A letter on teaching "new math" in US schools

21 September 2000

To the editor:

On April 27, 2000 the *New York Times* carried an article describing the parental backlash against the self-declared “new math” philosophy of teaching mathematics. The word “new,” it should perhaps be noted, has spread rapidly through our vocabulary—the new Russians, the new economy, etc.—and invariably serves to obscure some social phenomenon involving social consciousness and money, usually unequally distributed. The “new math,” although perhaps more abstruse, is no exception.

The article begins by affirming what many in mathematical circles have long suspected: the “new math” is a result of a reaction by the educational establishment to the changing social dynamics of the American classroom. Specifically, the article writes that the “new math” tried to “tackle a nagging problem: the math phobia that afflicts many students, and the disparity between the test scores of white middle-class students and their poorer black and Hispanic counterparts.” Not surprisingly, the *Times* does not analyze the causes of these problems, such as the generally low quality of teacher training, poor preparation in previous math courses, and the lamentable socioeconomic conditions that face most American schools, especially ones in poorer areas.

Instead, the *Times* performs the less demanding task of outlining common arguments for and against new math, and concluding with a small anecdote expressing the pious hope that the two sides will be reconciled and American education somehow improve. Examining the myths and omissions in the *Times*' article clarifies the current state of mathematics education, and of public education in general.

The *Times* describes the “new math” movement as the expression of a “passionate belief shared by tens of thousands of teachers around the country that they can reach more children, especially low-achieving minority children, by dropping standard rules in favor of exercises that allow students to discover the principles of math on their own.” Describing “new math” as the expression of passionate belief is to give it at once far too much and far too little credit. As with any top-down bureaucratic initiative, it has often been imposed on an indifferent or hostile teaching staff who has little enthusiasm, let alone passion, for the latest slogan administrators and a few educational specialists have adopted. At the same time, the “new math” is a bonanza for a certain group of publishers and makers of educational materials, whose massive financial donations to educational institutions to “promote” their products have played no small role in spreading “new math.”

The article then details, somewhat critically, the substance of the “new math program.” Instead of learning formulas and formal procedures, students perform a variety of supposedly fun and intuitive tasks to get an idea of “how math really works” and try to “discover math for themselves.” These include counting beanbags to learn how to add whole numbers, and folding paper strips to learn to deal with fractions. In and of themselves, these are not unreasonable activities; anything goes, so to speak, if the end result is that students understand or have intuition for what the teacher is talking about. The problem is that “new math” proposes that these activities cease to serve as background for learning how to perform basic mathematical tasks, and become instead ends in themselves. This outlook will do a disservice to the students when they take high-school standardized tests or college-entry tests like the SATs, where facility with paper strips is not directly useful and the ability to perform high school algebra is required. The extent to which a “new math” outlook is adopted varies according to the teacher's independence from school administrators and personal competence, so precisely how “new math” is changing American mathematics education as a whole is hard to judge. However, what is certain is that the educational establishment is pushing a “don't worry, be happy” philosophy down the throats of its teachers with no particular attention paid to students' mathematical abilities.

The reactionary ideological company that “new math” keeps—and which the *Times* ignores—is an indication of the bankruptcy or confusion of the layers that propel it into public affairs. Some in educational circles “passionately believe,” we are told, that “unconventional exercises [have] a way of keeping weaker students engaged, especially those from groups that have historically lagged in mathematics performance, like girls and black and Hispanic students.” These exercises should be judged according to “flexible” standards and “‘reasonable' answers should be valued over a single right answer.”

At times it seems that these people have never been inside a classroom or read a newspaper. Unconventionality is a quantity independent from usefulness, and it is underestimating students to think that they do not realize this just as teachers do. The story—recounted elsewhere in the article—of a boy who seeks out computational problems in order to understand the material matches the experience of many students, who are confused and not at all engaged by the utter lack of method in certain “new math” courses. There is no substitute, whatever one's gender or skin color, for well-explained economy of thought, and all students realize at some level or other that they are being fed a confused, “flexible” version of elementary and high school mathematics.

It often seems that the only reason “new math” insists on “flexible standards” is that it has no faith in the ability of the disadvantaged to meet the usual standards, and no particular interest in developing it.

In a way, one has to feel for the predicament of “new math” proponents. They know that American schools face a flood of struggling children from a society beset with intellectual and socioeconomic ills, and realize from bitter experience that in this

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context not everyone will pass, let alone do well; they do not know what to do. So, instead of publicly exposing the terrible conditions facing schools and children in contemporary society, they try lowering accuracy requirements and teaching "fuzzier" for "groups that have historically lagged in mathematics performance." However, bank balances, tax forms, and SAT exams are not measured according to "flexible standards." The later high school and college curriculum in the United States—which is already not particularly advanced compared to certain other countries' curricula—nonetheless assumes that students will be familiar with the "usual standards." These methods of teaching thus merely perpetuate pre-existing problems and weaknesses in low-achieving areas.

