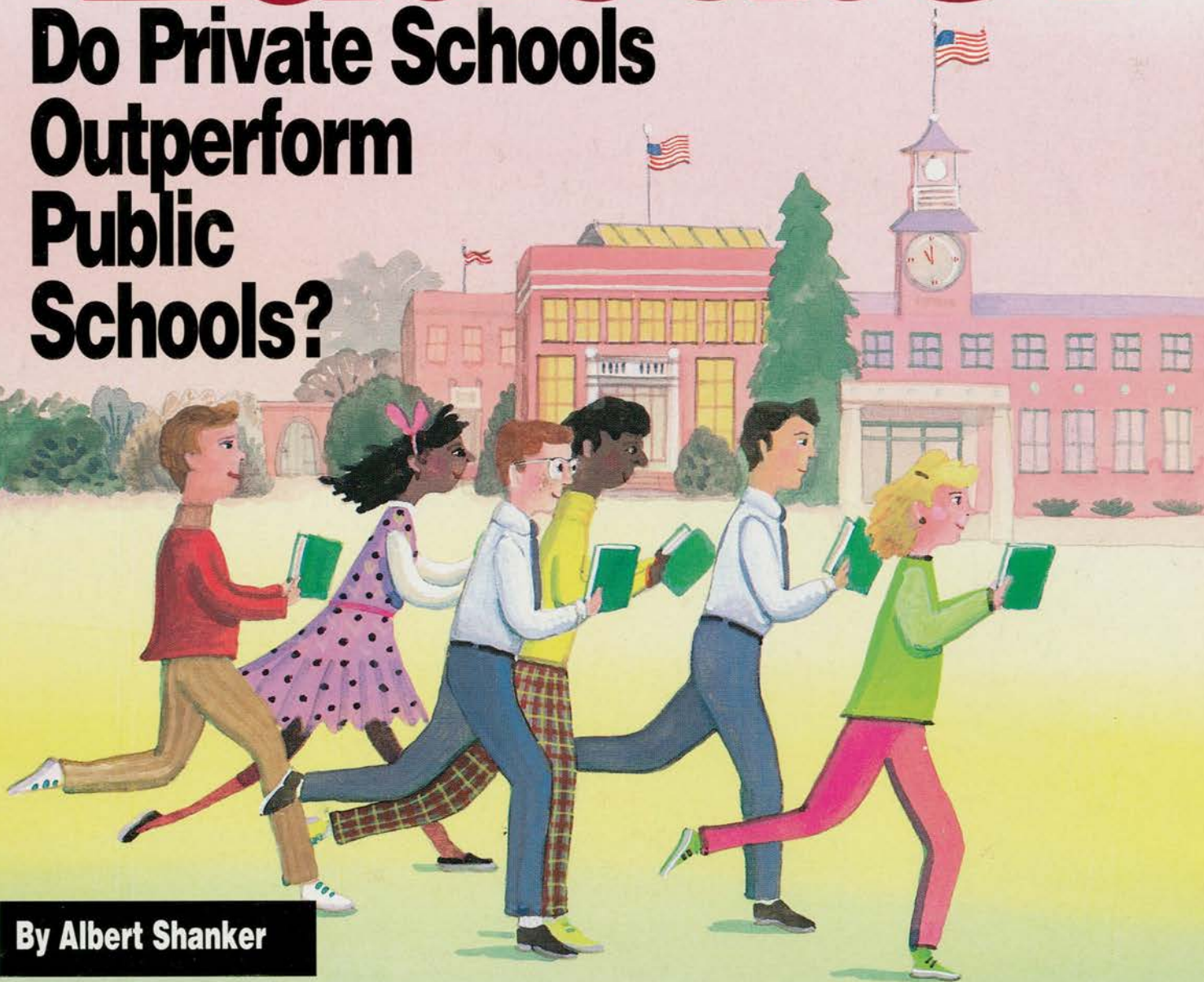


Math Revolution? ■ What European Students Know about Us

**AMERICAN FEDERATION OF TEACHERS
FALL 1991**

AMERICAN **Educator**

**Do Private Schools
Outperform
Public
Schools?**



By Albert Shanker



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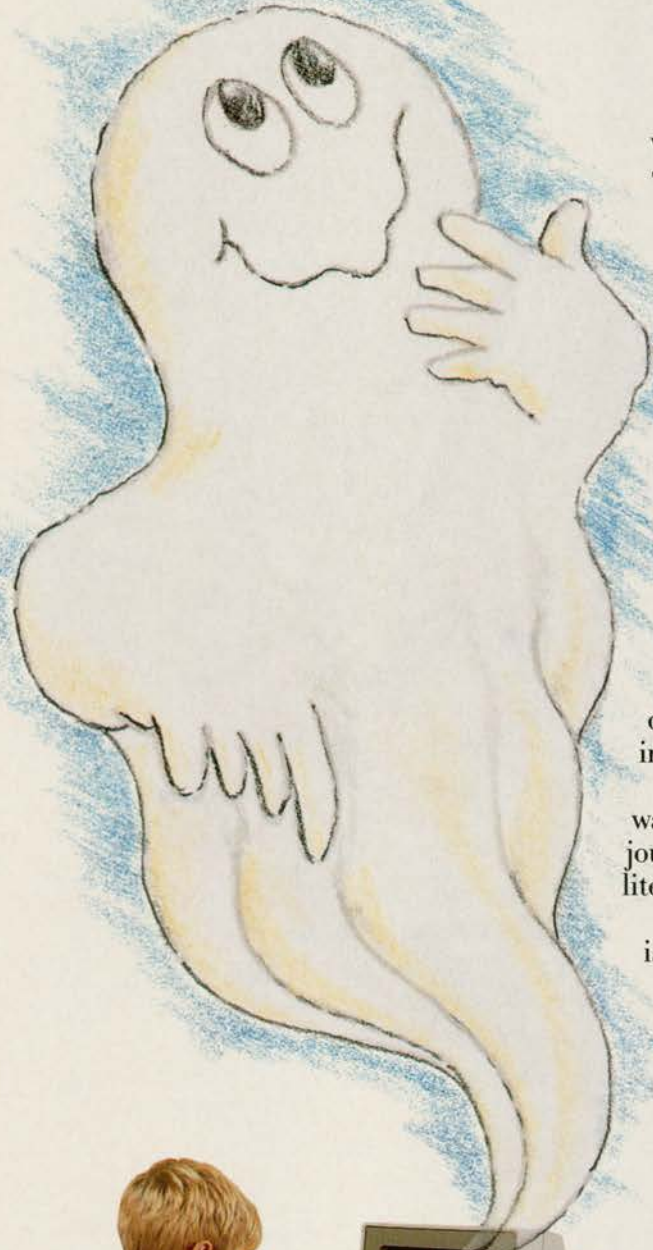
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NOTEBOOK

BRING *LABOR'S HERITAGE* TO CLASS

Dramatic photos like this one fill the pages of *Labor's Heritage* magazine. Along with articles and historic documents—and, now, with two lesson guides each year—this quarterly publication of the George Meany labor history archives is an excellent resource for teachers of history and other social studies courses.

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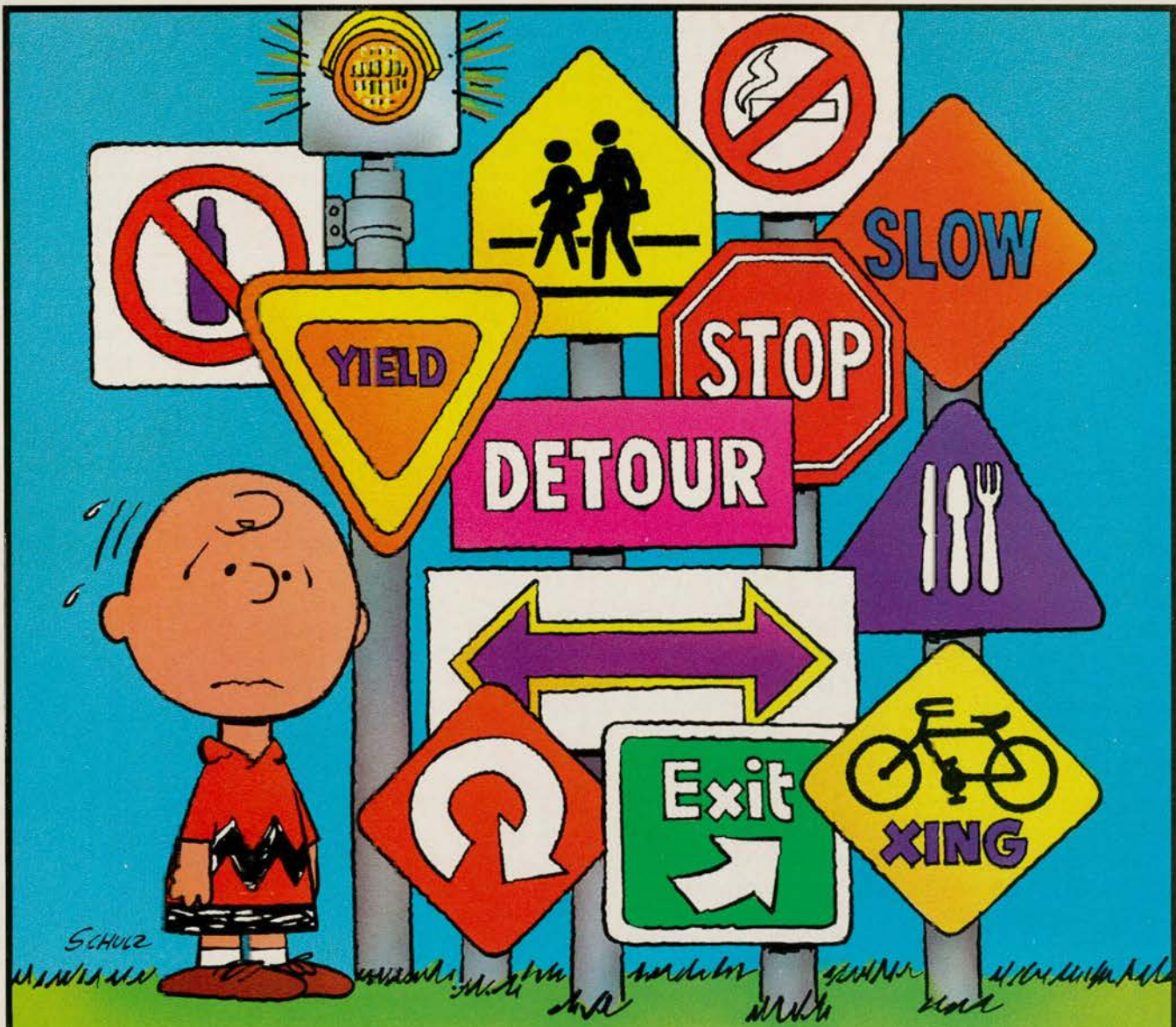
ca. 1890. The lump room of a tobacco plug factory. Lumpers were highly skilled workers who formed carefully shaped lumps of chewing tobacco that they then encased in a wrapper leaf.

A NEW ORGANIZATION FOR HISTORY TEACHERS

History teachers at all levels now have an organization all their own: the National Council for History Education. The NCHE presses at the national level and at the state level for both expanded and improved history education. In this coming year, NCHE will play a role in developing the standards for the history portion of the National Assessment of Educational Progress (NAEP).

If your district is revising its history/social studies curriculum, you may want to draw on the resources of the NCHE—especially on its speakers bureau, which can dispatch experts on curriculum reform and other issues. As a member, you will receive NCHE's monthly newsletter, "History Matters," and occasional papers on topics of interest to classroom history teachers. Members also get discounts on certain relevant publications.

The suggested membership contribution is \$25, but smaller contributions are accepted. Make your check payable to the National Council for History Education, 26915 Westwood Road, Suite B-2, Westlake, Ohio 44145-4656.



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LETTERS

TROUBLE ON SESAME STREET

Three cheers for Jane Healy ("Chaos on 'Sesame Street'")! I am glad that someone is finally evaluating "Sesame Street." When it first appeared, I was told that all of my kindergarten students would come to school knowing their numbers and letters; I would no longer have to teach these skills. Would I be out of a job? No, because we would now teach what used to be first-grade curriculum. Yet some children cannot tell a number from a letter.

As a kindergarten teacher for thirty-two years, I agree with Jane Healy that the children of today cannot concentrate for any length of time. They are so used to the frantic pace of "Sesame Street" that they cannot picture what is said or read. Everything has been presented visually to them. They do not have to use their minds or brains. Things have to be repeated three, five, ten times because they have not been trained to listen carefully. I find that when I present things slowly, like "Mr. Rogers," the children can understand, comprehend, relate, absorb, and learn.

The children come to school not knowing how to relate to others, how to use a pencil or crayons or scissors (some don't even have them at home), or how to do anything that takes concentration or self-control.

Jane Healy's statement, "What these less-advantaged children need is not early phonics but language development" should be put in capital letters and be the motto for early childhood educators. The children yearn to speak and to be heard. They need to hear correct speech, with lots of new words, over and over, and have the opportunity to repeat these words and to use them in their own speech. I wish that I had my children for a longer time each day so that we could do more of this.

It is a shame that the very children that "Sesame Street" is supposed to help—the less intelligent, the educationally disadvantaged—remember less from their exposure to it, according to Dr. Singer. I hope to

teach my children what "Sesame Street" is trying to teach.

JUNE KOSTER
MASSAPEQUA, NY

Jane Healy's critique of "Sesame Street" makes some interesting points, but it suffers from one fatal flaw. When she concludes that the "Sesame Street Generation" does not read well because it has viewed that show's "peripatetic carnival," she assumes that "Sesame Street" is the only (or even the primary) influence on reading skills. Of course, such an assumption is ridiculous. Reading skills are influenced by hundreds of variables, like parental attitudes, economic resources, presence of reading material in the home, and how many hours a child spends watching television. Let's face it, the same child who watches "Sesame Street" may also be watching MTV. Kids learn every time they turn on the set, not just when they watch "educational" programs. Healy has no way of distilling the influence of one show from another. It is certainly easier to blame "Sesame Street" than to tackle the complex combination of factors contributing to declining reading skills, but it won't solve the problem.

"Sesame Street" is not perfect, and no one has ever claimed it can teach reading by itself. That is why most public television stations air additional programs that employ alternative strategies to teach reading, such as "Reading Rainbow." It is also why Children's Television Workshop offers *Sesame Street Magazine* and *Parents' Guide*, both of which facilitate the very reading skills Healy describes as important.

Missing from Healy's analysis are reports I regularly hear from teachers about kids whose self-esteem is boosted when, having mastered the alphabet, they enter their first classroom able to answer the teacher's questions and easily complete introductory assignments. Nor does Healy's analysis reflect a teacher's ability to spend scarce class time on more advanced skills when students come in already knowing letters and numbers. Perhaps Healy's most sig-

nificant omission is any sense that "Sesame Street" conveys values critical to school success, such as cooperation, appreciation for people who are different from oneself, and the general notion that learning is fun.

Healy's analysis suggests some important issues for the creators of "Sesame Street" to examine as they seek to improve the show, but casting the program as *the* enemy ultimately diverts attention away from much more serious threats to the next generation's ability to learn.

DR. FAITH ROGOW
EDUCATIONAL SERVICES MANAGER, WSKG
BINGHAMTON, NY

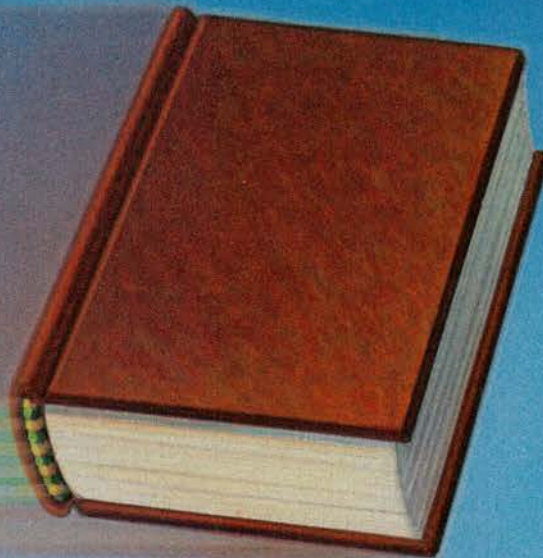
Our children are entering school with unprecedented emotional and academic problems, and the importance of "Sesame Street" in their early education has been questioned. Surely there are other alternatives than putting children in front of a screen for their daily imprinting of muppets with streetwise colloquialisms, muffled intonations, silly jingles, and disjointed teaching of isolated letters with no follow-up. These techniques defy the laws of learning, waste a child's own creative time, and condition him to TV's soft-shoe act for the rest of his life.

Our nation has been at risk for some time, and only early, effective teaching will help. But we still don't get the message! What will it take to bring us to our senses, turn the television off, and stop relying on it to educate our youth? Children need the prolonged guidance of teachers who cater to individual differences, provide challenges, drill, review, who check work to show progress, who give special attention, love, inspiration, a love of books and reading. Only by participation will children make an effort to succeed.

Only adults can rescue children from the masquerades of "Sesame Street" and let them use their own minds to learn, compete, socialize, and develop self-esteem in childhood's short span. The next century awaits these children.

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DO PRIVATE SCHOOLS OUTPERFORM PUBLIC SCHOOLS?

BY ALBERT SHANKER

THE BUSH administration is asking the public to pay for children to attend private and parochial schools. It wants to "voucherize" Chapter 1, the federal government's largest single expenditure on K-12 education and its most successful program for disadvantaged youngsters, and it wants to send new federal dollars to states and districts to implement choice plans that include private and parochial schools.

Legislators in a number of states, including Pennsyl-

Albert Shanker is president of the American Federation of Teachers.

vania and California, are asking the public to permit tax dollars to follow children to private schools. In Wisconsin, they have already succeeded, though, in the name of caution and equity, they limited the law to Milwaukee and to a relative handful of the city's low-income children and called it a voucher experiment. Chagrined by the defeat of a similar bill in Indiana and apparently too impatient to await its promised re-introduction, an insurance company will use its own money to fund a Milwaukee-style voucher program in Indianapolis. Finally, though not last and not least, the National Catholic Education Association, which represents the largest segment of the private school market, has declared getting public aid to

ILLUSTRATED BY SUSAN DAVIS



private schools its number one priority and has hired a top public relations firm to help it achieve this goal.

The demand for public aid to private schooling is not a new note in education policy debates, but this time it's like a chorus, with new voices from different parts of the ideological scale joining in. Judging from the extent of the movement for public aid to private education, its supporters are singing a well-orchestrated tune that is finding a receptive audience.

The lyrics go something like this: "Students in private schools achieve at much higher levels than public school students. Private schools, particularly Catholic schools, take students just like the ones attending public schools

and do a far better job of educating them. It should come as no surprise that private schools do so much better; after all, they don't have bureaucracies, teacher unions, tenure, desegregation orders, affirmative action, bans on school prayer, or due process in student expulsion cases to contend with. Therefore, in order to overcome the crisis in education and for the sake of fairness, we should give all children, and especially those who are poor, the same opportunity to get a good education at private schools as kids whose families can pay."

Are the supporters of public aid to private education correct? Do private schools outperform public schools? Are they really working with the same kids? The results



What these results tell us is that, by graduation, there is virtually no difference in the performance of public and parochial and other private schools.

of the recent National Assessment of Educational Progress (NAEP) math examinations demonstrate that the answer is no on all counts.

