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New Report Faults Performance Standards in the Nation's Benchmark Exam – NAEP Proficiency Standard Is Set Too High

Brown Center Report Also Examines Declining Enrollments in the Nation's Private Schools

Report Also Shows, Contrary to Previous Research, That Students' Performance on International Math Assessments Is Related to Time Spent on Math Instruction

Washington, D.C., December 11, 2007 – A new study from the Brown Center on Education Policy at the Brookings Institution finds that the benchmarks used in scoring the National Assessment of Educational Progress (NAEP) are set too high, causing inordinately large numbers of students to be classified as less than proficient in math and reading, and making it unrealistic to expect that schools will make rapid progress in bringing students to so-called "proficient" levels, as required under No Child Left Behind (NCLB).

"I've always wondered how the percentage of kids proficient on NAEP could look so awful, given that the exam itself covers fairly low-level content," says Tom Loveless, the Brown Center's director and author of the new report. "Now it's clear—NAEP's proficiency cutscores are set too high."

Even high achieving nations would not be "advanced" on NAEP
(basic = 469, proficient = 556, advanced = 637)

Table 1-4

Nation	Mean	Level of Nation's Mean
Singapore	605	Proficient
Korea, Rep. of	589	Proficient
Hong Kong, SAR	586	Proficient
Chinese Taipei	585	Proficient
Japan	570	Proficient
United States	504	Basic

Source: Revised version of table 11 from Gary W. Phillips, Linking NAEP Achievement Levels to TIMSS, Washington: American Institutes for Research.

Critics tend to accuse the states of being out of sync with the way in which NAEP defines academic proficiency. However, important new research suggests that it may be NAEP that is most out of sync, not just with the states but with the rest of the world. As a groundbreaking 2007 study by Gary W. Phillips showed,[1] if students from other industrialized nations were asked to take the NAEP, their performance would look dismal, too. Even in the countries that rank highest on international comparisons—Singapore, Hong Kong, South Korea, Taiwan, and Japan—anywhere from 25 to 50 percent of students would fail to score highly enough to be considered proficient.

"If the world's best school systems don't measure up to NAEP's standards, then maybe there's something wrong with the standards themselves," notes Loveless. "We have come to define anything less than proficiency as failure. Then 43% of Japanese 8th graders are failing at math. That's doubtful."

As noted in the 2004 Brown Center Report, students' difficulty in scoring at the proficient level has little to do with the rigor of the academic content of NAEP. Indeed, analysis of NAEP's mathematics tests reveal that they emphasize arithmetic skills that are far below the grade level of the students being assessed. For example, on the 8th grade test, almost all problem solving items use whole numbers and avoid fractions—which students must master to tackle higher mathematics.

The most plausible explanation for low proficiency rates is that NAEP's designers have over-compensated for the low level of the test

Worldwide, NAEP proficiency standards leave a lot of children behind.

Table 1-5

Nation	Percent at or above Proficient
Singapore	73
Hong Kong, SAR	66
Korea, Rep. of	65
Chinese Taipei	61
Japan	57
Belgium (Flemish)	40
United States	26
Israel	24
England	22
Scotland	22
Italy	17
Norway	9
Morocco	1
Botswana	0
Saudi Arabia	0
Ghana	0
South Africa	0

Source: Revised version of table 10 from Gary W. Phillips, Linking NAEP Achievement Levels to TIMSS, Washington: American Institutes for Research.

[1] Gary W. Phillips, "Linking NAEP Achievement Levels to TIMSS," (Washington: American Institutes for Research, April 2007).

content by ratcheting up the complexity of the test questions and the level of the cutscores.

This raises serious questions about the validity of the achievement levels—basic, proficient, and advanced—that NAEP uses when reporting its results. The public may take "proficient" to mean the capacity to do grade-level work. But in fact, scoring at the proficient level proves only that students have aced a test that poses tricky questions about simple content.

"When it comes to gauging the performance of American students across the board, NAEP is the only game in town," Loveless acknowledges. "The original purpose of the achievement levels was to translate the test's results into language that the public would understand. That's worth doing, but it hasn't been done right yet."

If Private Schools are Viewed as Superior, Then Why Have Their Enrollments Declined?

