemingly disconnected math lessons had squelched my students' interest in the subject.

Then, quietly, 10-year-old David spoke up. “Mr. Clavel, no one understands this stuff.” He looked up at me with a defeated expression; other children nodded pleadingly. We had clearly reached a crossroads. How would Mr. Clavel, a young teacher, inexperienced but trying hard, react to David's statement—so obvious to everyone in the class that it didn't even require seconding?

“Look,” I began, sighing deeply. “Math isn't half as hard as you all probably think right now.” A few kids seemed relieved—at least I wasn't just denying their problem. “There are different ways to teach it,” I continued. “I don't want to do this either . . . so we're not going to—at least most of the time.” I was thinking out loud now, and many of the children looked startled. What did I mean? We weren't going to learn *math*? “We can use these math books when we need them, but I'm going to figure out different ways to teach you the most important things.”

If school officials knew how far my lessons would deviate from the school district-mandated math program in the months ahead, they probably would have fired me on the spot. But boy, did my kids need a fresh approach. Since kindergarten, most of them had been taught math using this same dreadful curriculum, called *Everyday Mathematics*—a slightly older version of a program that New York City schools chancellor Joel Klein has now unwisely chosen for most of Gotham’s public elementary schools; the district had phased in *Everyday Mathematics* grade by grade, and it had just reached fourth grade during my first year of teaching.

The curriculum’s failure was undeniable: not one of my students knew his or her times tables, and few had mastered even the most basic operations; knowledge of multiplication and division was abysmal. Perhaps you think I shouldn’t have rejected a course of learning without giving it a full year (my school had only recently hired me as a 23-year-old Teach for America corps member). But what would you do, if you discovered that none of your fourth graders could correctly tell you the answer to four times eight?

The curriculum derives from a pedagogical philosophy that goes by several names—“Constructivist Math,” “New-New Math,” and, to its detractors, “Fuzzy Math.” I’ll stick with “Fuzzy Math,” since the critics are right. Nothing about Fuzzy Math makes much sense from a teaching standpoint.

One weakness is its emphasis on “cooperative learning.” Fuzzy Math belongs to a family of recent pedagogical innovations that imagine that kids possess innate wisdom and can teach *each other* while a self-effacing “facilitator” (the adult formerly known as a teacher) flutters over them. If the architects of *Everyday Mathematics* had their way, I would have placed my children in various groups, for the most part unsupervised, so that they could work on one elaborate activity after another, learning on their own.

Maybe this approach wouldn't lead to utter disaster in a wealthy suburban classroom. But I'd derive bitter pleasure in watching a Fuzzy Math "professional-development" expert try using it in an inner-city classroom, filled with kids whose often unstructured home lives make self-restraint a big problem. A guest art teacher, gung-ho about cooperative learning, tried to teach my kids using this method. By the second session, students were getting out of their seats, calling out without raising their hands, yelling to each other, and, in a couple of cases, throwing punches. I avoided this loss of control, because right from the outset, even before I chucked the whole program, I felt that pursuing cooperative learning with my students was asking for trouble, and so I mostly didn't do it. I was going to teach; my students were going to learn.

Everyday Mathematics is bad enough from the standpoint of maintaining a disciplined class. Making it even worse is its Fuzzy Math-inspired emphasis on "critical thinking skills" over old-fashioned drilling and the mastery of facts. What matters is showing that you understand a concept, not whether you can perform a calculation and come up with a right answer.

Defenders of critical thinking say we need to rescue our schools from a repressive "drill-and-kill" pedagogy that makes children automatons, spitting back the facts and rules that teachers have drummed into their heads and never learning to think on their own. The truth, of course, is that no one claims that knowing how to think independently isn't important. But thinking can't take flight unless you do know some basic facts—and nowhere is this more the case than in math. If you really want your students to engage in "higher-order thinking" in math, get them to master basic operations like their times tables first. When a middle schooler is learning to factor equations in eighth grade, it's a crippling waste of mental energy if he needs to figure out how

many times four goes into 20. Mastering fundamentals through practice can lift a child's confidence to do harder work.

Unfortunately, a student in a Fuzzy Math program—including *Everyday Mathematics*—is unlikely to master much of anything. The hours of logically linked lessons that old-style math classes spent on practicing operations so that they became second nature to students just are not there. As one local paper, complaining about Fuzzy Math, put it, “Rote learning and the memorization of traditional algorithms appear to have been completely thrown out the window.”