Most news stories about these NAEP exams concentrated on the state-by-state comparisons of achievement among eighth-graders: which state came in first, which was second, and who was at the bottom—much like the results of an athletic competition. But everyone ignored the simultaneous release of NAEP's national study of math achievement among fourth-, eighth- and twelfth-graders—and the fact that it allows us to compare public and private schools. What these results tell us is that, by graduation, there is virtually no difference in the performance of public and parochial and other private schools; students in *all* our schools are achieving at disastrously low levels. And what this evidence means is that, under so-called private school choice, even if half or all of our public school students were to “choose” and be chosen by private schools tomorrow, we'd still be a nation at risk. We also would be a nation that had destroyed its neighborhood schools and abandoned its common school ideals.

POOR RESULTS

What, specifically, do the 1990 NAEP math results tell us about public and private school performance? The most logical place to start is with the twelfth grade, the end of the elementary-secondary school road, where we can make some judgments about the value added by a public or private school education. The first thing to notice is that there is only a six- or seven-point difference in average scores among seniors in public, Catholic, and other private schools. That's not much of a difference, and it is certainly not evidence of the superiority of private over public education.

It is true that a little over half of seniors in private schools achieve at the 300 level, which means they can handle content that NAEP says is typ-

ically introduced by the seventh grade: decimals, fractions, percents, elementary geometry, and simple algebra. This is a few percentage points better than the public school figure, but, again, it's hardly evidence of the excellence of private school education. The relevant fact is that both school sectors performed miserably: Approximately half of our graduating seniors, from both public and private schools, cannot handle math operations they should have mastered before they even entered high school.

For still worse news, let's look at the proportion of graduating seniors who achieved at or above level 350, which roughly indicates readiness to do college-level math. The figure is 5 percent for the public schools and 4 percent for both the Catholic and other private schools. Five percent is nothing to cheer about, but public schools did manage to get a higher proportion of their seniors prepared for college math than did private schools.

Rather than focus on the poor results across the school sectors, private school choice supporters may still seek

**TABLE 1
AVERAGE PROFICIENCY AND PERCENTAGE OF STUDENTS AT OR ABOVE FOUR ANCHOR LEVELS ON THE NAEP MATHEMATICS SCALE BY TYPE OF SCHOOL**

	Percent of Students	Average Proficiency	Percentage of Students at or Above			
			Level 200	Level 250	Level 300	Level 350
GRADE 4						
Public Schools	88 (1.2)	214 (0.9)	70 (1.3)	10 (0.8)	0 (0.0)	0 (0.0)
Catholic Schools	8 (1.1)	224 (2.0)	83 (2.6)	16 (2.2)	0 (0.0)	0 (0.0)
Other Private Schools	4 (0.8)	231 (2.8)	89 (3.8)	22 (3.4)	0 (0.0)	0 (0.0)
GRADE 8						
Public Schools	89 (1.3)	264 (1.2)	97 (0.5)	66 (1.3)	13 (1.3)	0 (0.1)
Catholic Schools	7 (1.1)	278 (2.6)	100 (0.2)	84 (2.6)	22 (3.4)	0 (0.2)
Other Private Schools	4 (0.7)	274 (2.4)	100 (0.5)	80 (3.8)	18 (2.9)	0 (0.0)
GRADE 12						
Public Schools	90 (1.3)	295 (1.1)	100 (0.1)	90 (0.7)	45 (1.4)	5 (0.6)
Catholic Schools	6 (1.1)	302 (3.0)	100 (0.0)	96 (1.2)	54 (4.5)	4 (1.0)
Other Private Schools	4 (0.8)	301 (3.1)	100 (0.0)	97 (1.1)	51 (4.8)	4 (1.8)

The standard errors of the estimated percentages and proficiencies appear in parentheses. It can be said with 95 percent certainty that for each population of interest, the value for the whole population is within plus or minus two standard errors of the estimate for the sample. When the proportion of students is 0 percent, the standard error is inestimable. Although percentages less than 0.5 percent are rounded to 0 percent, a few eighth-grade public school students (0.2 percent) and Catholic school students (0.1 percent) reached Level 350.

DESCRIPTION OF NAEP LEVELS:

Level 200: Simple additive reasoning and problem solving with whole numbers; content typically covered by 3rd grade.

Level 250: Simple multiplicative reasoning and two-step problem solving; content typically covered by 5th grade.

Level 300: Reasoning and problem solving involving fractions, decimals, percents, elementary geometry, and simple algebra; content introduced by 7th grade.

Level 350: Reasoning and problem solving involving geometry, algebra, and beginning statistics and probability; content generally covered in high school math courses in preparation for the study of advanced math.

Source: The State of Mathematics Achievement: NAEP's 1990 Assessment of the Nation and the Trial Assessment of the States, U.S. Department of Education, National Center for Education Statistics, June 1991, Table 2.6 and Executive Summary, pp. 6-7.

“victory” by insisting that this public school figure is higher than the private schools’ only because public schools have a higher dropout rate; more of the kids who would score poorly are gone. That’s probably true. But if you adjust for that, and even if you ignore the private schools’ dropout rate, the result is 4 percent of students graduating from public school are prepared to do college math as are 4 percent of students graduating from Catholic and other private schools.

That’s terrible. With so few students prepared to take up college math—and, of course, not all of them will choose to pursue a math or science course of study—where will we find the scientists, engineers, and mathematicians needed to carry this country successfully into the future? And into what kind of downward spiral will we slide as we search in vain for enough qualified elementary and secondary school teachers to train the *next* generation of students in math and science?

The NAEP results are even more shocking when you compare them with the achievement of students in our competitor nations, where 20 to 30 percent of students meet standards that are at least as high as NAEP’s 350 level in order to get into college. Given those standards, 95 percent of our public *and* private high school graduates would not be admitted to college anywhere else in the industrialized world.

“Okay, so there’s not much difference between the performance of public and private schools in the twelfth grade, and their students are in a dead heat at NAEP’s highest level,” private school choice supporters might say. “But look at the fourth- and eighth-grade average scores. There’s a 10- to 17-point spread there, and a clear case of private school superiority.”

Let’s say, then, that it makes more sense to concentrate on results one-third or two-thirds of the way on the education process as well as on the end results. From this perspective, the NAEP results tell us that the longer students stay in private schools, the worse they do, and the longer students stay in public schools, the better they do; private school children end up scoring like public school children, and public school children end up scoring like private school children. Rather than constituting proof of private school superiority, this seems more like evidence that public schools add more value to their students than do private schools.

DIFFERENT STUDENTS

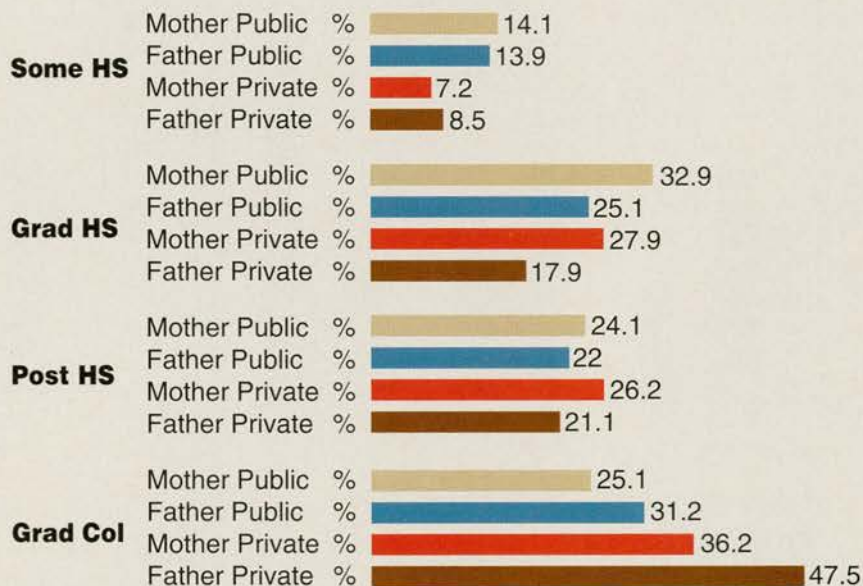
This conclusion becomes more compelling—and the small differences between public and private school performance in all the grades become more shocking—when you look at how different public school students are from the youngsters

who attend Catholic and other private schools. Contrary to what private school choice supporters claim, especially about Catholic schools, the students public and private schools educate are not alike, and not even remotely so. In fact, given the dramatic differences in their socioeconomic status and in the courses they take, to name just two, what’s surprising is not that private school students, on average, performed slightly better than public school students but that they didn’t leave them behind in the dust.

The basic difference is that private schools can and do select their students and turn away applicants who do not meet their standards. For example, 71 percent of Catholic high schools require an entrance exam, as do 43 percent of other religious schools and 66 percent of independent schools.¹ Moreover, 71 percent of Catholic high schools cite student discipline as their chief admissions criterion, and 80 percent require that entering students have successfully completed their previous year of school. In other words, these schools do not take all comers, as public schools must, and they are free to get rid of students who do not work out, who generally end up in the public schools.

So who are the students who attend private schools? They turn out to be children who should have given private schools an enormous edge over public schools in performance. In the sample of students tested by NAEP, about 50 percent more private school youngsters than public school youngsters have parents who were college graduates (Chart 1). For the nation as a whole, the difference between public and private school students in level of parent education is even more dramatic: 30 percent of parochial school kids’ parents and 57 percent of

CHART 1
EDUCATION LEVEL OF PARENTS FOR PUBLIC AND PRIVATE SCHOOL STUDENTS IN NAEP SAMPLE GRADE 12



Data source: National Assessment of Educational Progress 1990

Chart prepared by American Federation of Teachers

About three times as many public school students as private and parochial school students had family incomes under \$15,000.

the parents of kids in other private schools graduated from college, in comparison with 19 percent of public school students' parents (Chart 2).

If there is anything education research tells us, it is that higher education translates into higher incomes, and both are strongly associated with higher academic achievement. Even on the basis of family income alone, private school students should have performed dramatically better. According to the latest national figures, about three times as many public school students as private and parochial school students had family incomes under \$15,000, while twice as many parochial school students and more than three times as many other private school students had family incomes of \$50,000 and more (Chart 3). Given the strong link between poverty and lower academic achievement, it is important to note, too,

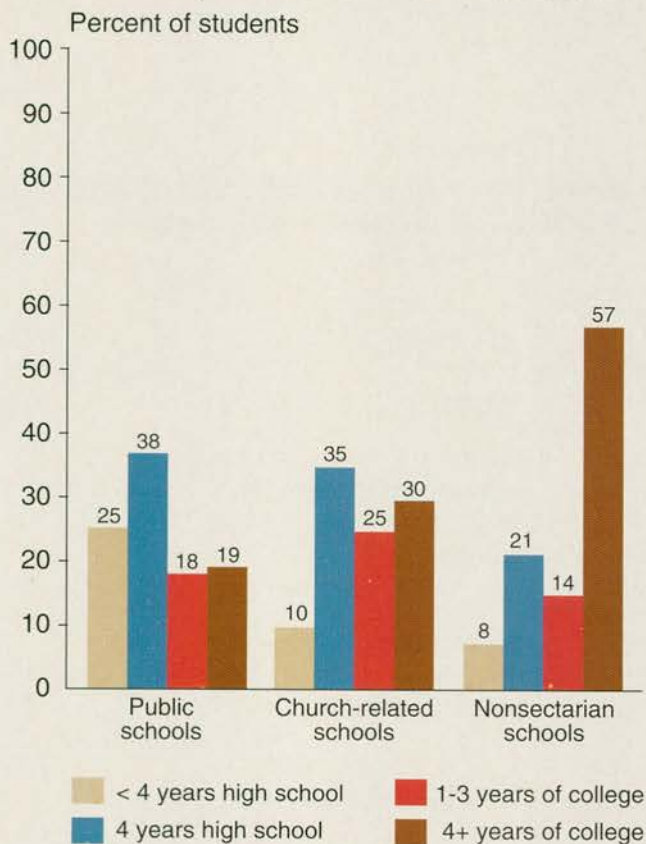
that there just are not that many private schools or private school students in the very rural and disadvantaged urban communities where the nation's poorest youngsters live.

Socioeconomic status makes a big difference in student achievement, but school counts, too. And there are big differences in the courses public and private school students take in school. For example, 81 percent of the private school seniors and only 56 percent of the public school seniors in the NAEP sample were in an academic track. Taking more academic courses, like having better-educated and wealthier parents, is strongly associated with higher scores, so why then did public and private schools have an identical record in the percentage of students they produced who were prepared to handle college-level math? And why were the average scores of private school seniors almost the same as those of public school seniors?

In light of these outcomes, claiming that private schools outperform public schools is like reporting that a grand chess master who played a match with a novice and won after 450 moves defeated the novice. The master may have won, but the real news is that, against all odds, the novice kept him in the game for 450 moves.

CHART 2

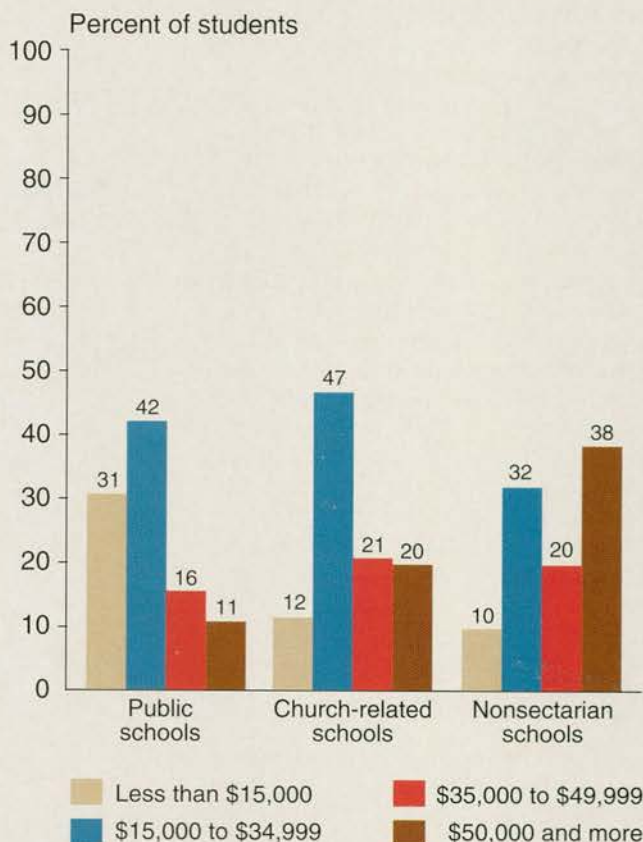
PARENTAL EDUCATION LEVELS OF ELEMENTARY AND SECONDARY STUDENTS IN PUBLIC, PAROCHIAL, AND OTHER PRIVATE SCHOOLS



Source: Private Schools in the United States: A Statistical Profile, With Comparisons to Public Schools, Figure 3-6, p. 47, U.S. Department of Education, National Center for Education Statistics, February 1991.

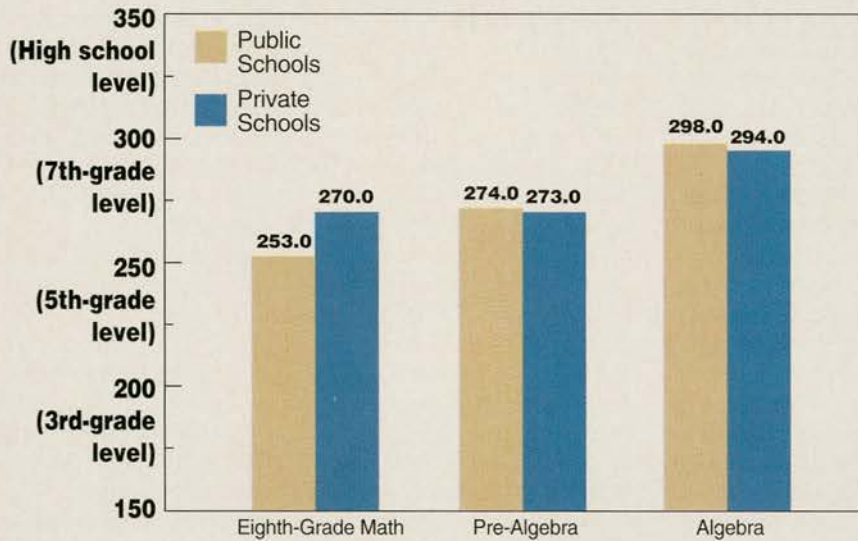
CHART 3

FAMILY INCOME OF ELEMENTARY AND SECONDARY STUDENTS IN PUBLIC, PAROCHIAL, AND OTHER PRIVATE SCHOOLS



Source: Private Schools in the United States: A Statistical Profile, With Comparisons to Public Schools, Figure 3-5, p. 46, U.S. Department of Education, National Center for Education Statistics, February 1991.

CHART 4
AVERAGE OVERALL MATHEMATICS PROFICIENCY
BY STUDENTS TAKING SIMILAR COURSES
GRADE 8



Data source: National Assessment of Educational Progress 1990, Student Data. Chart prepared by American Federation of Teachers.

SAME COURSES, SAME RESULTS

In fact, these considerable differences between the family and academic backgrounds of public and private school youngsters explain why, when you look only at average scores, private school students do somewhat

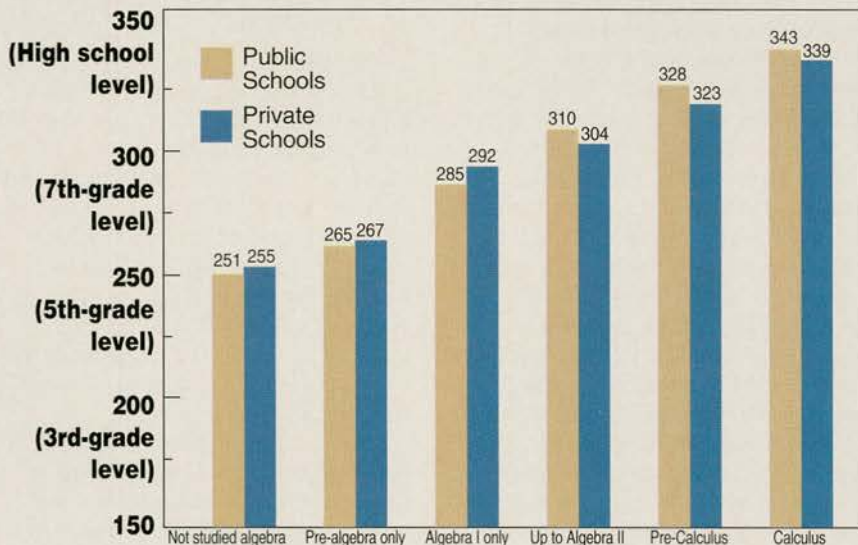
among kids who have taken more advanced courses, public school students score slightly better. But the point is that when you look at private and public school kids who have done the same coursework, there are no big differences in their achievement; there is no “private school advantage.”

better—though well below what you would expect, given their advantages. But what happens when you compare the NAEP scores of public and private school students who have similar family backgrounds and who have taken similar courses—if you compare apples with apples? Their achievement is almost identical.

Look at the results when eighth-graders are matched according to the math courses they have taken: Public school students who have had pre-algebra score 274, and private school students score 273. The results are similar for eighth-graders who have taken algebra, except that public school kids score four points better than kids from private schools: 298 as opposed to 294 (Chart 4).

It's the same story when you compare the scores of public and private school seniors who have taken similar courses (Chart 5). Among kids who have gotten only as far as Algebra I, private school students score slightly better; and among kids who have taken more advanced courses, public school students score slightly better. But the point is that when you look at private and public school kids who have done the same coursework, there are no big differences in their achievement; there is no “private school advantage.” And when you consider that these comparisons by courses taken did not factor in the big differences in public and private school students’ backgrounds, the result is additional confirmation that public schools are adding more value to their students than are private schools.

CHART 5
AVERAGE OVERALL MATHEMATICS PROFICIENCY
BY STUDENTS TAKING SIMILAR COURSES
GRADE 12



Data source: National Assessment of Educational Progress 1990, Student Data. Chart prepared by American Federation of Teachers.

