More Math, Please

The Surprising Consensus on Math Among Parents, the Public, and Business Leaders in Two "New Economy" States

April, 2004

Ready for Leadership: The first of two reports from public and business leader opinion polling on education reform in Massachusetts and Washington state

Washington Mutual

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Acknowledgements

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Our thanks also go to one of our leadership contributors, Washington Mutual, and to Massachusetts-based Alliance for Better Schools and the Noyce Foundation for the financial support they provided to underwrite this project.

None of this work would be possible without the contributions of Mass Insight Education's other corporate and philanthropic contributors as well, including FleetBoston, State Street Corporation, the Irene E. and George A. Davis Foundation, Verizon Corporation, IBM, EMC Corporation, and The Boston Foundation. The Nellie Mae Education Foundation is serving as lead funder of our three-year, three-city *Keep the Promise* research initiative, which helped to inform this report.

We have always believed that raising standards and improving student achievement must be a community-wide endeavor. To that end, we have conducted quarterly public opinion surveys of Massachusetts residents (in association with our sister organization, Mass Insight Corporation) that have included education-related questions since the beginning of Massachusetts' higher-standards effort in 1993. We are all better off when the public is well informed on the most critical issues of the day. It is in that spirit that we present the findings of this report.

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Project Partners

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Mass Insight Education is an independent nonprofit organization focused on improving student achievement in Massachusetts public schools. Through extensive school district networks and training and technical assistance based on converting research into effective organizational reform practices; leadership development programs; public service outreach initiatives; and public opinion policy and field research reports, Mass Insight Education supports the thoughtful implementation of the 1993 Massachusetts Education Reform Act, with a primary focus on its central initiative — the statewide standards and testing program.

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Partnership for Learning is an independent, statewide, nonprofit coalition of Washington business and community leaders. The organization works to educate, influence and mobilize educators, parents and the general public in order to improve our public schools and better prepare our high school graduates for the demands of today's global economy.

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Overview of Main Findings

Introduction and Context

MATH ANXIETY: FACT OR FICTION? PUBLIC ATTITUDES ON MATH IN TWO LEADING, HIGH-TECH STATES

"Math is a phobia right up there with snakes, public speaking, and heights."

— Amazon.com review of Marilyn Burns' best-selling *Math: Facing an American Phobia* (Math Solutions Publications)

"In the United States, most people would be ashamed to admit that they never could learn to read, yet it is perfectly respectable to confess that one can't do math."

—Claudia Zaslavsky, *Fear of Math: How to Get Over It and Get On With Your Life* (Rutgers University Press)

"The music of Fear of Math is like a soundtrack for the short attention span."

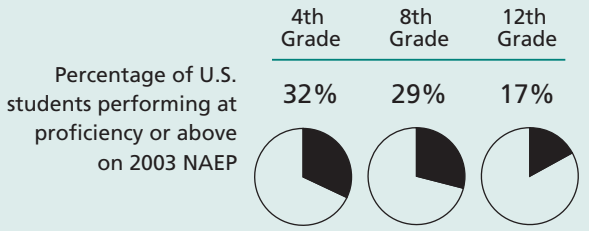
— from the website of the San Francisco-area rock band "Fear of Math"

Are we, really, so all-fired afraid of math? Are our kids destined for math phobia because their parents break out in sweat at the sight of $a + b$? Does this "American phobia" reflect —and fuel — common misperceptions on Main Street about math, its strategic importance to the economy, how much math the average high school graduate should know, and how well our kids are measuring up against those in other countries?

Conventional wisdom: "Well... yes." But the results of this survey of 1000 adults in two New Economy states make us not so sure. Perhaps the American public deserves more credit for valuing math and feeling at least somewhat math-capable than conventional wisdom would have it.

Math (or, more accurately, concern about math) has certainly been center-stage news, at least in school, business, and national policymaking circles. Along with standards, accountability, teaching quality, and evidence-based research, improving the quality of math and science education was a central theme of the No Child Left Behind Act. Test results at the state, national, and international level have mostly fueled this concern (see box). Educators at all levels — including those who are members of the 30-district, Massachusetts-based Coalition for Higher Standards managed by Mass Insight Education, publisher of this report — say that they generally know what needs to be done to improve student literacy, but that improving math achievement presents a set of more complex, more deeply embedded challenges.

Math Achievement: Still A Long Way To Go



Those challenges are set out in Mass Insight Education's 2003 policy report, *Raising Math Achievement in Massachusetts* (available at www.massinsight.com), based on interviews with two dozen prominent math and education reform experts nationally. Among the challenges:

- Low math content knowledge among elementary and many middle school teachers;
- The utter inadequacy of the pipeline producing new math-knowledgeable teachers;
- The distraction of math curriculum wars over how best to teach math; and
- Parents' and the public's math anxiety, which becomes a self-fulfilling prophecy (we wrote) for students — and undercuts public will to do something serious about improving math achievement.