Instead of rote learning and memorization, students move haphazardly from one seemingly unconnected topic to another. In Fuzzy Math lingo, it's called “spiraling.” On this view, teachers shouldn't use a single method to get addition across to students; they should try lots of approaches—like adding the left-most digits first. That way, the Fuzzy Math approach says, you have a better chance of getting students to understand the concept of addition. In practice, however, trying to teach a host of different methods if students haven't sufficiently mastered any specific one—as is all but inevitable, since they haven't spent much time *practicing* any specific one—can be very confusing.

Equally mystifying, *Everyday Mathematics*, like Fuzzy Math programs generally, abruptly introduces concepts like basic algebra that students aren't officially taught until years later. Imagine you're a fourth grader and see in your workbook, right next to a relatively easy addition word problem, a forbidding algebra exercise you couldn't begin to answer because . . . well, you haven't learned algebra yet. Bewilderment is inevitable. Ivette Apollo, the mother of a fourth grader in nearby District 11, also using a Fuzzy Math program, paid for a tutor for her son when the strange, illogical learning sequences began to baffle him. “Frank went from learning some multiplication in third grade right into

doing what seems to be algebra and geometry,” she complained. “He doesn’t even know how to do long division, and yet he’s being taught skills that kids should learn in eighth grade. You have to walk before you can run.”

Teachers frustrated by this incoherent approach got little sympathy from school administrators. District officials told us that we should just keep going—even if not a single child in our rooms understood what we were talking about. We were going to spiral back to each topic later in the year, they reassured us. Yet the district officials themselves seemed perplexed by *Everyday Mathematics*. One assessment, created by the district to judge the progress the fourth graders were making in the program, came with an answer sheet with two incorrect answers. As for students, many just tuned out. The lesson plans jumped around so much that an especially confusing and oddly presented topic was only going to be on the agenda for a few days. Why bother trying to understand it?

The repudiation of skills in Fuzzy Math also encourages a detrimental overreliance on calculators. The use of these gadgets to replace mental computation raises concerns about learning skills for all school children. According to a 2000 Brookings Institute study, fourth graders who used calculators every day were likely to do worse in math than other students. But it’s minority kids like those in my class who are turning to calculators the most. The Brookings study reports that half of all black school children used calculators every day, compared with 27 percent of white school kids.

Then there is the bizarre recommended homework. According to *Everyday Mathematics*, I should have assigned my students extra-hard material to struggle with at home. Here’s an example from the updated fourth-grade workbook: “Homer’s is selling roller blades at 25 percent off the regular price of \$52.00. Martin’s is selling them for one-third off the regular price of \$60. Which store is offering the better buy?”

Now put yourself in the place of kid who hasn't learned how to multiply quickly, who isn't sure about what a percentage is, and whose knowledge of fractions is meager. The problem will seem forbidding. The homework assignments required way too much reading, too. If you didn't read well, as was the case with many of my kids, it meant that you were going to run into trouble, even if your natural mathematical abilities were strong. The end result: if no adult is around to walk them through the homework assignment, kids will likely dash off a string of guesses and go watch TV.

But then, the program seeks to involve parents. As the *Elementary Mathematics* web site points out, "the authors . . . believe it is very important to help parents become actively involved in their child's mathematical education, and they have worked hard to provide opportunities [i.e. hard problems] for this to happen." This sounds nice—who doesn't want to see parents involved with their children's education? But it obscures some realities of inner-city life. What if the parents (or parent: many of my kids belonged to single-mother households) worked long hours? What if they lacked college educations? Or barely spoke English? Or just weren't interested? I knew many of my students' parents to whom one or more of these categories applied. For my class, anyway, I came to believe that a good homework assignment should almost never require parental help. Homework should simply build mastery through straightforward practice of what classroom instruction has already taught.

There's mounting evidence that Fuzzy Math doesn't work. During the 1990s, Fuzzy Math represented the new wave, and President Clinton's Department of Education was pushing it, so district after district across the country tried it out. But its popularity among educational elites could not hide the dismal test scores.

California, ever on the cutting edge of educational reforms,

enthusiastically embraced Fuzzy Math in the early nineties only to watch state math scores plummet. In 1996, California registered one of the worst scores of all 50 states on the National Assessment of Educational Progress. By the end of 1997, the State Board of Education realized its mistake and produced sensible standards that encouraged more traditional math instruction. Other states that experimented with Fuzzy Math have started to see the light as well. “The pendulum is swinging back to the more traditional approach to education,” says one administrator in Massachusetts.