IS THIS A FLUKE?

Some people will wonder whether there's something wrong with the NAEP results. “What about the SAT scores?” they'll ask. “What about the dropout rate?” Don't Catholic and other private schools do much better on both of those measures?

John Chubb and Terry Moe, authors of *Politics, Markets and America's Schools* and influential supporters of private school choice, ask these questions in a recent *Wall Street Journal* article (July 26, 1991). They point out that private school kids who take the SAT score, on average, 12 percentiles higher than public school

kids. What they don't mention is that an overwhelmingly greater percentage of the SAT-takers in public high schools than private ones come from non-academic tracks, and this depresses the average public school score because being in an academic track is associated with higher SAT scores. Add to this the fact that there has been a dramatic increase in the proportion of public school kids from the bottom half of their class taking the SAT, and the private school advantage in scores looks pretty puny. Moreover, when you compare the SAT scores of comparable public and private school kids, the private school advantage disappears again.

As for the public schools' dropout rate, the 24 percent figure Chubb and Moe cite is certainly shameful (if inflated), and the 12 percent figure for private schools is better. But how much better is it when you consider that private schools pick their students and public schools accept all comers? Wouldn't hospitals that refused terminally ill patients or physicians who rejected smokers or patients who were obese have lower patient death rates than ones that did not screen out the bad risks? It's therefore no surprise that Catholic and private schools have lower dropout rates. Again, we might wonder why the difference between public and private school dropout rates is not greater.

So the 1990 NAEP mathematics assessment is not the only place where we can see the supposed educational superiority of private schools evaporate. Nor is it the first place, and neither am I the first person to point it out.

In 1988, Chester E. Finn, Jr., now an adviser to Secretary of Education Lamar Alexander and then Bill Bennett's assistant secretary of education, presented unpublished public-private school comparisons from the 1986

NAEP assessments of reading, history, and literature achievement to the annual meeting of the National Association of Independent Schools. According to Finn, private school students (including parochial school kids) scored, on average, only about four percentage points higher than public school students on reading and six percentage points higher on history and literature. He also said that the soon-to-be-released 1986 math exams would show similar results. "There's a differential," he said, according to *Education Week* (March 9, 1988), "but it's a very small differential, in an area where the public school performance is scandalously low."

Finn then pointed out that twice as many private school students as public school students taking the tests had parents who were college graduates and that this probably explained the slightly higher average private school score: "With differences that large in parent education, it is conceivable that there's no school effect showing up here at all." His advice to the private school audience? "You need to improve faster than the public schools if you expect to continue to have people paying an average of \$6,200 a year for day schools . . . in order to get a presumably better educational product."

Even James Coleman, whose 1981 analysis of public-private school performance is cited as the premier source of scientific evidence of private school superiority, warned in that study that "one should not make a mistake: Our estimates for the size of the private sector effects show them not to be large." A small army of other researchers proved that the small private school edge found by Coleman disappeared when differences in students' family background and course taking were examined.

THE MILWAUKEE STORY

WHAT IF a voucher program were limited to children of low-income families, excluded religious schools, and required private schools to charge voucher holders no more than the value of the voucher? Wouldn't that overcome many of the critics' objections? In fact, a voucher program just like this began in September of 1990 in Milwaukee, and its results to date graphically substantiate many of the concerns of private school choice opponents.

The program offered a \$2,500 voucher out of the public school budget and was open to a maximum of 1,000 low-income children in a school district where about 60,000 children fit the program's definition of poverty. The families of 600 to 750 children (estimates vary) applied for the voucher, and only seven of the approximately twenty-one eligible private schools

in Milwaukee volunteered to take voucher students. The number given for how many students were accepted ranges from 341 to 390.

With few exceptions, students ended up in segregated schools with an ethnocentric educational program. One financially strapped school that took in a large number of voucher kids had been a religious school up until it decided to participate in the program. Then the non-voucher parents became unhappy with the switch, feuds broke out, and religion classes were reintroduced. In the middle of the year, the sixty-three voucher students were suddenly expelled, and mostly into the public schools. And only then did the public hear that this private school had been doing a lousy job of feeding, transporting, and providing books to the kids, that its facilities were even more decrepit than the public

schools, and that little, if any, education took place.

The owner's entrepreneurship got her the voucher monies, but the school collapsed anyway. The fate of the school's other students is unclear.

The tale of the Juanita Virgil School may seem dramatic, but it is not unique. Another school has folded, and some of the remaining private schools that participate in the program are financially and educationally unstable. Nor are Juanita Virgil's voucher students the only ones who have been expelled. At the end of the school year, 259 voucher students were left in the private schools. Although it is perhaps too early to deem this "model" voucher program a failure, declaring it a success, as many private school choice proponents do, is manifestly misleading. □

Wouldn't hospitals that refused terminally ill patients or physicians who rejected smokers or patients who were obese have lower patient death rates than ones that did not screen out the bad risks?



That leaves Chubb and Moe, the present-day purveyors of "objective proof" of private school superiority. Lots of politicians and op-ed writers have repeated their findings as gospel, and many individuals have become converts to public aid for private education on their authority. But as their peer reviewers and even a few statistics-savvy journalists have pointed out, Chubb and Moe's study of public and private high schools also did not find a private school advantage once students' background characteristics and academic courses were taken into account; their "choice" recommendations were not supported by the results of their analysis.

The latest piece of evidence to debunk the private

school superiority myth comes from Milwaukee's Catholic school diocese. Catholic and other private schools are not required to and usually do not report their students' test scores to the public. But when the *Milwaukee Journal's* religion reporter, Marie Rohde, recently asked the Milwaukee archdiocese to do so, her request was granted. In a story that ran in the *Journal* on August 1, 1991, Rohde reported that "minority students enrolled in Milwaukee's Catholic elementary schools suffer the same lag in achievement test scores as their counterparts in the public schools, according to test results made public for the first time." The test was the same one used by the Milwaukee public schools, the Iowa Test of Basic Skills. The scores, Rohde continued, "run counter to longstanding claims by most Catholic educators that they are doing a superior job of teaching disadvantaged children." In fact, while the scores of public school minority students have been stable, those of minority children in the Milwaukee Catholic schools have declined.

According to Rohde, John Norris, superintendent of the Catholic schools, blamed the gap on "socioeconomic factors" and said that test scores of Catholic and public schools "should not be directly compared." But two years ago, when the archdiocese used a different test from the one in the public schools and reported out the scores without breaking them down by race or individual school, it had no qualms about making such a comparison: "The bottom line is, in our system we perform better than the national average, and we are dealing with minority people in an inner-city situation."

Although all the talk about how private schools are doing a better job than public schools, especially with disadvantaged students, turns out to be just talk, that does not mean private schools have nothing to teach public schools. For instance, public schools could stop giving students a choice of curricula—they choose easier ones—and insist that they take more academically challenging courses, the way they do in Catholic and other private schools. The public school system also could start heeding the message that many parents, especially poor minority parents, have been trying to convey when they move their children to Catholic and other private schools: Teachers can't teach and students can't learn when a handful of violent or disruptive kids are allowed to terrorize the school community. Something needs to be done for those kids, but right now the failure of many school boards to face up to the issue means that public school youngsters who want to achieve, and that's a majority, are being held hostage by a small minority of destructive kids. Private schools do not tolerate that, and neither should public schools.

Private schools also have a lesson to teach policy makers and the public, and the subject is children in poverty. As the NAEP results indicate, most of the advantage private schools have in average scores is due to their more advantaged student body. In fact, one of the most striking features of the results of NAEP and other assessments is that childhood poverty is not only bad for America morally and socially but educationally, as well. Of course, many poor children do very well in school, and education continues to be a major route out of poverty. But it is also the case that poverty, especially when it is

(Continued on page 40)

REVOLUTION IN ONE CLASSROOM

(or, then again, was it?)

BY DAVID K. COHEN

AS MRS. Oublier sees it, her classroom is a new world. When she began six or seven years ago, she was a thoroughly traditional teacher. She reported that she followed the mathematics text. Her second graders spent most of their time on worksheets. Learning math meant memorizing facts and procedures. Then Mrs. O found a new way to teach math. The summer after her first year of teaching, she took a workshop in which she learned to focus lessons on students' understanding of mathematical ideas. She found ways to relate mathematical concepts to students' knowledge and experience. And she learned how to engage students in actively understanding mathematics.

Mrs. O's story is a timely one. I encountered her in the late 1980s, as reformers once again began trying to change mathematics teaching and learning from mechanical drill and memorization to reasoning and understanding. Since the early twentieth century, mathematicians and math educators had intermittently insisted that students should learn to reason mathematically, to apply mathematical ideas to everyday situations, and to understand the conceptual basis of mathematics. But

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in the 1980s, state and national education leaders, chagrined about reports of weak school performance and worried about America's economic situation, gave new force to demands for reform.

These are revolutionary aspirations, at least judged by current classroom practice. But the new ambitions are being taken quite seriously. The National Council of Teachers of Mathematics has formulated an ambitious new set of standards for teaching and curriculum, which have received favorable attention in many quarters, including the secretary of education and the president. Several states are trying to realize the new ideas. For instance, since 1985, California's department of education has been pressing a remarkable program of reform in mathematics teaching and learning. The state issued a new curriculum framework. It then required publishers to re-orient math textbooks to conform more closely to new ideas about instruction. It also began to re-write the state testing program so that it assesses students' understanding and reasoning. And it has been offering workshops and other assistance to teachers.

Mrs. O teaches in California and sees her work as part of the changes that the state is trying to promote. Her story is engaging, and so is she. She is considerate of her students, eager for them to learn, energetic, and attractive. These qualities would stand out anywhere, but they seem particularly vivid in her school—a drab collection of one-story concrete buildings that sprawl over several



acres. Though clean and well managed, her school has none of the familiar signs of classy education. It has no legacy of experimentation or progressive pedagogy, or even of heavy spending on education. Only a minority of children come from well-off families. Most have middling or modest incomes, and many are eligible for Chapter 1 assistance. A sizable minority are on welfare. The school district is situated in a dusty corner of southern California, where city migrants are turning a rural town into a suburb. New condominiums are sprouting up all over the community, but one still sees pick-up trucks with rifle racks in their rear windows. Like several of her colleagues, Mrs. O works in a covey of tacky, portable, pre-fab classrooms, trucked into the back of the schoolyard to absorb growing enrollments on the cheap.

Mrs. O's story seems even more unlikely when considered against the history of American educational reform. Great plans for educational change are familiar in that history, but so are reports of failed reform. John Dewey and others announced a revolution in pedagogy just as our century opened, but apparently it fizzled, for classrooms changed only a little (Cuban, 1984). That also seems to have been the fate of the earlier "new math" in the 1950s and 1960s and of related efforts to improve science teaching (Welch, 1979). Since then, many studies of instructional innovation have embroidered these old themes of great ambitions and modest results (Gross, et al., 1971; Berman and McLaughlin, 1977; Rowan and Guthrie, 1989; Cohen, 1988).

Some analysts attribute these results to teachers' resistance, saying that entrenched classroom habits defeat reform (Gross, et al., 1971). Others report that many innovations fail because they are so poorly adapted to the classroom that even teachers who avidly desire change can do little (Cuban, 1984; Cuban, 1986). Mrs. O's revolution looks particularly appealing against this background. She eagerly embraced change, rather than resisting it, finding new ideas and materials that worked in her classroom. Mrs. O sees her class as a success for the new mathematics Framework. She reports that her math teaching has wound up where the Framework wants it to be.

SOMETHING OLD AND SOMETHING NEW

One prominent feature of Mrs. O's teaching is her use of innovative instructional materials and activities designed to help students make sense of mathematics. But she used these new activities and materials quite traditionally, as though mathematics contained only right and wrong answers. Similarly, while she had revised the class organization and activities to help students understand math, she managed the discourse in ways that discouraged exploration of students' understanding.

In fact, Mrs. O's lessons were quite mixed. They contained some important elements that reformers embraced, but others that they branded inadequate. Her classes present an extraordinary *mélange* of tradition and novel approaches to math instruction, which is one reason that they deserve attention. For such mixtures are quite common in instructional innovations, though little noticed. As teachers and students try to find their way from familiar practices to new ones, they cobble new

Students' number sentences were accepted if correct, and written down on the board. But they were turned down if incorrect, and not written on the board. Right answers were not explained, and wrong answers were treated as unreal.



ideas together with old practices. Teachers' ingenuity is remarkable, but the mixtures raise fundamental questions. Can we say that an innovation has made much progress when it is tangled up with many traditional practices? What might it take to help teachers continue to learn and change? These questions have a special urgency just now, as reformers urge teachers to radically revise their work in math and other subjects.

New Materials, Old Mathematics

From one angle, the curriculum and instructional materials in this class looked just like what the new California math Framework invited. For instance, Mrs. O regularly asked her second graders to work on "number sentences." In one class that I observed, students had just done the problem: $10+4=14$. Mrs. O then asked them to generate additional "number sentences" about 14. They volunteered various ways to write addition problems about fourteen—that is, $10+1+1+1+1=14$, $5+5+4=14$, etc. Some students proposed several ways to write subtraction problems—that is, $14-4=10$, $14-10=4$, etc. Most of the students' proposals were correct. Such work could make mathematical relationships more accessible, by coming at them with ordinary language rather than working only with bare numbers on a page. It also could unpack mathematical relationships, by offering different ways to get the same result. It could illuminate the reversible relations between addition and subtraction. And it could get students to do "mental math," i.e., to solve problems in their heads and thereby learn to see math as something to puzzle about and figure out, rather than just a bunch of facts and procedures to be memorized.

These are all things that the new Framework celebrated. It exhorted teachers to help students cultivate "... an attitude of curiosity and the willingness to probe and explore ..." (California State Department of Education [CSDE], 1985, p.1). It also called for classroom work that helps students "... to understand why computational algorithms are constructed in particular forms ..." (CSDE, 1985, p.4).

But Mrs. O conducted the entire exercise in a thoroughly traditional fashion. The class recited in response to the teacher's queries. Students' sentences were accepted if correct, and written down on the board. But they were turned down if incorrect, and not written on the board. Right answers were not explained, and wrong answers were treated as unreal. The Framework made no such distinction, arguing instead that understanding how to arrive at answers is an essential part of helping students figure out how mathematics works—no less important than whether the answers are right or wrong. The Framework criticized the usual algorithmic approach to mathematics, and the usual search for the right answer. It called for class discussion of problems as an important part of figuring out mathematical relationships (CSDE, 1985, pp. 13-14). But no one in Mrs. O's class was asked to explain his or her proposed number sentences, whether correct or not. No student was invited to demonstrate how he or she knew whether a sentence was correct or not. The teacher used a new mathematics curriculum, but used it in a way that conveyed a sense of mathematics as a fixed body of knowledge of right answers rather than as a field of inquiry.

The mixture of new mathematical ideas and materials with old mathematical knowledge and pedagogy showed up elsewhere in Mrs. O's work. She used concrete materials and other physical activities extensively to represent mathematical concepts in forms that are vivid and accessible to young children. She opened every day with a calendar activity in which she and the students gathered on a rug at one side of the room to count up the days of the school year. She used this activity for various purposes. During my first visit, she was familiarizing students with place value, regrouping, and odd and even numbers. As it happened, my visit began on the thirtieth day of the school year, and so the class counted to thirty-nine. They used single claps for most numbers but double claps for ten, twenty, etc. Thus, one physical activity represented the "tens" and distinguished them from another physical activity that was used to represent the "ones." The idea was that fundamental distinctions among types of numbers can be represented in ways that make immediate sense to young children and that will easily familiarize them with important mathematical ideas.

Mrs. O's class abounds with such activities and materials, and they are very different from the bare numbers on worksheets that would be found in a traditional math class. Her approach seems nicely attuned to the new Framework. For instance, that document argues that "many activities should involve concrete experiences so that students develop a sense of what numbers mean and how they are related before they are asked to add, subtract, multiply, or divide them (CSDE, 1985, p. 8). And it adds that "concrete materials provide a way for students to connect their own understandings about real objects and their own experiences to mathematical concepts. They gain direct experience with the underlying principles of each concept" (CSDE, 1985, p.15).

But it is one thing to embrace a doctrine of instruction and quite another to weave it deeply into one's practice. For even rather monotonous teaching comprises many different threads, and any new instructional element is somehow related to many others already there. The new thread can simply be dropped onto the fabric, and everything else left as is. Or new threads may be somehow woven into the fabric. Mrs. O introduced new threads but only slightly re-adjusted the old ones. Hence the novel materials and activities were infused with traditional messages about what mathematics was and what it meant to understand it.

These mixed qualities were vividly apparent in a lesson that focused on addition and subtraction with regrouping. The lesson occurred early in an eight-or-ten-week cycle concerning these topics. Like many of Mrs. O's lessons, it combined a game-like activity with the use of concrete materials. She hoped to capture children's interest in math while helping them to understand it. Mrs. O introduced this lesson by announcing: "Boys and girls, today we are going to play a counting game. Inside this paper [holding up a wadded-up sheet of paper] is the secret message. ..." Mrs. O unwadded the paper and held it up: "6" was inscribed. The number was important because it would establish the number base for the lesson: Six. In previous lessons, they had done the same thing with four and five. So part of the story here was exploring how things work in different number bases,

and one reason for that, presumably, was to get some perspective on the base-ten system that we conventionally use. Mrs. O told the children that, as in the previous games, they would use a nonsense word in place of the secret number. This time they selected "cat's eye" to stand in for six.

With this groundwork laid, Mrs. O had "place-value boards" given to each student. She held up her board: It was roughly eight by eleven; one half was blue, the other white. She said: "We call this a place-value board. What do you notice about it?"

Cristie Smith, who turned out to be a steady infielder on Mrs. O's team, said: "There's a smiling face at the top." Mrs. O agreed, noting that the smiling face needed to be at the top at all times [that would keep the blue half of the board to everyone's left]. Several kids held theirs up for inspection from various angles, and she admonished them to leave the boards flat on their tables at all times.

"What else do we notice?" she inquired. Sam said that one half is blue and the other white. Mrs. O agreed and went on to say that "... the blue side will be the cat's eye side. During this game we will add one to the white side, and when we get a cat's eye, we will move it over to the blue side." With that, each student was given a small plastic tub, which contained a handful of dried beans and half a dozen small paper cups, perhaps a third the size of those dispensed in dentists' offices. This was the sum total of pre-lesson framing—no other discussion or description preceded the work.

There was a small flurry of activity as students took their tubs and checked out the contents. Beans present nearly endless mischievous possibilities, and several of the kids seemed on the verge of exploring their properties as guided missiles. Mrs. O nipped off these investigations, saying: "Put your tubs at the top of your desks, and put both hands in the air." The students complied, as though in a small stagecoach robbery. "Please keep them up while I talk." She opened a spiral-bound book, not the school district's adopted text but *Math Their Way*. This was the innovative curriculum guide that had helped to spark her revolution. She looked at it from time to time as the lesson progressed but seemed to have quite a good grip on the activity.

Mrs. O got things off to a brisk start: "Boys and girls [who still were in the holdup], when I clap my hands, add a bean to the white side."

She clapped once vigorously, adding that they could put their hands down. "Now we are going to read what we have: What do we have?" (She led a choral chant of the answer.) "Zero cat's eye and one." She asked students to repeat that, and everyone did. She clapped again, and students obediently added a second bean to the white portion of the card. "What do we have now?" she inquired. Again she led a choral chant: "Zero cat's eye and two." So another part of the story in this lesson was place value: "Zero cat's eye denoted what would be the "tens" place in the base-ten numbering, and "two" is the "one's" place. Counting individual beans and beans grouped in "cat's eye" would give the kids a first-hand, physical sense of how place value worked in this and other number bases.