The 2007 Brown Center report also examines the national decline in private school enrollment that has occurred over the past half-century.

According to a 2004 Kappan poll, a majority of Americans believe that private schools are superior to public schools, a view consistent with well-publicized research showing that private school students achieve at higher levels than do their public school peers, even when parental income and other factors are taken into account.

School enrollment of 14-17 year olds, 1890-2000
(Percentage of students by sector and decade)

Table 2-1

Year	Overall	Public	Private
1890	5.6	3.8	1.8
1900	10.2	8.4	1.8
1910	14.3	12.7	1.6
1920	31.2	28.4	2.8
1930	50.7	47.1	3.7
1940	72.6	67.9	4.7
1950	76.1	68.1	8.0
1960	83.4	74.1	9.3
1970	92.2	83.8	8.4
1980	89.8	82.0	7.8
1990	92.5	84.1	8.3
2000	91.2	83.5	7.7

NOTE: Dates refer to spring semester, e.g., 1890 is fall 1889.

NOTE: In Fall 2004 8.0% and 86.9% went to private and public schools respectively.

Source: Author's calculations from Table 52 in the 2006 Digest of Education Statistics.

Why, then, have private schools seen their market share decline in recent decades? And in particular, why do private school enrollments tend to shrink in the transition to high school (a time

when parents especially should be concerned about school quality, given the need for their children to prepare for college and work)?

The report offers two explanations: First, declining private school enrollments can be traced largely to specific difficulties facing the nation's Catholic schools, in particular, rising costs associated with teacher salaries. Second, the report points to broad changes in American culture, which have made Catholic parents more likely to embrace secular schools and have made parents in general more likely to give their children a say in choosing where to attend high school.

Elementary and secondary enrollment, 1890-2000
(Percentage of students by sector and decade)

Table 2-2

Year	Elementary		Secondary	
	Private	Public	Private	Public
1890	10.8	89.2	31.9	68.1
1900	7.6	92.4	17.6	82.4
1910	7.9	92.1	11.4	88.6
1920	7.1	92.9	8.9	91.1
1930	9.8	90.2	7.2	92.8
1940	10.3	89.7	6.5	93.5
1950	12.3	87.7	10.5	89.5
1960	14.7	85.3	11.1	88.9
1970	11.4	88.6	9.1	90.9
1980	11.7	88.3	8.7	91.3
1990	13.3	86.7	9.0	91.0
2000	12.5	87.5	8.4	91.6

NOTE: Dates refer to spring semester, e.g., 1890 is fall 1889.

NOTE: For elementary students in fall 2004 12.3% and 87.7% went to private and public schools respectively. For secondary students the corresponding percentages were 8.4% and 91.6%.

Source: Author's calculations from Table 3 in the 2006 Digest of Education Statistics.

Viewed as a percentage of the overall population of America's school-aged children, private school enrollments were miniscule as the twentieth century began, and they grew rapidly over subsequent decades. For example, private schools enrolled less than 2 percent of the nation's 14-17 year olds in 1890, and their enrollment peaked at more than 9 percent in 1960. As of 2000, private high school enrollment stood at 7.7 percent of the age cohort (and 8.0 percent in 2004, not shown in the table), while the public school share grew from 74 percent in 1960 to 83.5 percent in 2000.

Much of the decline in private school enrollments since 1960 can be attributed to a drop in Catholic school attendance, particularly in urban areas. In 1965, Catholic schools served 5.6 million students, but the number had dropped to 2.3 million by 2003, even though the nation's Catholic population roughly doubled in that period. According to the National Catholic Educational Association, nearly 600 Catholic schools closed from 2000 to 2006 alone. The increasing expense of operating schools is the typical reason given for the closures.

Tuition explains why high school is the point at which private schools lose students. In 2004, tuition at private secondary schools averaged $8,412, a significant leap from the $5,049 charged at the elementary level. Tuition at Catholic schools averaged $3,533 for elementary and $6,046 for secondary schools. As children transition from elementary to secondary schools, families that cannot afford such hefty increases in tuition are forced to reevaluate the relative advantages of private and public schooling.