Another interesting comment emerges from the president of the council of mathematics teachers, who claims that "if I only teach it the way I understand, then only students who understand it the way I do will be successful." This statement is replete with intellectual oddities. First, the teacher admits that he "understands" the material in just one fashion, which seems a bit limited for a teacher. In the same breath, he notes that other students have other ways of "understanding" the material which are different from his own, but which cannot communicate with his way of "understanding" the material. Secondly, there is no mention that there is a common set of basic computational skills that all students simply must have in order to function as adults (and a larger one if students are to undertake any sort of technical work). It is a teacher's responsibility to at least attempt to transmit these common skills to all of his students. Finally, he seems to suggest by his comment that, in order to be more inclusive, he should teach the material in a way that he does not understand, which sounds like the pinnacle of confusion.

Perhaps he is admitting his failures and incompetence as a teacher in front of a council of which he is the president. If we are correct in guessing otherwise, then he is putting forth the idea of "ways of understanding" mathematics which are mutually incomprehensible and unrelated to social and intellectual needs of students. Given the previously observed class, gender, and race subtext of "the underachieving student who thinks differently," this sounds suspiciously like Social Darwinism and racial or gender essentialism. Crudely put, the logical conclusion of this confusing line of thought seems to be that teachers and mathematicians think of math one way, "underachieving women and minorities" think of it another way, and that these two ways are incommensurable.

New math is thus revealed as a pedagogical method which ignores and talks down to its students, refuses to examine the causes of educational difficulties, and generates an obscurantist ideology in order to hide its pessimism. Combining the discouragement and bankruptcy of educational unions and the crass self-interest of educational publishers, it unifies powerful social forces that work against American mathematics.

The *Times* article then details the outpouring of parents' opposition to these new trends in education. While carefully avoiding a clear or sympathetic statement of the scope of parents' worries, the *Times* claims that "In their worst nightmares, parents fear that schools are producing a lost generation of math illiterate children." This simply shows that many parents are more concerned about their children's education, and have a better understanding of the objective consequences of educational policy, than a large section of the educational establishment. The *Times* also quotes several mathematicians who are highly concerned by the quality of mathematical skills that their students and children possess. The *Times*, however, forgets to mention the social forces that are currently most influential in their opposition to "new math" and its sister ideologies in other academic disciplines.

Rightist politicians have sought to direct popular discontent over educational problems away from a discussion of their actual causes—underfunding, poor teacher training, child malnutrition, and the lack of a serious educational setting for the a sizable proportion of today's children—towards a punitive outlook on the public schools. They propose school vouchers to pay for private and parochial schools (a completely preposterous suggestion given that there are 55 million school-age children in the US and 6 million seats in private and parochial schools), advocate punitive funding measures for schools that do not perform well on standardized exams, and seek to restore the "moral fiber" of the classroom by setting aside a few seconds of silence for prayer. These destructive or educationally useless measures are generally in line with the needs of big business to decrease social spending. However, they receive a populist cover of toughness and common sense by at least verbally opposing the clearly lax and happy-go-lucky quality of systems like "new math."

These politicians, and the interests they serve, often idealize pre-"new math" mathematical training as an era where people learned formulas, took things seriously, and didn't put up a facade of racial harmony by studying the mathematical development of other cultures. Except for the last statement, however, this is an inaccurate description of mathematics education in American prior to the 1980s. There are many adults with poor math backgrounds, too. Moreover, this idealization is as mathematically useless as that put forth by "new math." Formulas and memorization are undoubtedly important; however, when they exist independently of practice in actually solving problems, enthusiasm, and intuition for the subject, they produce mathematical nonentities incapable of logical argument. Schools need an intelligently undertaken improving of students' mathematical culture, not a mechanistic logical negation of "new math."

Ultimately, both conservative politicians and "new math" educational bureaucrats come up against a hard reality which their outlook is organically incapable of confronting: American capitalism does not provide the social setting or the funding necessary for the proper education of huge layers of the youth. When children go hungry, take classes in decrepit bathrooms or boiler rooms, fear physical harm at school, work in order to support families' incomes, or suffer the intellectually dulling effect of a conformist and profit-oriented culture, the teaching of mathematics and other academic subjects cannot prosper. Concerned parents, mathematicians, and the general public must eventually come to the conclusion that the state of education today cannot be improved without a massive social change, one that goes against the interests of the most powerful and established elements of American society.

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