In these opening chants, as in all subsequent ones, Mrs. O performed as much as a drill sergeant as a choir director. Rather than establishing a beat and then main-

taining it, she led each chant and the class followed at a split-second interval. Any kid who didn't grasp the idea needed only to wait for her cue or for his table-mates. Students were never invited or allowed to count on their own. Thus, while the *leitmotif* in their second chant was "zero cat's eye and two," there was an audible minor theme of "zero cat's eye and one." That several students repeated the first chant suggested that they did not get either the routine or its point.

Mrs. O moved right on nonetheless, saying that it "... is very important that you read the numbers with your hands." This was a matter to which she returned many times during the lesson, reminding children to put their little paws first on the beans in the white square and then on the little cups on the blue square as they incanted the mathematical chants. She seemed to feel it essential that they manipulate the concrete materials. Whenever she spotted a child who was not palpating beans and cups, she walked over and moved their arms and hands for them.

Mrs. O led the bean adding and chants up to five. Then, with five beans down on everyone's card, she asked: "Now think ahead; when I clap my hands this time, what will you have on the white side?"

Reliable Cristie Smith scooped it up and threw smoothly to first: "Cat's eye."

Mrs. O led off again: "When you get a cat's eye, put all the beans in a paper cup and move them over." She clapped her hands for the cat's eye and then led the following chant: "Put the beans in the cup and move them over."

"Now let's read what we have." The chant rolled on: "One cat's eye and zero." A puzzling undercurrent of "one cat's eye and one" went unattended. She then led the class through a series of claps and chants, leading up to two cat's eyes. And then, with a methodical monotony, up to five cat's eyes and five. By the time they got to five cat's eyes and five, her claps had grown more perfunctory, and many kids had gotten the fidgets. But Mrs. O saw this chanting and bean-pawing as the high road to mathematical understanding and tenaciously drove her team on.

"Now, how many do we have?" "Five cat's eyes and five beans," came the chant. "Now we will take away one bean" (from the "ones" side of the board). "How many do we have?" Again the answering chant, again led by her, a fraction of a second earlier: "Five cat's eyes and four."

This was a crucial point, for the class was moving from a representation of addition with regrouping to a representation of subtraction with regrouping. It would have been an obvious moment for some such comment or discussion, at least if one saw the articulation of ideas as part of understanding mathematics. But Mrs. O did not comment or explain. She took an activity-based approach, as though all the important ideas were implicit, and better that way.

Thus the class counted down to five cat's eyes and zero. Mrs. O then asked, "What do we do now?" Jane responded: "Take a dish from the cat's eye side and move it to the white side." No explanation was requested or offered to embroider this response. Mrs. O simply approved the answer, clapped her hands, and everyone followed Jane's lead. With this, Mrs. O led the class back

Her inspiration for all this was Math Their Way, on which Mrs. O relied heavily.

through each step, with claps, chants, and reminders to “read” the beans with their hands, down to zero cat’s eye and zero beans. Everyone was flagging long before it was done, but not a chant was skipped or a movement missed.

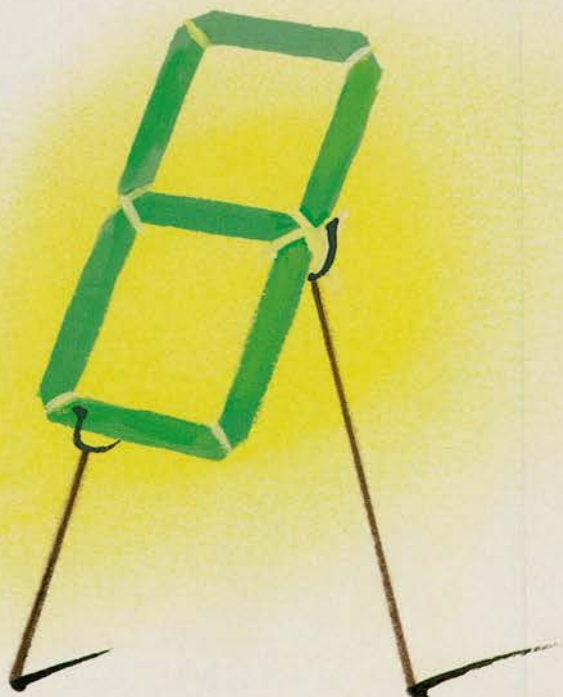
Why did Mrs. O teach in this fashion? In an interview following the lesson, I asked what she thought the children learned from the exercise. She said that manipulating the materials helped them to understand what goes on in addition and subtraction with regrouping. She seemed convinced that these physical experiences caused learning, that mathematical knowledge arose from the activities.

Her inspiration for all this was *Math Their Way*, on which Mrs. O relied heavily. This increasingly popular book, a system of primary grade math teaching, announces that it will help “. . . to develop understanding and insight of the patterns of mathematics through the use of concrete materials” (Baratta-Lorton, 1976: xiv). Concrete materials and physical activities are crucial because they are believed to provide real experience with mathematics. The book sharply distinguishes between mathematical symbols and concepts and criticizes teaching with symbols. Symbols—that is, numbers—“. . . are not *the concept* [emphasis in original], they are only a representation of the concept, and as such are abstractions describing something which is not visible to the child. Real materials, on the other hand, can be manipulated to illustrate the concept concretely, and can be experienced visually by the child. . . . The emphasis throughout this book is making concepts, rather than numerical symbols, meaningful” (Baratta-Lorton, 1976: xiv).

Math Their Way fairly oozes with the belief that physical representations are much more real than symbolic ones. This idea is a recent mathematical mutation of the idea, at least as old as Rousseau, Pestalozzi, and James Fenimore Cooper, that experience is a better teacher than books. For experience is vivid, vital, and immediate, while books are all abstract ideas and dead formulations. *Math Their Way* also claims that concrete materials are developmentally desirable for young children. Numbers are referred to many times as an “adult” way of approaching math. That idea leads to another, still more important: If math is taught properly, it will be easy. Activities with concrete materials, the book insists, are the natural way for kids to learn math: “. . . if this foundation is firmly laid, dealing with abstract numbers will be effortless” (Baratta-Lorton, 1976: 176).

Stated so baldly, that seems a phenomenal claim. Simply beginning with the proper activities and materials ensures that math will be understood well and easily. But the idea is quite common. Pestalozzi might have cheered it. Many other pedagogical Romantics, Rousseau and Dewey among them, embraced a version of this view. Piaget is commonly thought to have endorsed a similar idea. So when *Math Their Way* argues that the key to teaching math for understanding is to get children to use the right sorts of activities and materials, it is in one of the main lines of modern educational thought and practice.

The book’s claim also helps to explain why it gives so little attention to the explanation of mathematical ideas. For the author seems convinced that it is superfluous.



Appropriate materials and activities alone will do the trick. Students will “understand” math without any need to question or explain mathematical ideas. This made *Math Their Way* an appealing package, for it enabled Mrs. O to whole-heartedly embrace teaching math for understanding, without considering or reconsidering mathematics. She was keen that children should understand math and worked hard at helping them. But she placed nearly the entire weight of this effort on concrete materials and activities. Her use of the materials, insisting that all the children actually feel them and perform the same prescribed physical operations with them, suggests that she endowed them with enormous, even magical, instructional powers. The lack of any other ways of making sense of mathematics in her lessons was no oversight. With *Math Their Way*, she simply saw no need for anything else.

In what sense was Mrs. O teaching for understanding? The question opens up a great puzzle. Her classes exuded traditional conceptions of mathematical knowledge and were organized as though explanation and discussion were irrelevant to mathematics. But she had changed her math teaching quite dramatically. She now used a new curriculum specifically designed to promote students’ understanding of mathematics, as opposed to simple memorization. And her students worked with materials that represented mathematical relationships in the concrete ways that the Framework and many other authorities endorse.

New Topics and Old Knowledge

The puzzle was apparent in other features of Mrs. O’s teaching. For instance, she taught several topics that would not have been covered in many traditional math classes, among them estimation. She told me that estimation is important because it helps students to make sense of numbers by making educated guesses and figuring out why some guesses are better than others. She reported that she dealt with estimation recurrently in her second-grade classwork, for it could not be learned by doing it once or twice, and is useful in many different problem-solving situations. Her reasoning on this matter seemed to accord with the Framework’s call for “guessing and checking the result” as an important element in mathematical problem solving (CSDE, 1985, p. 14).

But the teaching that I observed did not entirely realize these ambitions. In one lesson, Mrs. O asked the class to estimate how many large paper clips would be required to span one edge of her desk. Two students were enlisted to stand near the desk and hold up the clips. They were near enough to visually gauge its width in relation to the clips, but all the other students remained at their tables, scattered around the room. None had any clips, and few could see the edge of the teacher’s desk that was in question, for it was a side edge, away from most of the class. Seated at the back with many of the kids, I could see that they were the large sort of clip, but even then they were barely visible.

So only two members of the class had real contact with the two key data sources in the problem—visible, palpable clips and a clear view of the desk edge. Hence only two members of the class had any solid basis for deciding if their estimates were mathematically reasonable. Even Mrs. O was seated too far away to see the edge well.

Her use of the materials, insisting that all the children actually feel them and perform the same prescribed physical operations with them, suggests that she endowed them with enormous, even magical, instructional powers.



The problem was sensible and could have been an opportunity to make and discuss estimates of a real puzzle. But it was set up in a way that frustrated mathematical sense making.

Mrs. O did not seem aware of this. She asked the students to estimate how many clips it would take to cover the edge and to write down their answers. Then she took estimates from most of the class, wrote them on the board, and asked class members if the estimates were "reasonable." Not surprisingly, many of the answers lacked mathematical discrimination. Estimates that were close to three times the actual answer, or one-third of it, were accepted by the class and the teacher as "reasonable." Indeed, no answers were rejected as unreasonable, even though quite a few were far from the mark. Nor were some estimates distinguished as more or less reasonable than others. Mrs. O did ask the class what "reasonable" meant, and one boy offered an appropriate answer, suggesting that the class had some previous contact with this idea.

I could see nothing that led inexorably to this treatment. Mrs. O had many clips. If eight or ten had been passed around, the kids would have had at least a bit of direct access to one element in the estimation problem. She also could have pointed to the desk edge that the class could see, rather than the far edge that was obscured from their view. Alternatively, she could have invited them to estimate the length of their own desk edges, which were all the same standard-issue models. Either or both would have given them much more direct contact with the elements of the problem and more of a basis to consider how reasonable their estimates were.

Why did Mrs. O not set the problem up in one of these ways? In an interview after the class, she displayed no sense that anything had been wrong, in response to my queries. She seemed to understand the broad purpose of teaching and learning estimation, but she taught as though she lacked the mathematical and pedagogical infrastructure—the knowledge of mathematics, and of teaching and learning mathematics—that would have helped her to set the problem up so that the crucial mathematical data were available to students. And despite her earlier comments, Mrs. O presented estimation as a topic in its own right rather than as a part of solving problems that came up in the course of studying mathematics. It was as though she thought that estimation bore no intimate relation to solving the ordinary run of mathematical problems. In contrast, the Framework argued that "... estimation activities should be presented not as separate lessons but as a step to be used in all computational activities" (CSDE, 1985, p.4).

I wondered what students made of this. They appeared to accept the lesson as reasonable. No one complained about the lack of comprehensible data, which they might have done if they were used to such data. No one said that they had done it differently some other time and that this didn't make sense. That could mean that the other lessons on estimation conveyed a similar impression, or it could mean that students were doing as they had been told because they had so often been told to do so, or because they had a visitor. Or it may mean only that students took nothing from the lesson. Schools present many mystifying examples of adult behavior that children learn to simply accept, and this

may have been such a case.

Was this teaching math for understanding? From one angle, it was. Mrs. O taught a novel and important topic, specifically intended to promote students' sense-making in arithmetic. It may have done that. But from another angle it was not. For the problem was framed so that many students could not bring mathematical evidence to bear on it and had little basis for making reasonable estimates. These alternatives are not mutually exclusive. This bit of teaching could have promoted more understanding of mathematics along with more misunderstanding.

New Organization and Old Discourse

Mrs. O's class was organized to promote "cooperative learning." The students' desks and tables were gathered in groups of four and five so that they could easily work together. Each group had a leader to help with various chores, and instructional materials often were managed by groups rather than individually. The new Framework approved: "To internalize concepts and apply them to new situations, students must interact with materials, express their thoughts, and discuss alternative approaches and explanations. Often, these activities can be accomplished well in groups of four students" (CSDE, 1985, p.16).

Hence cooperative learning groups are seen as vehicles for a new sort of instructional discourse, in which students would do much more of the teaching. Students would learn from their own efforts to articulate and explain ideas, and they would learn from their mates' ideas. The Framework explains: "Students have more chances to speak in a small group than in a class discussion; and in that setting, some students are more comfortable speculating, questioning, and explaining concepts in order to clarify their thinking" (CSDE, 1985, pp. 16-17). Mrs. O's class was spatially and socially organized for such learning, but the class was conducted in a highly structured and classically teacher-centered fashion. The exchanges were either between the teacher and one student or choral responses to the teacher's questions. No student ever spoke to another about mathematical ideas, as part of the public discourse of the classes that I observed. Nor was such conversation ever encouraged by the teacher. Indeed, Mrs. O specifically discouraged students from speaking with each other in her efforts to keep the class orderly and quiet.

Still, the small groups were used for some instructional purposes. In one class that I observed, Mrs. O announced a "graphing activity" about mid-way through the math period. She wrote across the chalk board, at the front of the room, "Letter to Santa?" Underneath she wrote "Yes" and "No." Then she told the children that she would call on them by groups to answer the question. If she had been following the Framework's injunctions, she might have asked each group to tally its answers to the question, asked each group to figure out whether it had more "yes" than "no" answers, or the reverse, and asked each group to figure out how many more. Then she might have had each group contribute its totals to the chart at the front of the room. This would not have been the most challenging group activity, but it would have meaningfully used the small groups as agents for working on this

(Continued on page 44)

THE CAREER CONNECTION

These Students Don't Have To Be Reminded Why They're in School

BY NEILL S. ROSENFELD

MAYBE IT was the few shares of AT&T, bought for him when he was small, that hooked Rick Brody. When other kids burrowed into the sports pages to see how the Mets had fared, Rick was checking the financial pages for his stock. So when he heard that his local high school was offering a two-year Wall Street-preparatory course called the Academy of Finance, Rick pounced like an arbitrageur.

Between junior and senior years, when he took special finance courses at New York City's Jamaica High School, Rick spent a summer earning a salary as an intern on the worldwide stock and bond trading floor at Shearson Lehman Hutton's Manhattan headquarters. He carried trading tickets for processing, moved into data entry, repaired and worked with computer hardware and software, and conducted market research on various topics, including Japanese stocks.

The program set him on a path to a career. "Without it, I'd be dishing out ice cream at Baskin-Robbins," says Rick, now moving into his second year majoring in business at the State University of New York at Binghamton. "I have job experience at a major firm, which looks tremendous on my résumé. It puts me ahead of other people."

During vacations, Rick continues to work at Shearson. "I don't know if I want to be a trader, but I definitely want to be in this field," Rick says. "I can see myself following stocks and finding out the value of companies. That's really interesting."

IN MORE than twenty-five school districts across the country, programs like this one, sponsored by the National Academy Foundation (NAF), give thousands of public high school students a solid foundation for careers through coursework, mentoring, and internships. An academy is a school-within-a-school that offers a supplemental, rigorous program focused on a specific career.

In partnership with business, academies equip students to take entry-level jobs with a future straight out of

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high school. That's no small goal, given the dismal employment prospects of the typical urban teenager. High school graduates often lack marketable skills, and, with the shift from a manufacturing to a service economy, there are far fewer jobs that require only a high school diploma than there were years ago.

However, NAF's programs do a lot more than prepare youngsters to work. Take Baltimore, for example: With a

56.3 percent dropout rate and a 40 percent teenage pregnancy rate among high school students, the Academy of Finance—which draws from this same student population and produces a high proportion of high school graduates—functions as a dropout prevention program as well. But for the most part, as in New York, the academies are geared toward C-average students who have no definite plans either for college or for work.

Yet, the Academy of Finance might as well call itself a college-preparatory program, for across the country an astonishing 95 percent of its formerly C-average graduates* continue their education, with 58 percent majoring in business or finance, and 67 percent planning on an advanced degree. When finance academy graduates



Dr. Stephen Moss, vice president/Option Arbitrage for Shearson Lehman Brothers, has supervised and acted as a mentor to Academy students for many years.

do go to work in the fields studied in high schools, they're headed toward managerial positions.

A variety of initiatives claim the name "academy." NAF is the most prominent and successful in encouraging youngsters to go on to college. It sponsors academies in finance, travel and tourism, public service, and manufacturing science.

The other well-known programs are in Philadelphia—which first used the term "academy" in this context in 1969—and California. Philadelphia offers training in such blue-collar fields as horticulture and automobile repair, as well as such college-oriented courses as health and environment. The fifty California Partnership Academies ready youngsters for high-tech and other business jobs. While many of their graduates do further their educations—42 percent in Philadelphia and 64 percent at the California Partnership Academies—they appear to emphasize vocational preparation and, an independent evaluation says, dropout prevention more than NAF.

NAF's academies differ from traditional vocational courses in the balance between career and academic classes. Work-related training is the core of a vocational program, and classwork tends to be practical; for example, a student might learn the mechanics of being a bank teller. In contrast, NAF's courses are taken on top of the regular academic program and are more theoretical; a student might learn about bank telling but also would explore economics and how banks function in local and world markets. Three central assumptions unite the various programs:

- that students become more serious about education when they connect schoolwork with a way of earning a living, particularly when the connection is to an attractive job and a good living;
- that potentially boring classroom theory becomes concrete—and interesting—when it has to be applied in an apprenticeship; and
- that students mature when they're treated with respect and are expected to meet the same real-life work requirements as adults.

NAF president William E. Brock, a former senator, labor secretary, and U.S. trade representative, says that preparing students for higher-level work is critically important for America's future. "We can compete with the world in one of two ways: by trying to get more sweat out of people and holding wages down to a subsistence level, or on the basis of human talent, which means using your mind. The problem with the U.S. is that without really thinking about it, we've unconsciously opted for lower wages and sweat.

"The United States has the worst school-to-work transition of any industrial country in the world," Brock says. "If you ask kids why they are in school, they have no idea. No one asks for their high school transcript when they get out. School is just something they have to do. And most high school kids are bored.

"In an academy, you can make them work their heels off and like it, because they can see a relationship between what they are doing and what they will be doing the rest of their lives. This is an American-style response

*These figures are based on a national telephone poll of Academy of Finance graduates conducted in 1989 by the Academy for Educational Development, an independent research firm.

to what other countries give their young people," Brock says. "We can give children the ability to maximize their talents—and then we can explode with better jobs, better-paying jobs, more interesting jobs. That's the choice we have to make."

Brock formerly believed that educational deficiencies were best addressed through prenatal and postnatal care and preschool programs. "I thought that efforts centered on juniors and seniors were after the fact and expensive," he says. Then he encountered the Academy of Finance. "I concluded that kids could be given a program that would motivate them, for which they'd spend four and one-half hours, instead of minutes, a day on homework, and that would take them through college."

The impact of NAF's college-oriented program is evident in students like Efrain Sanchez, a Mexican immigrant. While in high school in Los Angeles, his eight-person family got by on \$14,000 a year in a gang-infested neighborhood. His best friend went to prison for murder.

In his early teens, Efrain became curious about nightly television reports about the stock market. "I wanted to know why the Dow Jones went up and down, how companies make money, how companies go broke," he recalls. He found the answers at NAF's Academy of Finance in Los Angeles. Located at the 750-student Downtown Business Magnet High School, the student

population is approximately 40 percent black, 30 percent Hispanic, 10 percent Asian, almost all at risk.