At the same time, the report suggests, cultural factors also play a role in the decline of Catholic school enrollments and, thus, of private school enrollments overall. American Catholic schools were founded in the nineteenth century to provide schooling for families who felt that the larger society, and its public schools, was hostile to their interests and would not provide the kind of education they desired for their children. However, since the 1960s, anti-Catholic sentiment has significantly decreased across the U.S., and Catholic parents are now more likely to embrace secular schools.

To underscore the point, in the past few decades, and even as Catholic school enrollments have declined, attendance at evangelical Christian schools has surged. Today, it is evangelical Christians—far more than Catholics—who feel ostracized by mainstream institutions and perceive a need to create their own schools.

Finally, the report speculates that changes in American child-rearing practices may help to explain the fact that private school enrollment declines most sharply between the 8th and 9th grade. Parents are more likely than in previous generations to permit their children to weigh in on choices such as where to attend school, and many teenagers may prefer to go to their local high school rather than to commute to a private school across town.

Recent declines in private school enrollment are driven by a confluence of economic and social forces, Loveless concludes. “Despite the public’s belief that private high schools excel academically, overwhelmingly parents choose to send high-school-age children to public schools. It could be that American parents do not consider academic quality the prime criterion for selecting schools, especially if the academic advantage incurs significant costs in tuition. This suggests it will take more than higher test scores to stem the decline of private schooling in the United States. It also suggests that, in an era when school quality is the focus of much debate, we have much to learn about what that elusive term really means.”

Contrary to Recent Research, Students’ Performance on International Math Assessments Are Associated with the Amount of Time They Spend in Class

The report also investigates a conundrum raised by recent research into the use of time in education—on the one hand, researchers have confirmed the common-sense assumption that the more time kids spend on learning, the more they learn; on the other hand, when researchers compare students from various countries, they can’t find any correlation between achievement and the amount of time spent on school tasks.

This section of the Brown Report attempts to make sense of this contradiction by taking a fresh look at the existing data. Specifically, it examines data from the math portion of the Trends in Mathematics and Science Survey (TIMSS), an international assessment. Unlike previous analyses, which looked for relationships in TIMSS data collected at one point in time, this study looks at changes in instruction and homework over several years.

Eighth grade TIMSS scorecard

Table 3-3

	TIMSS score went up	TIMSS score went down
Increased instructional minutes	5 countries	2 countries
Decreased instructional minutes	3 countries	10 countries

Source: 1995 and 2003 TIMSS reports and userguides.
See endnotes for a complete list of sources.

The analysis shows no relationship between TIMSS math scores and the amount of time students spent on homework. However, it does find a positive relationship between test scores and the amount of time teachers spent on classroom instruction, contradicting the findings of previous research.

Increased time is associated with higher test scores whether extra minutes are added to the school day or an equivalent number of days are added to the school year. Adding time to the school day appears to have the greatest value, though.

The average amount of math instruction for U.S. eighth graders was 45 minutes per day in 2003 (down from 49 minutes in 1995) over a total of 180 days (unchanged from 1995). Adding 10 minutes per day to math instruction (a 22 percent gain in instructional time) is associated with a 19 point gain on TIMSS math assessment, and increasing the school year by 40 days (which would basically eliminate the summer break) is associated with a gain of 8.5 points.

The effect of adding 1800 minutes of math instruction to the school year

Table 3-4

Increase in Instruction	Gain in TIMSS Score
10 minutes per day	19.0 points
40 days per year	8.5 points

NOTE: results of regression of change in TIMSS score on change in time variables.

Source: 1995 and 2003 TIMSS reports and userguides.
See endnotes for a complete list of sources.

“We can’t say for sure that more minutes of instruction would translate directly into higher test scores,” notes Loveless. “But the data suggest that if America’s schools were to devote more time to math instruction, the nation’s students could gain a decent amount of ground on their counterparts from Singapore and other high-scoring countries.”

About the Brown Center on Education Policy & The Brookings Institution

Established in 1992, the Brown Center on Education Policy conducts research on topics in American education, with a special focus on efforts to improve academic achievement in elementary and secondary schools. The Brown Center is part of The Brookings Institution, a private nonprofit organization devoted to independent research and innovative policy solutions. For more than 90 years, Brookings has analyzed current and emerging issues and produced new ideas that matter — for the nation and the world. Interpretations or conclusions in Brookings publications should be understood to be solely those of the authors.

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