Regrettably, in the heavily bureaucratized public schools, bad results do not necessarily lead to re-evaluation. Fuzzy Math, cooperative learning, and myriad other educational fads are the pet projects of very influential, tenured university “experts,” who fiercely protect their theoretical turf, in teachers colleges and among school administrators. If test scores seem to rise thanks to Fuzzy Math, great: campus enthusiasts will tout the results. If they stagnate or fall, the theoreticians will find ways to poke holes in any critical study that blames the theory.

Back on planet Earth, however, the frustration of parents and community leaders has gathered momentum. “Why do students add with their fingers?” complain many parents, according to the *Boston Globe*’s Laura Pappano. “Why don’t they know addition facts and times tables cold?” Parents overwhelmingly want to set aside ideological preoccupations in math and get back to fundamentals. A big push is on to allow parents to opt their kids out of *Everyday Mathematics* and other Fuzzy Math programs. Elizabeth Carson, a mother who has led the fight in New York City to reevaluate the public-school math curriculum, perfectly captured the prevailing attitude among many parents in a letter published in the *New York Times* last summer. “Parents have had enough of trendy, flavor-of-the-month educational reforms, like whole language and Fuzzy Math,” she wrote. “Our children are continually used as guinea pigs for pedagogical

fads, promulgated not by experienced classroom teachers who know better, but by those with vested interests in securing abundant grants and with an eye to the professional glory of being on the cutting edge.”

“Cooperative” learning that leads to classroom chaos, schizoid lessons that fail to impart mastery, ill-conceived and overly difficult homework assignments, lousy results, parental outrage—shouldn’t every teacher have done as I did and thrown *Elementary Mathematics* into the garbage? I certainly wasn’t alone in hating it. Indeed, I never heard a good word for it from my fellow teachers. At a grade conference one day, one our most respected fourth-grade teachers, a veteran who worked hard and cared deeply about the achievement of her students, summed up the general frustration with the new program: “I can’t teach it.”

But it isn’t easy for teachers to disobey mandated curricula—not if they want to keep their jobs. I abandoned *Everyday Mathematics* without too much worry because I wasn’t sticking around at my South Bronx school for more than a couple of years and didn’t really care if I turned a few administrative heads. Most teachers are trying to make a career in education, though—so they teach a newly mandated curriculum even if they know it to be absurd. As one of my colleagues told his frustrated class, “I’m sorry, but I’m supposed to keep going.”

Nor will school bureaucrats usually be quick to get rid of a deeply flawed curriculum. After all, if the “experts” say Fuzzy Math is the way to go—and school administrators are loath to challenge the experts—then the problem must be in how teachers are implementing the theory, not in the theory itself.

But even intensive teacher training will not solve the enormous problems of *Everyday Mathematics* and other Fuzzy Math programs. The professional development

workshops on *Every Mathematics* I attended were basically cheerleading sessions for the curriculum. If you complained, as I did, you might as well have been invisible. A third-grade teacher objected to the intimidating complexity of some of *Everyday Mathematics*'s word-heavy mandatory activities, mentioning by way of example one of her totally lost students, who could not yet read or write. I had a few students in my class who were in the same boat, so there was nothing unusual about her statement. Yet the district official, smiling, just responded, "I don't believe you."

By deciding against local control early on and moving to centralize the school system, Chancellor Klein and Mayor Bloomberg took a tremendous risk. The advantage of charter schools—public schools with a great deal of independence and flexibility—and decentralized public schools is that they have the chance to innovate and distinguish themselves. Any leader of a school system who decides to put blanket "reforms" in place could achieve great success; he also risks unknowingly stamping out improvements made at the local level. Unfortunately, it appears that Klein and Bloomberg, by embracing an all-but universal Fuzzy Math curriculum, are setting themselves up to lose their big gamble.

The inner-city students subjected to this curriculum will be the real losers. What will happen to kids who never adequately learned basic operations like long division—or even their times tables? How will they succeed in the knowledge-based twenty-first century economy? Most of them won't have parents who can afford math tutors to help them catch up. My guess is that most of these kids will never get the remedial education they need, and that we'll just brush another catastrophe under the rug.

Matthew Clavel is now writing a book on his teaching experiences and is a student at New York University's Wagner School of Public Service.

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