After graduating in January 1990, Efrain went to work full time at Great Western Financial Securities updating the records of mutual fund trades while he attended El Camino Community College. He is majoring in business engineering, a field that includes the computer systems that are so important to the financial industry. "I'm making finance my career," he says.

The Academy of Finance requires that each of its students take an economics course. The course emphasizes the practical applications of the theoretical material it teaches. As Efrain says, it "taught me a lot of things about the business world . . . more than I could have learned in a regular economics class. They prepared you to go for interviews [where] if they like you, you get the job and work. You learn to ask questions and how to meet people."

John Otterness, one of his teachers, says, "We take a lot of kids who aren't planning on going to college and we push them. About 80 percent of our academy students have gone to four-year colleges, including Brown, Harvard, Stanford, and Berkeley."

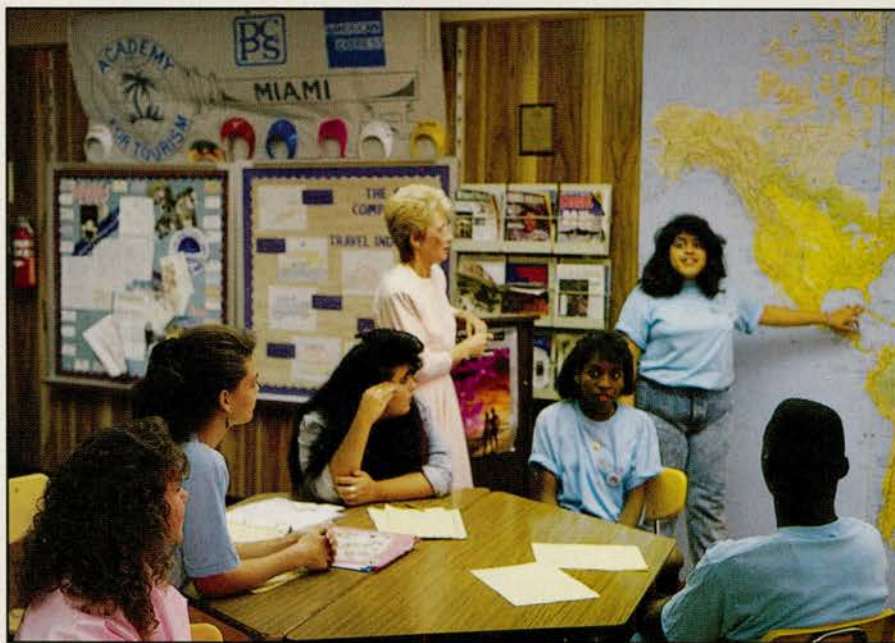
If Efrain's success in supporting himself while going to college isn't testimony enough to the program's worth, here's another: A younger brother and sister of his also enrolled in the Academy of Finance.

THE TRAVEL AND TOURISM ACADEMY

CLAIRE PACCIONE'S classroom at Richmond Hill High School in Queens, N.Y., is plastered with posters and displays depicting parts of the world, because the world is her topic. As coordinator of the school's Academy of Travel and Tourism, one of four in New York City, she aims at expanding her students' understanding of nations and peoples beyond the city limits. The school is a natural for the program, because sixty-five languages and dialects are spoken there.

Paccione begins a junior English class by asking about the holidays that the students celebrate. Christmas, says one. Hanukkah, offers another. Easter. Ramadan. She mentions Mardi Gras and students piece together what it's all about—and that it's a big holiday in New Orleans and Rio de Janeiro, major travel destinations at holiday time.

The discussion is a way station toward the point of her lesson: the Feast of the Yam, celebrated by Nigeria's Ibo tribe and described in *Things Fall Apart*, a novel by Chinua Achebe. It's a powerful tale, a story of how colonialism and mis-



Academy of Travel and Tourism class at Miami Springs High School in Florida.

sionaries change traditional life in a clash of cultures that reads like Greek tragedy.

Paccione links the book's events to the students' own lives, having

them discuss the roles of men and women in their own experience and how the protagonist's concept of manliness compares with those of their own cultures.

THE NATIONAL Academy Foundation, which has taken the lead in spreading the academy concept across the country, traces its roots to 1982.

Sanford Weill, then president of American Express and now chairman and CEO of Primerica Corp., a financial services company, became concerned that firms were leaving New York City in part because qualified workers were hard to find. (While New York Telephone wasn't leaving, it did have to test 57,000 people a few years ago in order to find 2,100 who qualified for entry-level jobs.) Yet youngsters were hanging out on street corners without jobs. Couldn't something be done to bring these students to the workplace?

Weill forged a partnership between New York City's Board of Education, American Express, and the Shearson Lehman Hutton stock brokerage. The first Academy of Finance, a two-year program with thirty-five students at John Dewey High School in Brooklyn, became the model for a program that now enrolls almost 2,900 students at forty-five Finance Academies in twenty-two districts across the nation.

By 1989, forecasters were worrying. Jobs required ever-increasing sophistication and knowledge of technology, but 20 to 30 million adults (including functionally illiterate high school graduates) could not read, write, or calculate sufficiently to function on the job. Studies found American youngsters lagging behind stu-

dents in other countries in reading, writing, and math. American students didn't know history and couldn't find their own country on a map.

With international competition heating up, apocalyptic books about the decline of America making the best-seller list, and a cry for school reform heard from the schoolhouse to the White House, Weill joined with Brock and other high-powered business and educational leaders to create the nonprofit National Academy Foundation. Its goal was to spread the word about a replicable model that works.

Some 3,550 students are now in NAF academies nationwide: Besides finance, NAF sponsors academies in travel and tourism in fourteen schools in eight districts; in manufacturing sciences, which started last year in Novi, Michigan; and in public service, which began last fall at Washington, D.C.'s troubled Anacostia High School.

Anacostia has one of the worst profiles a high school can have: It is located in a city plagued by a greater than 40 percent dropout rate, where the reading and math scores of those who graduate are two grades below the national average. The school, in a drug-blighted, crime-ridden neighborhood, holds a dubious honor: Anacostia High School has the city's highest dropout rate and lowest SAT scores.

Hoping to prepare their at-risk students for a good career in federal, state, or local government (nationally,

What would it be like to be one of a man's three wives? she asks.

"If it were here, the women would go at each other's throats, but there it's just part of their lives," one girl says.

"He beats them and they don't have any rights," says another.

"But at least they have each other."

Insight into another culture—something critical for a travel agent to know, as well as any well-educated person.

If Paccione's weaving of information about places and cultural differences can be subtle, Joe Bines' destination geography and social studies class is not.

Juniors learn about the United States. "And with the seniors, I take them around the world—Europe, the Middle East, Latin America, the Caribbean," he says. "I teach capitals, languages, customs"—and, he might add, history, politics, and more.

Destination geography is more than knowing where someplace is on a map—which travel and tourism students learn fast enough.

"If someone wants to take a fourteen-day tour of the Middle East, you have to know what sites have historical interest, Biblical importance, or political turmoil," Bines says. "Otherwise your tour group could get into a lot of trouble."

The Academy of Travel and Tourism aims at preparing youngsters for a variety of jobs. Travel and tourism are multibillion-dollar industries employing 5.5 million people in jobs ranging from organizing conventions to working in hotels to serving as travel agents. The travel industry is one of the top three employers in thirty-nine states.

Students get a firm view of travel industry economics, operations, marketing, writing, and research. Richmond Hill's juniors arrive at 7:30 A.M. for a specialized computer course that teaches them how to make airplane reservations. They use a computer simulation that mimics the systems used by major airlines.

Speakers have come to the school to discuss hotel management, tour organizing, packaging

bus tours, and writing travel literature. Students also get to hear from experts at an annual citywide meeting. Workshops include "Succeeding in Tomorrow's Hotel Industry," "Public Relations in Tourism," "How To Help the Fearful Traveler," "How To Arrange the Trouble-Free Conference," and "Airport Security."

Rondi Frey, manager of professional development at American Express Travel-Related Services, a major corporate supporter, anticipates a shortage of qualified employees in the industry. American Express itself will need numerous entry-level "travel counselors"—the people on the phone or in retail offices who book business and leisure travel. Frey, who started in that job, says the career opportunities are limited only by the individual.

Students like Janette Hernandez are ready. A junior interviewed before her summer internship, Janette wants to become a flight attendant because she enjoys traveling. "They've shown us there's a reason to be interested in geography." □

THE MANUFACTURING ACADEMY

IN THE HEART of Michigan car country, teachers at Novi High School, a mainly white middle-class school, were test driving the first Ford Academy of Manufacturing Sciences last year. With modifications suggested by Novi's teachers, Ford will take it on the road this fall to schools with a broader mix of students, one in Dearborn and two in Berea, Ohio, near Cleveland.

Ford plans to open manufacturing academies in about ten communities near its plants. The focus is not on automobiles but on the underlying concepts of manufacturing and on applying science, math, and technology to industry. This understanding will help in manufacturing everything from chairs to rubber products to, yes, automobiles. The goal is to orient youngsters to careers in engineering and skilled trades.

Ford has committed \$1 million over five years to the academies because, as company Chairman Harold A. Poling said in announcing the program, education "has a direct bearing on our company's ability to function well and because it is vital to our nation's ability to remain a dynamic force in world affairs." (Ford spends \$200 million a year to educate its salaried and hourly employees.)

In contrast to some NAF academies that are dropout prevention programs, this one is geared toward an elite. To get in, students must have passed algebra—a hurdle for many youngsters, but a necessity for engineers and other technical experts. Students also must read at grade level or above and demonstrate basic understanding of mathematics and science.

Larry Bruno, Ford's point man for the project, says the company asked Novi to incubate the program because it had a strong faculty, a good student body, and few problems. Novi, a 4,000-student district with one high school, sends 80 percent of its students to college. As the academy enters less-affluent areas, Bruno says it

may make sense to encourage guidance counselors to promote the program and its prerequisites among freshmen and sophomores. And although the first eighteen students at Novi included only two females and no minorities, many women and minorities are among those recruited in Dearborn and Berea for this fall.

Locating the academies near Ford plants ensures a base of support and manufacturing talent. It also gives some of the children of Ford employees an introduction to rewarding careers: Bruno estimates that a third of Novi's students and a quarter of Berea's have relatives working at Ford.

The curriculum includes a survey of the history and principles of manufacturing organizations, processes and economics; ways of improving quality by applying statistical methods; understanding how computers, electronics, and technology apply to the workplace; and science and mathematical operations, where students solve manufacturing problems. Students are likely to get a feel for robotics and computer-aided displays (CAD), computer systems that per-

mit three-dimensional design. The summer internships are with Ford and other manufacturers.

Dr. Rita Traynor, Novi's assistant superintendent for instruction, predicts that it will take several years to field the curriculum in the classroom. She says a team of five teachers (business, computers, social studies, science, and math) meets biweekly with Ford's curriculum designers to make adjustments. Cooperative learning and teamwork are central, which is not only advantageous educationally but also the model for solving manufacturing problems.

Debra Harris, who teaches the cornerstone "World of Manufacturing" survey course, says, "The kids really liked the groupwork, the projects, the analytical part, the problem solving. They don't like writing and reading executive summaries, but that comes with the territory."

Novi's students visited a Ford Escort plant and a robotics testing laboratory, which they particularly enjoyed. Harris said that, although some have not yet made up their minds about careers, others have chosen engineering or skilled trades. □



Abe Piyapilly, applications engineer for Ford Motor Company, demonstrates features of the ASEA Brown Boveri robot to Ford Academy of Manufacturing Sciences students at the Alpha Manufacturing Technology Applications Center in Dearborn, Michigan.

one in five Americans works in the public sector), the academy's eight teachers have worked together to develop ways of connecting their academic course material to the real issues that public service employees face. For example, in science class, students examine how people affect the environment—an issue that is likely to appear on government agendas well into the future. Mathematical concepts and skills are often used to tackle demographic data. School runs two hours longer than usual, with the extra time spent honing study skills or working on computers.

To jump start the program, the federal Office of Personnel Management lent NAF Dr. Frank Gavin, its director of personnel and equal employment opportunity, for two years. "We face the same problem as the private sector in recruiting," Gavin says.

"I've spoken with twenty-six personnel directors from city, county, state, and federal government agencies in the area," he says. "They want us to strengthen the functional and enabling skills—reading, research, communicating orally and in writing; understanding how to function in a work environment. Keyboarding is important, as is self-esteem. The basic civil service test is written on a ninth-grade level, yet only four out of ten pass it the first time around, and the percentage passing has declined over the last decade.

Gavin says college is not an immediately achievable goal for many Anacostia students. But at the Public Service Academy, these students will take a solid curriculum and be encouraged to take a civil service test in their senior year so that right after graduation they can start at entry-level jobs including procurement, clerical work, contracting, and computers. "We want them to understand that civil service is a noble career that they could follow," he says. And succeed in.

The Academy of Public Service expands to New York City this fall.

AMERICAN EXPRESS and Shearson footed a large part of the bill for the initial Academies of Finance in the early years. Now NAF has a broader financial base and a \$2 million budget, with support from many major companies. More than 170 businesses are partners in NAF's academies, offering internships and sharing expenses.

It costs about \$80,000 for a district to establish a NAF academy, with the private sector usually contributing

half. That includes \$6,000 to \$8,000 a year for teacher training, although businesses often offer free internships to teachers, which can reduce costs.

Weill and New York City's schools at first thought youngsters would be happy to walk into entry-level jobs straight out of high school—and they believed the program could be considered a success if that happened. But two things developed: Once students began their internships, their expectations rose; those who had never considered college began talking about getting MBAs. And technology has reshaped the financial industry, trimming the need for clerks and increasing demand for computer-literate people who can manipulate and interpret data.

As a result, the Academy of Finance quickly evolved into a college-preparatory program aimed at readying students for the 1.86 million jobs in finance that the industry expects will require a college degree by the year 2000. An independent telephone survey of 196 Academy of Finance graduates—half minority and slightly more than half female—last year found that almost all were in college; that 68 percent were working (mainly while attending college) for \$7 to \$10 an hour, half in financial services or related fields; and that another 25 percent wanted that kind of job but hadn't landed one.

The Academy of Finance program is rooted in rigorous supplemental classes that often extend beyond the school day. "They take our courses plus a full academic load, and it's a real burden" on students, says John O'Connor, the teacher who coordinates the Academy of Finance program at Fort Hamilton High School in Brooklyn. "They give up lunch and take independent study. In my classes, I let them eat lunch and drink soda, otherwise they won't have the chance."

Classes in the junior and senior years include economics; brokerage procedures, banking, and credit; financial products and financial planning; international finance; and accounting. Included is a course at a local college, which accustoms students to college and gives them a chance to succeed in higher education.

The courses include a good deal of practical knowledge. For example, in the banking course, students learn how to figure a monthly payment schedule and how to size up a loan applicant by analyzing the "five Cs" (character, capacity, capital, conditions, and collateral).

There are sessions on writing résumés, succeeding in interviews, and choosing business attire. (Academy students must dress in business clothes on Fridays.) "Sometimes I'll be the student and they'll be the interviewers," O'Connor says. "I'll behave in an outrageous manner and make wild gestures and crazy remarks and wear inappropriate clothing. It's easier for them to see that I'm being inappropriate than when they, themselves, are."

There are workshops where Academy of Finance students from New York City's eight Finance Academies can meet business leaders and hear experts discuss "The Floor Trader's Role in the Futures Market," "How You Can Borrow Money," "Unknown Facets of Insurance," and "How To Succeed as a Broker."

O'Connor says 120 sophomores applied for thirty-five openings last year; Fort Hamilton High has 3,200 students. As at other NAF schools, students need about a 75 average in English and math, good attendance, and the ability to pass an interview. "The interview is to see why

(Continued on page 42)

NUMBERS SPEAK LOUDER THAN WORDS

- Of the 619 graduates in academy programs in 1990, 572 went on to a two-year or four-year college (92.5%). Nationally, 59 percent of high school graduates pursue higher education.
- At Anacostia High School in Washington, D.C., the daily attendance rate averages 40 percent. Students in the school's NAF Academy of Public Service were present for class 98 percent of the time during the program's first year.
- In Los Angeles, there are academy programs at three inner-city high schools. In 1991, 90 percent of these academy graduates will attend a two-year or four-year college, compared to 40 percent of the school's full student population.

AN INVITATION TO BAKE BREAD

BY LINDA HAZARD HUGHS

DEAR PARENTS, We all know that September brings both excitement and dread to children as they wonder what school will be like this year. My son has always had trouble sleeping the night before the first day of school, so I try to be encouraging and supportive. But inside myself I wonder: Will this year hold all that I hope for him?

Last year I was running late on the first day of school, and as my car snaked around the streets of my neighborhood, I met a school bus stopped to pick up a child. A little boy was going off to school for the very first time, I could tell: His dad was giving him that paternal nudge. As the child climbed the steps into the big yellow bus, the father waved and smiled with the confidence that it would be all right. I realized that all over the community that day, parents like me were sending their children off to a new experience with a new teacher, and for many parents and children, I was that teacher. I was the person those parents were trusting to guide and nurture their children.

Linda Hazard Hughs teaches seventh-grade English at the Manbasset Junior-Senior High School in Manbasset, New York, and was teaching fifth grade at the Shelter Rock Elementary School, also in Manbasset, at the time this essay was written. This essay first appeared in Workshop 3: The Politics of Process (1991), edited by Nancie Atwell, and is reprinted with permission of Heinemann Educational Books, Inc., Portsmouth, New Hampshire.

Our own memories of school are often still vivid in our minds. They can bring a rush of excitement, a feeling of unease, or any one of a multitude of responses to school. And so I wonder when parents walk into my fifth-grade classroom: Are they imagining their children around the tables, on the rug, and in the beanbag chairs, or are they remembering, as I do, their own fifth-grade teachers' classrooms with rows of neatly spaced desks, where we sat in alphabetical order and passed papers back and forth just so? In the same way that I remember the challenges that Mrs. Collins offered me in the second grade as a math student and again as an actress when she gave me the lead in our class play, we parents bring our own histories with us when we face our child's teacher. Because we strive for a better life for our children, these classroom memories become important.

My mother says that I was born with a red pencil in my hand: her metaphor for teaching. From the very beginning, I subjected my younger brother to playing school, and I was always the teacher. When I went to kindergarten, I came home the first day crushed because I hadn't learned anything new. My childhood was spent learning and practicing the skills I thought I'd need to be a good teacher. And now that I have been teaching for fifteen years, I still ponder my childhood classrooms, wondering what I bring to my classroom from those roots. Clearly, my classroom diverges from the ones that I remember.

In October of first grade, Mrs. Johnson assigned us to reading groups: bluebirds, cardinals, and robins. It took



only a few days before we all knew that the kids in the bluebirds were the smart ones. The other two groups were left to figure out where they stood, and soon the robins knew they were the lowest group. So while the bluebirds skimmed along from one basal reader to another, the robins struggled—word by word, page by page—through the first one. Of course, Mrs. Johnson never let the bluebirds talk about how good it felt to be in the top reading group, but she didn't encourage the robins to express their confusion about learning to read either. As parents now, Mrs. Johnson's students send their own children off to first grade. Which reading group would they want their child to be in?

I want you to know that the children arriving in my class will also find reading groups, but the groups will be chosen based on their interests. Last year, in anticipation of a visit from Avi, a writer of appealing books for upper-elementary children, we began to explore his writing and his life as a writer. I chose *Captain Grey* and read it aloud each day, sharing my love for the story and the way it is written. I gathered his other books and gave short book talks about each of them. Each student decided which book he or she preferred to read, and groups emerged. As we continued to read, each group met to talk about the experience of reading its particular book.

In Avi's book *The Fighting Ground*, a compelling story of a boy who confronts the issue of war at the hands of the Hessians during the Revolutionary War, my reluctant readers Brian and David were fascinated that the book was arranged by time rather than by chapters. "I can't

stop reading," David admitted. "'9:58, 10:15, 10:25, 10:45'—It's amazing. Time flies!"

"Me, too!" agreed Brian. "Did you get to the part when Jonathan meets his father's friend. . . ."

"Sh-h-h," Shaneeka whispered. "I'm not there yet."

Later they turned the page and discovered that the Hessian soldiers don't speak English, for suddenly a foreign language appeared in the text. "What is this?" Brian demanded.

"It looks like French," Shaneeka suggested. "But how am I supposed to read it?"

"Well, it sort of makes sense when you read what Jonathan says. Look . . ." and Troy was off, explaining the strategy of reading ahead. Then Brian found the translation in the back of the book, and all four readers attacked the German with a new appreciation.

"Why did Avi use the real German?" I asked, as I joined the group to wrap up the day's reading. I had just come from the group reading *A Place Called Ugly*. They were nearly finished, and we had discussed our predictions about the ending and looked for evidence from the story to support our opinions.

Of course, as children overhear the questions and comments of their peers about different books, new groups form and the process continues. Sometimes the group creates a project to show off its book, prepares an oral interpretation of a scene, or acts out the narrative in dramatic form. But for me the key factor for grouping is children's interests.

Other activities demand different groupings. If my goal

is a writing lesson based on Avi's books, groups might form for newspaper, diary, drama, or poetry as we explore styles of writing. I know that learning is based on the child's interaction with the text and his or her experience with it. My knowledge of kids' strengths and weaknesses also determines classroom groupings as I seek to encourage maximum learning. I put kids of varying abilities together, searching for combinations that click. Which child is the patient listener? The insightful thinker? Which reader is the skillful tactician? The groups reflect my awareness that kids learn from kids, that children will learn best when they want to learn, and that all children want to learn how to read and write.

I remember few writing experiences from my first-, second-, third-grade years. I don't remember writing poetry (or reading it, for that matter). I do remember workbook page after workbook page of skills that I often understood after the first model. I'd finish among the first three, and then all three of us would squirm impatiently like kids waiting for the ice cream maker to stop whirring on a hot summer day. Reviewing those pages later, when everyone was done, was torture as the teacher patiently explained the answers over and over again.

As we moved along in the grades, more attention was paid to composition exercises. Miss Kelly, in grade four, would assign a composition topic and instruct us to write a story. We'd sit silently at our desks and write. When the time was up, we'd hand the papers in to be graded. Days later Miss Kelly would hand the stories back. We'd look at the grade, and she'd admonish us to read her comments. Then she'd conduct a rewriting experience: We would copy our story over again, paying attention to her red revising remarks and corrections. Miss Kelly selected the best stories for the classroom bulletin board. I don't remember my friend John's papers ever being displayed.

In my classroom we write every day. We choose topics that we want to write about and we write. During writer's workshop, we practice the craft of writing. We grapple with issues of audience and voice, tense and tone, metaphor and meaning. Since I view each one of my students as a writer and because I write too, our classroom truly becomes a language laboratory. Each day I provide a focus through a whole-group mini-lesson prepared to meet the needs of my writers. One lesson may be about effective leads, while another stresses commas in compound sentences; but whatever it is, it has roots in what I call our "need-to-know" philosophy: What do these writers need to know to improve the pieces they are working on? Following this ten-minute lesson, we move on to our laboratory time, during which each writer works on his or her writing.

Last year, when Kristen wanted to confer with Cara about her narrative on losing her first tooth, Cara was ready because her draft about winning a gold medal skiing needed an audience. Kristen read her story to Cara, and Cara responded in two ways: She told Kristen what she liked about her piece, and she asked questions the story left unanswered for her as a listener. Kristen jotted these down to use later, when she revised. Then Cara shared her writing. When both girls had finished, they each worked independently to begin their revisions.

In the same class, Christine decided to write Chapter 2 of her book about her imaginary dog, Fluffy, and Bri-

anne began to add some more specific examples to her tale about a dissatisfied elephant. Matt struggled with his protagonist's quest. They were all absorbed in their work.

Peter, Tom, and Bobby had no idea what they wanted to write about, so I met with them briefly to see if I could spark their interest in a topic. We discussed categories, and fishing elicited the most interest. I suggested a new strategy—freewriting—and gave them directions to write without stopping for five minutes, with fishing as the theme. They separated reluctantly, and I moved on to Yvette. In Yvette's fictional piece, a girl has come to live with the narrator and her family. I had already questioned her about the visitor: What makes Lisa Merrie different? How does she fit into the family? Last night, Yvette struggled to answer these questions, so she was anxious to have some time with me. Then Grant wanted to talk with me about his scary butcher story, because previously I had pushed him to show rather than tell that the mild-mannered butcher had suddenly been transformed into a monster. Not an easy task for a ten-year-old, I know, so I was prepared to use some examples as models.

I looked around the classroom. I saw Dana alone and went to work with her. Dana's problems with spelling have made her a reluctant writer. When I conferred with her, I focused on her ideas and the design of her story first. I always worked with her spelling, too, to help her become more confident. I also stopped to talk with shy Nicole and to offer encouragement. She wanted to tell me about her piece, so I listened, told her something I liked about her writing, and asked a question for her to consider as she worked on her next draft. The one-on-one, writer-to-writer interaction keeps me in touch with each child's actual process of writing. I reinforce strategies I have taught in our mini-lessons. I give encouragement. And I listen so that writers will hear and discover for themselves where the power or the problem lies. Writers need time to share their writing.

Because I move from person to person, I am in charge of the tempo of the classroom. As the writers attack their individual projects, I seek out those who have told me they'd like to confer and those I've decided need some teacher time. I control the length of these conferences, too, so that I might meet with many children in one day. And I strive for brevity so that the child's responsibility for the writing isn't compromised by an overeager teacher.

With ten minutes left, it was time for group share. We gathered on the rug and listened as Andreas shared his fable about dolphins. Group share gives writers a larger audience and provides feedback for revision. It also helps writers grow in confidence as we share our writing again and again. Occasionally I read my own writing to the children, which helps them see the process at work in an adult's experience. The responses compel me to revise, and they begin to understand how a writer can struggle for just the right word or decide to delete whole paragraphs to make the meaning more precise. Kids know that I don't just talk about writing: I write.

The ultimate group share is our author's day celebration, when each writer takes a turn in the author's chair and listeners write personal responses to the authors. Lauren glowed as she clutched the valued copy of her story in one hand and the jotted notes from her peers in

the other. She knew that she is indeed a writer. I treasure these experiences as I join the enthusiastic applause when everyone is finished.

When I was a girl, Friday was spelling test day. Everyone could count on it. Ten words or twenty, sometimes fifty. Monday through Thursday we'd plod our way through the spelling workbook, writing the words ten times each, using them in sentences, seeing the patterns in the word lists. Mrs. Morris would dictate them, carefully pausing between words. Sometimes she'd put the word in a sentence, sometimes not. I still remember learning to spell *appreciate* for her. It seemed like such a big word for a third grader. She recorded our success on a chart, but everyone's performance was not commendable. So while Elizabeth always got a gold star for her 100, and Daniel, Shannon, Jeff, and I mostly did, many of my friends had few or no stars after their names. Only the perfect spelling papers with excellent handwriting went up on the board.

In my classroom, spelling becomes a key issue when we discuss publishing. My aim throughout the year is to have the children constantly publish their writing. They may produce classroom anthologies of stories or poems; their pieces might be selected for the Author of the Month bulletin board in the main corridor of the school; they may respond with keen interest to the contests that I announce and post or to professional publications that solicit children's writing. Other bulletin boards in the corridor and classroom also display children's writing. In every case, I expect that this writing will be free of spelling and grammatical errors, and I ask kids to do a number of things: Keep a list of their personal spelling demons, ask a good speller for assistance, circle words they think are misspelled and look them up in the dictionary, and finally, turn in their final copy to the editor, me, for proofreading. They still miss some words, so I point them out and they transfer them to their spelling demons list for future work. Fifth graders consistently miss the *their/there/they're* trio and the *your/you're* and *it's/its* pairs, so I conduct small-group lessons on ways to master these words and hold the children accountable for using them correctly. Accepting responsibility and knowing that spelling counts are essential in my classroom.

As I work in my classroom, my own childhood memories influence me. I am the teacher I am because of and in spite of the ways in which I was taught. (My mother would be surprised to learn that I rarely use a red pencil and hardly ever write on kids' papers.) When I look back at my elementary school days, I distinctly remember wondering what it was like for kids who didn't learn as quickly as some of the rest of us, pondering how the teacher could have made learning more interesting, and vowing I'd be different. Yet for many years I struggled to find my child's voice in the teacher's role, and my early teaching was often based on my own childhood, adolescent, and college models.

Now that I have begun to change, I've become aware of how difficult it is for parents who were taught differently. Even trying to explain it to my husband has been hard. But an experience this past Thanksgiving helped me understand why I feel so strongly about who I am now and why I do what I do.

My husband thought that this year for Thanksgiving

we should have *Gourmet* magazine's sweet potato cloverleaf rolls and that I should make them. His suggestion—and confidence in me—were a bit overwhelming. I am a bread baker and have mastered many simple recipes as well as fancy ones, but I had never attempted rolls before or used anything like mashed sweet potatoes in my bread baking. Always open to new challenges, however, I read the recipe, gathered the ingredients together, and waited for Thanksgiving morning.

After stuffing the turkey, I began the rolls. Bread baking with yeast takes time. After setting the yeast to work, measuring the flour, and mixing the sweet potatoes, eggs, and sugar with the other ingredients, I was finally ready to knead. And as I worked that orangey sweet dough with my hands, I began to think about why I knew I could make these rolls. All my experience as a bread baker gave me the confidence to try this new and unusual recipe.

In my reverie, I realized that this self-assurance was what I give my students by immersing them in literature and writing experiences. As a novice bread baker, I had read books about the art of bread baking, had considered bread-baking classes, and knew there were Julia Child videos available. But I really learned to bake bread by making it—by testing the temperature, by watching the yeast grow, by feeling the dough under my hands. With practice, I knew when to add more flour, when to punch the dough down and let it rise again. My experience led me to try new recipes.

In bread baking you can't separate the skills, one by one, to practice them; it's the whole process that counts—the fresh ingredients, the accurate temperature, the careful measuring, the steady kneading, the slow rising. So, too, with learning. The steps are all there, to be sure, and each learner needs to experience them over and over again. The old maxim is true: Practice makes perfect, but not practice only in proofing yeast. It's the whole experience that makes a reader and a writer. We learn by engaging in the whole process. As a teacher, I need to remember this so that, just as my family and friends savored the light, melt-in-your-mouth rolls with our Thanksgiving dinner, my students can savor the accomplishment of real communication of their own ideas and feelings.

I will work hard this year with your child. We'll read and write every day. We'll share our ideas with each other in our language laboratory, and we'll tackle new tasks as we learn from one another. There's a whole world to read and write about. I'm anxious to know you, too, so that you can work with me to make this a wonderful year for your child. After all, we've got the ingredients, I've rolled up my sleeves, and now it's time to bake the bread.

Sincerely,

LINDA HUGHES

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- . 1981. *A Place Called Ugly*. New York: Pantheon Books.
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DO WE KNOW AS MUCH ABOUT THEM AS THEY KNOW ABOUT US?



ILLUSTRATED BY PETER ALSBERG

THIS PAST May, the National Endowment for the Humanities released a report containing excerpts from the humanities sections of the achievement tests given to secondary school students—primarily those headed for higher education—in France, Germany, Great Britain, Japan, and the European Community schools. Compared with what is expected of college-bound students in the U.S., these exams are sobering.

What is striking about them, in addition to their overall high level of intellectual rigor, is the degree to which students in these other nations are expected not only to be well versed in their own country's history and culture but also to know a considerable amount about those of other countries. Here, for example, are some of the questions that deal with U.S. history, geography, and culture:

FROM THE FRENCH BACCALAURÉAT¹:

(The candidate is asked to choose from one of three topics and write an extended essay. Below is one of the topics from the history section.)

Topic C The president and presidential power in the constitution and domestic and foreign policy of the United States since 1945

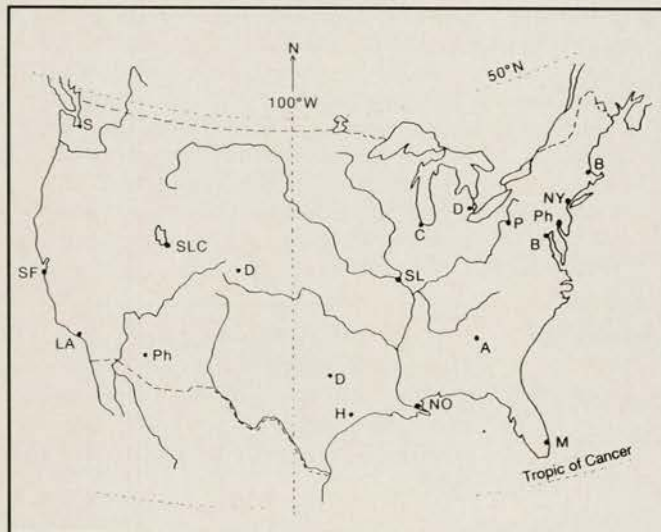
Succession of Presidencies

Truman (Democrat)	1945-52
Eisenhower (Republican)	1952-60
Kennedy (Democrat)	1960-63
Johnson (Democrat)	1963-68
Nixon (Republican)	1968-74
Ford (Republican)	1974-76
Carter (Democrat)	1976-80
Reagan (Republican)	1980-88
Bush (Republican)	1988-

(Same directions: This topic from the geography section.)

Topic A Principal industrial areas of the United States

Using your own knowledge and the map below, identify the principal industrial areas of the United States and define their essential features. Set up a systematic key to the map on a separate sheet of paper.



FROM ENGLAND AND WALES, the General Certificate of Education, advanced level:

History of the U.S.A., 1783-1974²

3 hours allowed

Answer any four questions.

All questions carry equal marks.

Section A: Political History, 1783-1878

1. Why, and with what justification, is the presidential election of 1800 spoken of as a "revolution"?
2. Why did Virginians dominate the presidency from 1789 to 1825?
3. Assess the extent and significance of opposition to Western expansion in the pre-Civil War period.
4. "It was necessary to free the slaves to win the war; the war was not fought to free the slaves." Discuss this judgment of the Civil War.
5. With what justification has the compromise of 1877 been considered a triumph for political parties and a disaster for the national interest?

Section B: Political History, 1878-1974

6. Why were so many of the victories of progressivism won at city or state, rather than at federal, level?
7. Account for the prominence of the temperance issue in American politics from ca. 1900 to 1933.

How To Obtain Copies

Single copies of *National Tests: What Other Countries Expect Their Students To Know* are available free from the Office of Publications and Public Affairs, National Endowment for the Humanities, 1100 Pennsylvania Avenue, N.W., Washington, DC 20506.

8. "Unbelievably naive" or "a dogged man of principle": Which verdict better characterises the conduct of Woodrow Wilson from 1917 to 1920?
9. Why, and to what extent, did American party politics to 1974 follow the pattern set in the 1930s?
10. Why, and with what consequences, did the Supreme Court involve itself after 1950 in **either** (a) electoral apportionment or (b) civil rights?
2. Explain what had produced these conditions.
3. Discuss the consequences for the USA and for other countries similarly affected.

Section C: General

11. "Government regulation did more harm than good to the American economy." Examine this statement with reference to the period 1880-1920.
12. Assess the contribution to American identity of **one** of the following:
 - a) Louis Armstrong
 - b) Henry Ford
 - c) Jesse Owens
 - d) Elvis Presley
13. Why was evangelical protestantism so important a force in American life, and what effects did it have in the period 1800-1860 or 1900-1960?
14. Examine the causes and consequences of the black migration from South to North in the inter-war period.
15. Why did so much controversy surround the career of **either** Douglas MacArthur or John Foster Dulles?
16. To what extent does the conduct of American foreign policy, 1954-1974, offer evidence for the existence and influence of a "military-industrial complex"?
17. Why was the Bay of Pigs expedition undertaken, and why was it a fiasco?

FROM THE EUROPEAN COMMUNITY³ (EC) SCHOOLS:

Work time: 20 minutes

History Oral Examination (sample topics)

America had a new hit song in 1932: "Brother, Can You Spare a Dime?"

*Once I built a railroad, made it run,
Made it race against time.
Once I built a railroad,
Now it's done-
Brother can you spare a dime?*

—T. Howarth, Twentieth Century History (1987)

- Questions** 1. What does this song suggest to you about the contrast in conditions in the USA between the 1920s and the early 1930s?

Advanced History Oral Examination (sample topics)

South Carolina

Declaration of Causes of Secession (December 24, 1860)

The people of the State of South Carolina in Convention assembled, on the 2d day of April A.D. 1852, declared that the frequent violations of the Constitution of the United States by the Federal Government, and its encroachments upon the reserved rights of the States, fully justified this State in their withdrawal from the Federal Union; but in deference to the opinions and wishes of the other Slaveholding States, she forbore at that time to exercise this right. Since that time these encroachments have continued to increase, and further forbearance ceases to be a virtue.

And now the State of South Carolina, having resumed her separate and equal place among nations, deems it due to herself, to the remaining United States of America, and to the nations of the world, that she should declare the immediate causes which have led to this act. . . .

We affirm that these ends for which this Government was instituted have been defeated, and the Government itself has been destructive of them by the action of the non-slaveholding States. Those States have assumed the right of deciding upon the propriety of our domestic institutions; and have denied the rights of property established in fifteen of the States and recognized by the Constitution; they have denounced as sinful the institution of Slavery; they have permitted the open establishment among them of societies, whose avowed object is to disturb the peace of and eloin the property of the citizens of other States. They have encouraged and assisted thousands of our slaves to leave their homes; and those who remain, have been incited by emissaries, books, and pictures, to servile insurrection.

- Questions** 1. Discuss and explain the causes of secession revealed in the above extract.
2. How would the Unionists respond to these arguments?
3. Justify the action of either side in the dispute.

REFERENCES

- (1) Republic of France, Ministry of National Education, *Baccalauréat* 1989.
- (2) The Associated Examining Board (Southern Examining Group), *General Certificate of Education, Advanced Level, Advanced Common History Paper 1* (1989). Reprinted with permission of the copyright owner, The Associated Examining Board.
- (3) These examples were obtained from the European School at Woluwe-St. Lambert, Brussels, "Baccalauréat Examination" (selected oral examination topics).

WITH A CRITIC'S EYE

Helping Language/Learning-Disabled Kids Think about Their Thinking



ILLUSTRATED BY DAN SIERRO

BY MARILYN D'ALESSANDRO

TELEVISION, MOVIES, and video games are here to stay. The research on the learning process shows that TV and video games set children up to expect immediate satisfaction for little effort. The problem teachers face is not just how to introduce books into the lives of young readers but how to make reading a natural activity. Can electronics be used to encourage and increase intellectual activity and enrich the critical faculties rather than dull the mind into passive reception, much like a TV itself?

One Sunday morning, I noticed that the list of paperback bestsellers in the *New York Times Book Review* included three novels that were current hits in the movies. A trip to my local bookstore added two more prominently featured novels that were also adapted to film and playing in neighborhood theaters. The fact that each of these books was the basis for a popular movie seemed significant in inspiring people to choose them as reading material. If this is true for adult readers, I wondered why the interaction of media couldn't be used to inspire excitement when children read.

I chose two books to begin an experiment—*Sarah, Plain and Tall*, by Patricia MacLachlan, and *Helen Keller*, by Margaret Davidson. Both have a second- to third-grade

reading level, and both have movie versions available on VCR. I decided that we would read the books as usual each day and see the movie version at the book's completion. I was trying to compare reactions to the different media—print and video—to see if there would be a significant difference in critical thinking during each process.

I teach learning-disabled nine- and ten-year-olds. The most critical deficit in their development is in the area of language: listening skills, the ability to analyze oral or written material, and the ability to communicate ideas, feelings, and opinions. Most children can be taught to decode words. When I teach decoding to nonreaders, there is an initial period of excitement as the children unlock the words for themselves. But when they realize that reading a book involves thinking as well as decoding, they quickly turn off. They expected the meaning to jump off the page without any effort on their parts. They become discouraged, bored, and incapable of holding the plot in their heads from one day to the next. This transition period, from decoding to critical thinking, is when they turn off and decide that they "don't like reading."

For several years, I have been teaching reading through a combination of phonics and using novels and biographies as text. I have encouraged expressive language through book-related activities such as trips, cooking, and art—anything that would encourage the children to have critical interaction with the book itself. This

Marilyn D'Alessandro is a special education teacher at P.S. 32 in Brooklyn, New York.

method has been successful in terms of holding their interest in the story and broadening their knowledge, but it has never increased their enthusiasm for the act of reading. The reading time is a period of restless shifting and yawning. Even when the children are interested in the text, the effort they expend to concentrate seems too extreme.

Each day we read one chapter of *Sarah, Plain and Tall* aloud. There were seven children, reading on a first- to third-grade level. We sat in a circle and took turns reading. I prompt the difficult words in order to keep the flow of the sentences smooth. I continued the social studies program, putting the book into historical perspective. We baked bread, made butter, and stitched a small quilt to get the feel of life on the prairie. We read grade-level factual material about life on the frontier. We studied a map of the United States to get a geographical perspective. At the end of approximately two weeks, I felt the same gains and lacks as always. Decoding skills had increased. All but the lowest-functioning readers had acquired sight words such as "prairie" and learned the proper nouns Maine, Kentucky, Illinois, Sarah, Caleb, Anna, and so forth. They had enlarged their frame of reference to include a general understanding of the American frontier. They loved the enrichment activities. What had not been accomplished was the ability to analyze text. The reading time remained slow and lacking in concentration. This was apparent when the children were asked to respond to written comprehension questions. Their writing revealed a lack of attention paid to detail and an inability to analyze action and make logical inferences.

At this point, I told the children we were going to see *Sarah, Plain and Tall* in its television movie version. I discussed with them the impact a director and actors have on a movie—how we would be seeing the way other people imagined the book. While they watched the tape, they commented about similarities and differences from the book. They were especially concerned about the actor's interpretation of "Pa," which was substantially different from their own. During the viewing, they were engaged in highly active thinking rather than passive receiving. No one had the spaced-out television eyes I've noticed during other tape viewings. Afterwards, we discussed our reactions. The children talked about how they imagined the characters to look and behave and how the actors portrayed them. They were surprised at how powerful their own imaginations had been in shaping an opinion of the book. I asked them which seemed easier to remember—the book or the movie? I was wondering if the habit of watching TV would make the movie plot more accessible to comprehension than the book. The comments were surprising:

"The movie is more interesting because there are more exciting things, but the book has fewer scenes and it's easier to remember."

"You remember the book better because it doesn't have pictures and you use your imagination. The TV is only a bunch of pictures and you remember what's in your head better."

"You remember more when you read because you have to think and imagine in your head, but when you watch you don't have to think about nuthin', just watch and listen."

Most surprising of all, the class spontaneously decided to reread *Sarah, Plain and Tall*. This time, the read-

ing went very quickly. Throughout the reading, they continued to discuss how differently they had imagined the book from the movie. They were amazed at how individual each child's imagination had been. One little girl had assumed on the first reading that all the characters were African-American. She had missed details of physical description that would have made it clear that the family was Caucasian; however, her comprehension of the emotional level of the story was no different from the other children's.

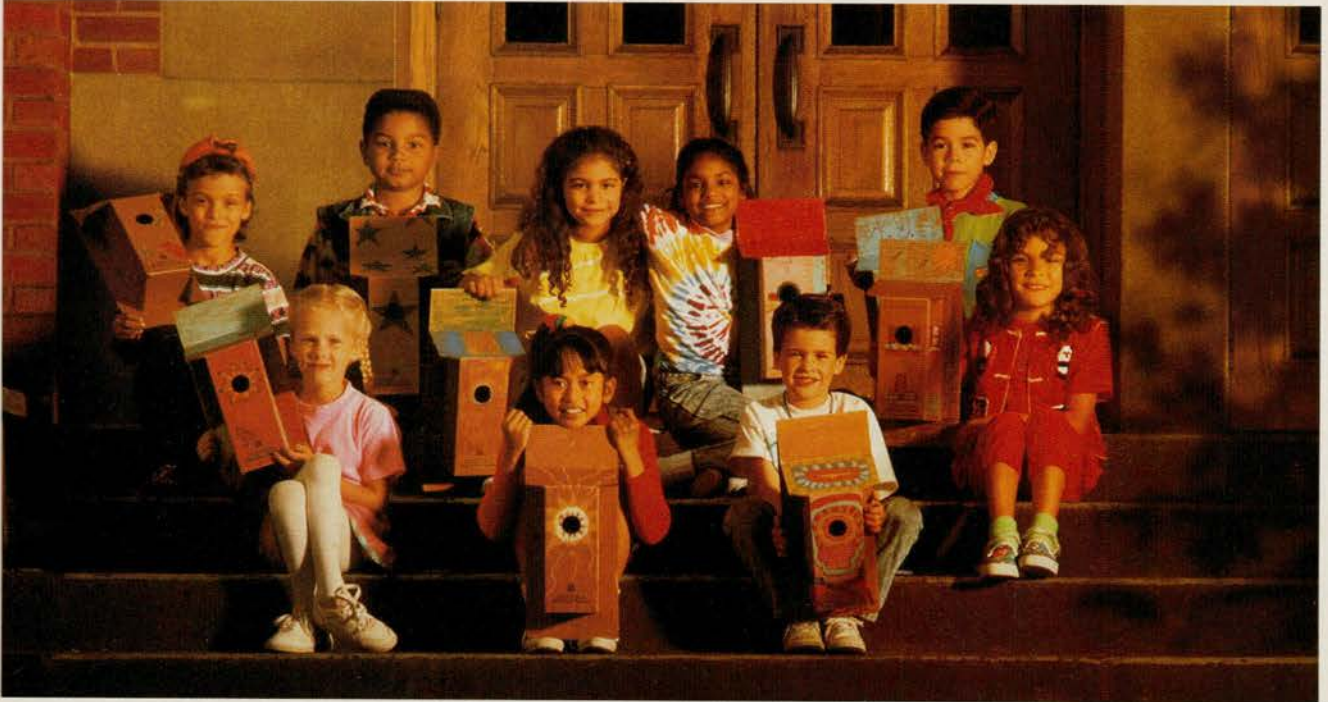
WE REPEATED the process with the biography of Helen Keller, by Margaret Davidson. This time, I told them in advance that there was a film about Helen Keller that we would also see after the reading. I introduced the subject with pictures of Helen Keller and a discussion of what it might feel like to lose sight and hearing. We read the book to its conclusion. This book has a strong plot line, and it was not difficult for the children to follow the story. They were also anticipating the movie and trying to predict which scenes would be filmed. The reading was followed by a viewing of *The Miracle Worker*. The children were delighted with scenes in the movie that they had anticipated from the reading. They were surprised that the movie ended during Helen's childhood while the book followed her life to its end. The book had provided a structure for a deeper connection to the film. The art of the movie—the action and dramatic presentation—riveted their attention. They were active viewers because they were anticipating scenes they had read, and they had been active readers because they were trying to predict what would be included in the film.

I returned then to my initial concept, which was to try to foster reading comprehension through the use of other media. I felt for the first time that I had found a way to encourage reasoning as well as teach decoding, vocabulary, and historical context. In effect, what I had encouraged was metacognitive awareness. The children had learned to see the differences in the thinking processes used to read and to watch TV. They would not necessarily choose books over television and movies from now on, but they had seen firsthand that their own imaginations could create pictures as powerful and long lasting as any movie. They had also achieved connections to the printed page that had previously been lacking. They took their intellectual activity more seriously. They seemed to have gained respect for their ability to imagine and think for themselves. Perhaps the tragedy of endless video in children's lives is the loss of confidence in their own imaginations. They have to be shown how interesting their minds can be.

As for the effect on the analytical process of each child, I believe that they all achieved an increase in reasoning. Kimberly, for example, is a highly disorganized child with the classic messy desk, lost homework, papers on the floor, and confused logic, which often gets her in trouble. At the beginning of the year, reading meant semi-decoding sentences with no regard to meaning. Several words per sentence were misread based on initial letter sound or word configuration, rendering the sentence a meaningless jumble. As her decoding became more accurate, Kimberly's comprehension improved; however, her sense of the entirety of a book was closer to a sensory perception than an analytical experience. She was inca-

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pable of holding the sequence of events in her memory. While she was able to relate isolated episodes after we had finished reading, she had no sense of what the book was about. Beginning, middle, and end were almost interchangeable.

After the second reading of *Sarah, Plain and Tall*, Kimberly decided to write a book report. She came up with four sentences telling four different episodes, but again, they were out of order. As she read aloud to me, her face clouded and she concluded by saying, "This doesn't make any sense." Together we numbered the sentences, putting them in the right sequence. She recopied the paragraph and added a conclusion.

She was relieved as well as proud to have lifted her own "veil of confusion."

While Kimberly had not been able to independently order her own thought process, she had become aware of the need to do so. For children who do not develop these skills at an appropriate time, it is necessary to find a way to teach them how to do it. If Kimberly can be taught to think about her thinking, she can train her mind to find the logical sequence of events, and her comprehension will increase naturally. One month after this experience, she was asked to write a plot summary of another book for homework. She brought in two handwritten pages filled with crossouts and explained that she needed a little help getting it to "make sense." After reading her essay aloud, she was able to independently revise her summary so that it included all the important points in the story in the correct sequence.

THE INSIGHT I gained from this experimental unit is that it is possible to teach young children how to think in a way that increases psycholinguistic skills. Reading is a linguistic experience. It involves the interaction of thought and written words. A successful reader is able to process written information into a sequence of thoughts that communicate meaning. The juxtaposition of reading books and watching videos stimulated this thought process in the children. It became a metacognitive strategy that encouraged active, self-aware analyses of book and film. It was successful because it contrasted the cognitive processes used in receptive and expressive language in a way that excited the children. They used all their mental faculties and enjoyed themselves much the same way as the adults who go back and forth between book and film, film and book.

Reading is creating images in the mind based on printed words. But the modern world with its fast-paced, overwhelming series of images has forced children to focus on sorting out the sensory perceptions they are constantly receiving. They don't have time to quietly reflect or allow their imaginations to wander. They are too busy absorbing images created by others. Television is such a powerful influence that the children thought their minds were second rate. They learned to respect their own power to create mental images only after they were given an experience that developed self-awareness as well as confidence. One of our challenges as teachers is to find ways to give children experiences that show them that their thought process is a valid source of self-stimulation. Otherwise, we will not have just a nation of nonreaders but a nation of easily fooled nonthinkers. □

PRIVATE SCHOOLS VERSUS PUBLIC SCHOOLS

(Continued from page 15)

accompanied by family and community disintegration, is associated with lower academic achievement. Overcoming childhood poverty may not solve our crisis in education, but it would take us a good stretch down that road.

MANY RISKS, NO BENEFITS

Would permitting public dollars to follow children to private and parochial schools turn our education system upside down? Would it destroy neighborhood schools and transform public education into a system for the have-nots? Would it violate the separation between church and state and to the detriment of both? Could it lead to public money going to cult schools, radical schools (of the left and the right), and crassly commercial schools thrown together by people out for a quick buck? Would it mean less accountability in education because private and parochial schools, unlike public schools, are not required to publicly report their test results or their finances? Might it sanction a school system stratified by class, religion, ethnicity, and race and thereby undermine our pluralistic democracy?

The risks involved in public aid to private education are substantial, and they are not balanced by any evidence of educational benefit. In fact, the results of NAEP and other national assessments show that if we want American children to meet world-class education standards—or even be able to do seventh-grade math by the time they leave high school—then spending tax dollars to send them to private and parochial schools is a bankrupt strategy.

The dismal performance of private schools also means that those who have charged that bureaucracy or teacher unions or desegregation orders or democratic control is chiefly responsible for our crisis in education had better look elsewhere because private schools are not constrained by any of these. On the other hand, it means that public schools cannot blame their dismal performance chiefly on the deterioration of families and communities. Even if we were to get the kinds of kids private schools have—handpicked and whose parents are relatively well educated and motivated to spend money on schooling—and even if we, like the private schools, were to have smaller class sizes or more flexibility in removing trouble makers, the evidence indicates that student achievement would still be at a level that is far below world standards.

WHY THE POOR RESULTS?

That is shocking, but it is not a counsel of despair. Rather, it underscores, and in the strongest possible way, the case for restructuring our schools, both public and private. The majority of our youngsters—and even the selected, more academically tracked students in private schools—are not achieving at the levels they and this nation need through the ways in which we are educating them. As surprising, then, as the results of the public-private school comparisons may be, they are not real-

Public and private schools also have students who are subject to the same incentives for working hard in school—that is to say, very few such incentives.

ly shocking: Public and private schools by and large have the same textbooks, the same curriculum, the same pedagogical approach, the same tracking methods, and the same internal organizations.

Public and private schools also have students who are subject to the same incentives for working hard in school—that is to say, very few such incentives. College-bound students in both public and private schools know they'll be able to find a school that will accept them, no matter how poor their grades are or how little they know, as long as they have a high school diploma and, usually, money—and in the latter case, the private school kids do have an advantage. The one exception is students, in either school sector, who hope to attend elite universities; they have to work very hard indeed. As for going to work from high school, students in both public and private schools know that employers don't ask to see high school transcripts and don't even offer decent jobs to high school graduates until they are twenty-four or so, if then. So a student who has worked hard at rigorous courses will be competing for the same poor job at the same low pay as a student who has filled his schedule with soft courses that he barely passed. And these bad lessons are being learned by students in public and private schools alike.

What about parents? Why aren't they making sure youngsters apply themselves? That's easy. Whether kids are in public or private schools, most parents won't be successful at pressuring them to work harder when the kids can tell them, "I've already done what I need to do to get what I want."

As for teachers, they have a hard enough time, under the best of circumstances, persuading kids that history or physics or even regular attendance is "relevant" to their future lives. But when the kids can say, "I don't need that to get into college or to get a job; it doesn't count" or "Taking that course will pull my average down," the battle is lost before it has begun.

One solution—though it's by no means the only one—is for American businesses to link getting jobs to high school achievement and for colleges to do the same thing in setting admission standards. Elementary and secondary schools would then have back-up for upholding standards. Parents and teachers would have back-up when they say, "Unless you turn off the television set and work harder, you're not going to make it." Also our stu-

dents would have evidence that working hard and learning something are essential to getting what they want. At the very least, they would see a reason to achieve, and because they're no stupider than students in our competitor nations, they would.

The poor outcomes of both public and private education also indicate that there is not much to the argument that the competition school choice would produce would in turn serve as an excellent accountability system. As the argument goes, parents would make school decisions on the basis of educational excellence, so bad schools would go under and good schools would thrive and be replicated. But there are parents who choose private schools and who keep their youngsters there despite, as NAEP tells us, their mediocre performance, and this suggests that if school choice produces accountability, it is not primarily or always on the basis of educational quality and outcomes. Choice, then, may be an excellent incentive for schools to work hard to attract customers, but it is a dubious incentive for getting them to focus on improving student achievement. The only way to do that is to do so directly, that is, to design school-wide incentives in which there are rewards for improving student achievement and consequences for failure.

The idea of an accountability system for schools that involves rewards and consequences is radical and very controversial, and it would need to be tested to see what works, when, and how. But the idea of an accountability system based on private school choice is also radical and very controversial, and the NAEP and other results tell us it would not work. This much is very clear: Even if the public rejects private school choice, it will not stand for the status quo in public education. There either will be a new kind of accountability system in education that both the public and educators can believe in, or some crazy accountability scheme that would not be good for education will be imposed on us.

The so-called private school choice package that the Bush administration is pushing will not help kids find out that they need to work hard in school to get what they want, just as they must on the athletic field and in the world of work. It will not stimulate schools to focus on improving student achievement and to experiment with new ways of doing so. It will not produce greater accountability in education, and it will undoubtedly yield less. It certainly will not eradicate the effects of childhood poverty. And it will not solve the crisis in education because that crisis afflicts public and private schools alike.

Rhetoric aside, the administration's proposal doesn't have much to do with education or children at all. It's a way for the government to divest itself of all responsibility for schools; it's like saying, "All right, customers, it's up to you. We don't care about the quality of the wares being peddled in the school market. If you pick a lemon, well, that was your own choice. Better luck next time." By then, America will be out of luck, and, like Humpty Dumpty, it's doubtful public education would be put back together again. □

REFERENCE

- ¹ U.S. Department of Education, National Center for Education Statistics. *Private Schools and Private School Teachers: Final Report of the 1985-86 Private School Study*, 1987.

THE CAREER CONNECTION

(Continued from page 29)

they're applying, to look for motivation," O'Connor says. "Some students are only interested in the jobs [for summer income], but we try to get students who are interested in a career."

He says there's no attempt at "creaming" the best students—"this is for average students"—although the high motivation of the academy students often sets them apart and explains why only a small number quit the demanding two-year program. The academy reflects the diversity of Fort Hamilton High School, where students come from 112 countries; a large contingent are from Spanish-speaking countries and a rising number are Asians. Many academy students are still perfecting their English.

They learn about business methods first hand. For instance, Elizabeth Durney, 18, participates in a quality circle to discuss with representatives from other academies ways in which to improve the academy program.

The program expands the students' contacts with the world. Popi Angelos learned how to commute during her internship: a subway from Brooklyn to Wall Street, a walk to the World Financial Center, and a ferry across the Hudson River to New Jersey, where she worked in Paine Webber's mutual funds department.

The most popular part of the program is the internship. Last summer some two hundred students worked for sixty sponsors in New York City's financial community, earning up to \$9 an hour. Students agree that the internships made them grow and gave them self-confidence.

"I was the only person there my age," recalls Popi, 17. "I was balancing client accounts on the 'scopes'—basically the same work as adults were doing. I'd worked for a dentist for two years before, but this was different because I was expected to be an adult." Among the enjoyable differences: "I had to dress up in business clothes."

Spiros Georgedakis, 17, who interned at Coopers and Lybrand, a major accounting firm, says the attitude of his co-workers was a major factor in his decision to pursue a business career. "They treated you like an adult, not like a teenager."

Some are there to explore career options. "You want to be more educated about possibilities before college," Bridget Sullivan, 16, says. One thing she learned at Solomon Brothers is that "accounting is boring, but there are interesting jobs that deal with it—financial analysts who predict the future."

Students believe that the internship and the classwork provide a head start. "No one else can say they worked on Wall Street at 16," says Rhonda Abdinoor. "When it comes time to get a job, they'll see we have experience and hire us before someone that doesn't."

After his internship ended, Yuman Chan, 16, who intends to study management and computer science in college this fall, has continued working for Shearson corporate vice president Steven Moss, who oversees

trading floor technology. "I worked as a research analyst," Yuman says. "It's not really an entry-level job. You had to produce stock reports for people who deal with millions of shares for clients. The analyst uses the information I gave him to predict stock movements. These reports are very important to clients, and we only get a week to produce them. My manager put my name on a couple of them."

Moss looks at Yuman as a future colleague as well as a present one; indeed, Moss works across from a 1982 intern. "I regard internships as the start of something . . . [and assume] this person will be around for a long time," he says.

He tries to thoughtfully expose the intern to the business, "so he understands why what we are doing is important to the firm and to our clients. Working with interns is very rewarding . . . [because mentors] tend to get involved in their lives. We'll help Yuman decide which colleges to apply to, how to present himself at interviews and on his application form. These are skills you develop in this context that become valuable later, since presentation skills are very important in business."

One former intern knows what he means. Moss encouraged David Seidman to try and become the Academy of Finance's 1990 valedictorian—a title earned through a public speaking competition and carrying a hefty scholarship. His judges would be Baruch College professors whom he had never met before. And he knew nothing about his topic: forecasting real estate values in the 1990s.

David, then a senior at Jamaica High School, prepared by playing hooky for a day at the city's research library. He delved further into articles at Shearson's library. And Moss and other supervisors coached him.

"We grilled him severely for three days to prepare him to face the hostile questions he could expect from the professors," Moss recalls. "It's just as if he were working for me and had to make a presentation to the bosses."

David, now entering his sophomore year at the University of Pennsylvania, was chosen valedictorian.

"Now I'm very confident that David could make a presentation to any of my clients," Moss says.

THE ACADEMIES also play an important role in the lives of their teachers. John O'Connor, the twenty-seven-year veteran from Fort Hamilton High School, admits that before he volunteered to start the program three years ago, "I just taught my classes and went home; it was just a job. Now the academy is the reason I don't retire. To not be able to finish my lesson because the kids have so many questions—it's fantastic. The kids benefit and I really benefit."

"I've had to go out in the summertime and learn about the jobs. I've met people that I never would have," O'Connor says. Primerica CEO "Sanford Weill probably makes more money in a day than I'll make in my entire life, but we had dinner with him and I wound up sitting with him and [NAF chairman and civil rights leader] Vernon Jordan. I'm an economics teacher from Brooklyn and I was at a loss about what to talk about. So I said to Sanford Weill, 'How's business?' And he told me! What a feeling to be able to learn from him." □

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REVOLUTION IN ONE CLASSROOM

(Continued from page 23)

bit of mathematics.

But Mrs. O used the groups only to call on individual children. She asked individuals from each group to come to the front and put their entry under the "Yes" or "No" column, exhausting one group before going on to the next. The groups were used in a socially meaningful way, but there was no mathematical discourse within them.

Was this teaching for understanding? Mrs. O did use a new form of classroom organization that was designed to promote collaborative work and broader discourse about academic work. She did employ the small groups consistently during my visits. The children seemed quite familiar with procedures and worked easily in this organization. She also used the groups to distribute and collect instructional materials and to dismiss the class for lunch and recess (she let the quietest and tidiest group go first). Moreover, she referred to her classwork as "cooperative learning" and used the organization for some regular features of classroom work. When I mentally compared her class with others I had observed in which students sat in rows and in which there was only whole group or individual work, her class seemed really different. But she filled the new social organization with old discourse processes that effectively frustrated the sort of cooperative learning that the Framework's authors had envisioned. I asked if she ever used the groups for discussions and that sort of thing; she said that mostly she worked in the ways I had observed.

REPRISE

I have emphasized certain tensions within Mrs. O's classes, but these came into view partly because I crouched in her class with one eye on the Framework. Other observers might not have noticed them, for Mrs. O's lessons went quite smoothly. She and her students were well used to each other, and the contrary elements of instruction that I have highlighted did not jar the class. On the contrary, students and teacher acted as though these lessons made perfect sense. Features of instruction that seemed at odds analytically appeared to co-exist nicely in practice.

One reason for this lay in the classroom discourse. Mrs. O never invited or permitted broad participation in mathematical discussion. She held most exchanges within a recitation format; she initiated nearly every interaction, and the students responded. They complied. After all, most second graders want to please their teacher, and compliance is easier than initiation. In consequence, the discourse was very familiar to members of the class, almost ritually so. The calendar exercises that I observed were so familiar that students often gave the answers before she asked the questions. Most of the class participated, but they did so on a narrow track in which she maintained control of direction, content, and pace.

In contrast, the Framework argued that children need to express and discuss their ideas in order to understand the material on which they are working (CSDE, 1985, pp. 14, 16). But the discourse in Mrs. O's class discouraged students from reflecting on mathematical ideas or from sharing their puzzles with the class. Attention was focused

instead on successfully managing a highly structured set of activities. This restricted even the questions and ideas that could occur to students, for thought is created, not merely expressed, in social interactions. Mrs. O employed a curriculum that sought to teach math for understanding, but she kept evidence about what students understood from entering the classroom discourse. The discourse remained smooth partly because so much possible roughness was choked off at the source.

Another reason for the lesson's smoothness lay in Mrs. O's knowledge of mathematics. Though she plainly wanted her students to understand this subject, she did not know mathematics deeply or extensively. She had taken one or two courses in college, and reported that she had liked them; but she had not pursued the subject further. Moreover, Mrs. O knew mathematics as a fixed body of truths, rather than as a particular way of framing and solving problems. Questioning, argument, and explanation seemed quite foreign to her. She worked hard to make the fixed truths accessible to her students,

*Mathematically she was
on thin ice.*

using a new curriculum that promised to embody mathematical ideas and operations in concrete materials and physical activities. This struck her (and many other teachers today) as a great improvement on words and sheets of numbers. But neither Mrs. O nor *Math Their Way* saw mathematics as a source of puzzles, as a terrain for argument, or as a subject in which questioning and explanation were key elements of learning—all ideas that are plainly featured in the Framework (CSDE, 1985, pp. 13-14). Lacking a sense of importance of explanation in mathematics, she simply slipped over many opportunities to elicit it, unaware that they existed. Because her conception of mathematical understanding was so limited, she could "teach for understanding," with little sense of how much remained to be understood, how much might be incompletely or naively understood, and how much might still remain to be taught. Working as she did near the surface of the subject, many elements of understanding and many pedagogical possibilities remained invisible. Mathematically she was on thin ice. But she did not know it and so skated smoothly on with great confidence.

In a sense, then, the tensions that I observed were not there. Though real enough in my view, they did not enter the public arena of the class. For they were kept hidden by the nature of the class itself. Mrs. O's modest grasp of mathematics, her limited conception of mathematical understanding, and her close management of classroom discourse simply obliterated many potential sources of roughness in the lessons. Had Mrs. O known more math and constructed a somewhat more open discourse, her

class would not have run so smoothly. Some of the tensions that I noticed would have become audible and visible. Things would have been rougher, potentially more fruitful, and vastly more difficult.

PRACTICE AND PROGRESS

Is Mrs. O's mathematical revolution a sign of progress or confusion? Does it signal an advance or a setback for the latest new math? It probably is unwise to sharply distinguish progress from confusion when considering such deep change in instruction as reformers press today. For the teachers and students who try to carry out such change cannot simply shed their old ideas and practices like a shabby coat and slip on something new. Inherited ideas and practices are all that teachers and students know, even as they begin to know something else. As they reach out toward a new instruction, they do so with their old instructional practices. Their past is their only path to the future. Mixed practice and confusion, therefore, seem essential to progress.

This point often goes unnoticed by those in the throes of change, as well as by those who promote it. The changes in Mrs. O's teaching that seemed paradoxical to me seemed revolutionary to her, and I do not think she was deluded. She saw certain crucial limits of her early emphasis on computation and memorization and was convinced that her classes have greatly improved. She contended that her students now understood and learned much more math than their predecessors had a few years ago. She even asserts that this has been reflected in their achievement test scores. I have no direct evidence of these claims. But when I mentally compared this class with others that I have seen, in which instruction consisted only of rote exercises in manipulating numbers, her claims seemed entirely plausible. Many traditional teachers viewing her classes today would also think they were revolutionary.

But all revolutions preserve large elements of the old order as they invent new ones, if only because everything cannot change at once. One continuing element in Mrs. O's practice was a conception of mathematics as a fixed body of knowledge. Another was a view of learning mathematics as getting the right answers. She said that math had not been a favorite subject in school and that she had only learned to do well at it in college. When I asked her how that had happened, she said, "... I found that if I just didn't ask so many 'why's' about things that it all started fitting into place. ..." Mrs. O learned to do well at math by avoiding exactly the sort of questions that the Framework associates with understanding mathematics. She noted that her view of math has not changed since college.

Another persistent element in her practice was "clinical teaching," that is, the California version of Madeline Hunter's Instructional Theory Into Practice (ITIP). This approach stresses the importance of structure in lessons and is associated with a rigid, sonata-form pedagogy, close teacher control, brisk pacing, and highly structured recitations. ITIP appears to have played an important part in Mrs. O's own education as a teacher, and she has been encouraged to persist with it. Both her principal and assistant principal at the time were devotees of Hunter's method and vigorously promoted it in the

Is Mrs. O's mathematical revolution a sign of progress or confusion?

school. I asked all three of them whether clinical teaching worked well with the Framework. None saw any inconsistency, saying emphatically that the two innovations were "complementary." Yet as ITIP was realized in Mrs. O's class, it cut across the grain of the Framework. For she took clinical teaching as a license to rigidly limit discourse, to closely control social interaction, to focus the classroom on herself, and to hold instruction to relatively simple objectives.

If Mrs. O's past affected the changes in her practice, it also affected how she saw them. In the spring of 1989, I asked where her math teaching stood. She thought that her revolution was over. Her teaching had changed definitively: She had arrived at the other shore. In response to further queries, Mrs. O evinced no sense that there were areas in her math teaching that needed improvement. Nor did she seem to want guidance about how well she was doing or how far she had come.

There is an arresting contrast here. From an observer's perspective, especially one who had the new Framework in mind, Mrs. O looked like a teacher in transition. On this view, she might be imagined near the beginning of growth toward new math teaching. But the matter looked quite different to Mrs. O, who considered things in light of her past work. She saw herself as a teacher who had made a great transition and mastered a new practice.

Which perspective is most appropriate—Mrs. O's or the hypothetical observer's? This is a terrific puzzle. One wants to honor this teacher, who has made a serious and sincere effort to change, and who has changed. But one also wants to honor efforts to achieve greater intelligence and humanity in mathematics instruction.

We might begin by noticing that Mrs. O had only one perspective available. No one had asked how she saw her math teaching, in light of the Framework, nor had she been offered opportunities to view other sorts of teaching. If no one in California education had seen fit to ask her the question and help her to figure out answers, could we expect her to have asked and answered it all alone?

If math teaching is half as deficient as reformers say, then few teachers would know enough to raise many fruitful questions about their practice. Mrs. O's own lessons quite effectively protected her from experiences that might have provoked such questions. But even if such questions were somehow raised for Mrs. O and other teachers, would they know enough to frame appropriate answers? How could teachers be expected to assess their own progress in inventing a new sort of instruction if their teaching is half as dismal as reformers suggest?

One can imagine arrangements that would help teach-

ers to learn more about math teaching and how to think about it. But California's budget for professional development is painfully modest just now. Lacking such assistance, could teachers assess their progress as though they had access to thoughtful commentary, when in fact most had none?

Even if Mrs. O had had such assistance, she would still have had to build on her past practices as she changed, like any practitioner. Hence her view of how much she had accomplished would be tied to her subjective experience of change. Teachers whose practice is very traditional would most likely think that their first steps—that would seem small to an observer—were quite large. For from a perspective still rooted mostly in a traditional practice, such modest changes would be immense. Such teachers might come to regard them as small only if they

From this perspective, Mrs. O's progress seems remarkable.

took some larger steps later on and consequently gained a different perspective. Of course, we might expect more from teachers who had a good deal of help in thinking about teaching in some active discourse about their work, in which questions were asked and answered from a variety of perspectives. For those teachers would have more resources for change, unlike colleagues who had been left to figure things out for themselves.

What would it take to make such assistance available to teachers? And to help teachers pay constructive attention to it? Neither query has been given much attention, either in efforts to change instruction or in efforts to understand such change. But without such help, it is difficult to imagine how Mrs. O and many other teachers could make the changes that reformers now invite.

POLICY AND PRACTICE

Mrs. O's math classes suggest a paradox. On the one hand, policy is the key to changing practice. For new instructional policies illuminate deficiencies in teaching and learning and provide impetus for change. From this perspective, teachers are the problem, for it is their mechanical and modest knowledge of mathematics that impedes progress. But teachers also are the chief agents of any new instruction, because few students will learn a new mathematics unless teachers teach it. The new policy seeks great changes in knowledge, learning, and teaching, yet these are intimately held human constructions. They cannot be changed unless the people who know, teach, and learn want to change, take an active part in changing, and have the resources to change.

How can practice be improved if the chief change agents are also the problem to be corrected? This puzzle is worth noticing partly because so much instructional policy making seems to ignore it. Many policies that seek fundamental instructional reform look as

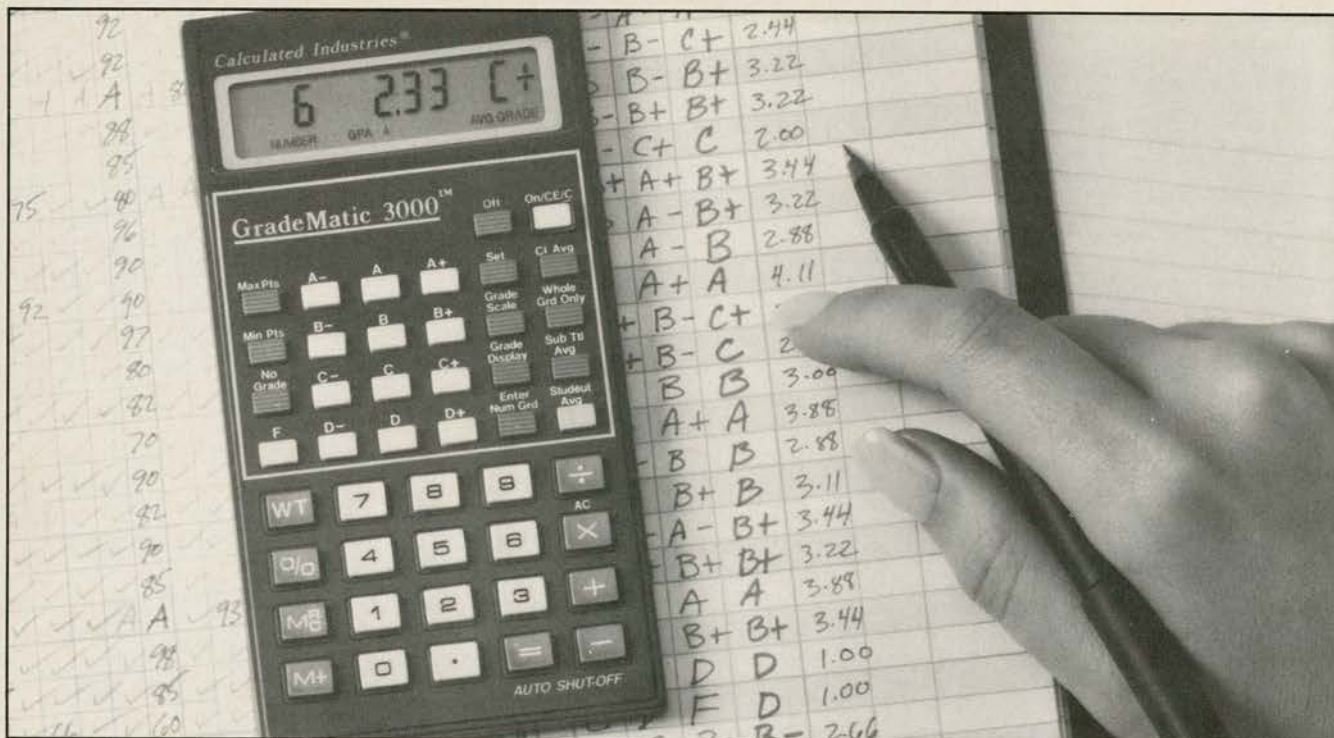
though their authors believed that students and teachers would change if they simply were told to do so. New goals are articulated, and exhortations to pursue them are issued. Sometimes new materials are provided. Another reason to notice the paradox is that the instructional changes reformers seek are immense. If the recent reforms are to succeed, students and teachers must not simply absorb a new "body" of knowledge. Rather, they must acquire a new way of thinking about knowledge and a new practice of acquiring it. They must cultivate strategies of problem solving that seem to be quite unusual among adult Americans. They must learn to treat knowledge as something they construct, test, and explore, rather than as something they absorb and accumulate. Additionally, and in order to do all of the above, they must un-learn much of what they know, whether they are second graders or veteran teachers. Their extant knowledge may be naive, but it often works. A few can learn these things easily, and some even seem to pick it up on their own. But many very able learners have great difficulty, and so prefer the traditional sorts of learning that reformers reject.

Learning a new mathematics is much more formidable for teachers than students, for they must learn how to teach anew while relearning what to teach. And they must un-learn the mathematics and teaching practices that they have used for decades.

Mrs. O was not taught about the new Framework in a way that recognized these difficulties. Instead, the California state education department taught her about the new math using roughly the same traditional pedagogy that it criticized in the Framework. Like students in many traditional math classrooms, she was told to do something. She was told that it was important. And a synopsis of what she was to learn was provided in a text. The state advanced an instructional revolution, but it used an old pedagogy to do so. If, as the Framework argues, it is implausible to expect students to understand math simply from telling it to them, why is it any less implausible to expect changes in teaching to result simply from telling teachers to change? From this perspective, Mrs. O's progress seems remarkable.

What more might it take to support major instructional change? It is no answer to the question, but I note that few people in Mrs. O's vicinity seemed to be asking that question, let alone taking action based on some answers.

This is no argument against the changes that reformers press. The revised California Mathematics Framework offers a bold and ambitious vision of mathematics instruction, one that took imagination to devise and courage to pursue. Yet this admirable initiative has done little to augment teachers' capacities to realize the vision. The new Framework, for instance, had barely been announced in her school. She knew that it existed but was not sure that she ever had read it. She knew that the principal had a copy and that the new text series had been written in light of the Framework. She had attended a publisher's workshop on the new text and found it informative. She also had studied the text and the teacher's guide. But like many teachers in her district, she used the new book only a little, preferring *Math Their Way*. The state education department also supported a network of teacher development projects, mostly in universities, that offered math workshops for teachers. But



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there are only a handful of these projects compared with the tens of thousands of teachers in California, and most workshop sessions are brief. A few project staffers follow teachers back into school and offer support for change, but most do not. To the extent that there was support or guidance for change in Mrs. O's practice, it was local, but there was precious little of that.

Hence the changes in Mrs. O's practice were at best weakly guided and supported by the new policy. From one angle, this seems admirable. Mrs. O has had considerable discretion to change her teaching, and she has done so in ways that seem well adapted to her school. Though I call attention to the mixed quality of her teaching, her superiors celebrate her work. But if we take seriously reformers' arguments about the importance of mathematics and the need for a new mathematical pedagogy, then Mrs. O's situation is troublesome. When I observed what I report here, there seemed little chance that she would be helped to struggle through to a more complex knowledge of mathematics and a more complex practice of teaching mathematics. And if she cannot struggle through, how can she better help her students to do so? The recent reform movement has vastly expanded Mrs. O's obligations in teaching mathematics, without much increasing her resources for meeting those obligations. Ambitions for reform have continued to escalate as state and local budgets contract.

That collision between ambitions and resources may turn out to be crippling. Researchers and other commentators on education have begun to appreciate how difficult it is for many students to achieve deep understanding of a subject. This appreciation is at least occasionally evident in the rhetoric of reform. But so far, there is little appreciation of how difficult and costly it will be for teachers to learn new practices in which students are competently guided toward deeper understanding. □

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A vibrant tropical beach scene featuring several palm trees against a clear blue sky. In the foreground, a couple is sitting on the thick trunk of a palm tree that leans over the water. The man is wearing a white hat and yellow shorts, and the woman is wearing a white top and yellow shorts. The water is a clear, light blue, and the beach is visible in the distance.

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