Imagine our surprise. While the survey reported here did not (and could not) probe the public's real capacity to *do* math, we found that adult residents of Massachusetts and Washington states have strong, well-formed opinions on math's strategic importance to the health of their state economies, the rigor of the expectations we should set for high school graduates' math skills, and the gap currently separating American high school graduates' math capacities from those of their counterparts in other countries.

In short: they get it. They are very nearly as strong on these issues as the 32 top business leaders we polled in both states with the same questions.

Why Washington and Massachusetts?

When we set out to probe public attitudes on math, we wanted to focus on New Economy states that had made a substantial commitment to standards-based reform. Massachusetts and Washington state share similar demographics and economies (see box); they also both embarked on major education reform efforts in the same year (1993) and placed a challenging high school exit exam at the core of that effort. The critical difference between the two:

- Massachusetts targeted 2003 to be the first year it would require high school students to earn a diploma through its Massachusetts Comprehensive Assessment System (MCAS).
- Washington policymakers set 2008, five years later, as the date for that state's Washington Assessment of Student Learning (WASL) to be required for graduation.

With ten years of public opinion research behind us, Mass Insight Education and our survey research partner, Opinion Dynamics of Cambridge, MA, were well-positioned to carry out the survey. The nonprofit, Seattle-based Partnership for Learning, which has carried out extensive public opinion polling in Washington state, proved an able collaborator. We benefited as well from the contributions of the two Business Roundtables in those states in surveying the attitudes of top-level business leaders, by way of comparison with parents and the public.

Washington and Massachusetts: So Far, and Yet So Close

	Wash.	Mass.
Population	6 million	6.3 million
Minority	18%	16%
Percent under 18	26%	24%
K-12 Enrollment	1,010,000	980,000
K-12 Minority Percent	27%	24%
HS Graduates	87%	85%
Bachelor's plus	28%	33%
Bilingual Households	14%	18%
Household income	$46,000	$50,000
Per Capita Income	$23,000	$26,000
Persons below poverty	9.3%	10.6%

Sources: U.S. Census Bureau, education state agencies; most figures 2001-2

Ready for Leadership: What Policymakers Should Take Away From This Research

The signals from this survey are very clear to us. At least in high-tech states with firm, longstanding commitments to higher academic expectations for kids, parents and the public are equally firm in their understanding of math's importance and the need to improve math skill-building in our public schools. Contrary to popular conception, they do not fear math; they say they use it in the course of everyday life; and they remember learning it without appreciable grimacing, compared to other academic disciplines.

They would hold students to high expectations in math — for many, to a standard that includes trigonometry and calculus. Other strategies they would propose (for improving achievement across all curriculum areas) will be detailed in a second, companion report to be released later in 2004 as part of this public opinion research project. That report, to be entitled *Ready for Leadership*, will examine the challenges of standards-based reform in these two states in greater detail, drawing lessons from Massachusetts' 10-year timeframe (from the 1993 legislative act to the 2003 higher-standards graduation requirement) for the benefit of policymakers in Washington and other states.

A preview: with respect to standards, high school exit tests, dealing with common barriers to reform, and the adequacy of funding for school improvement, the public gets it there, too.

— Mass Insight Education
Spring, 2004

How Important Is Math to Economic Competitiveness?

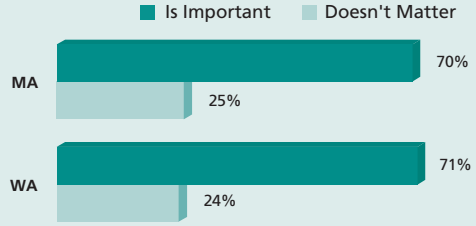
RESIDENTS IN BOTH STATES SAY BETTER MATH SKILLS ARE CRITICAL TO THEIR STATE'S ECONOMIC FUTURE

As the chart at right indicates, residents of Massachusetts and Washington state are persuaded (by nearly two-to-one margins) that highly developed math skills are important to the future of their state's economy. As perhaps could be expected, the 32 high-level business leaders we surveyed agreed nearly unanimously on this point.

What's more: by nearly eight-to-one margins, residents in the states perceive that having math skills is important, given the nature of today's economy. (See second box at right.) By similar margins, those surveyed would dispute making literacy a graduation requirement but not insisting on math.

Most think teaching math is important to the economy

Do you think it is important to the future of the state economy that our schools teach math better than those in other states?

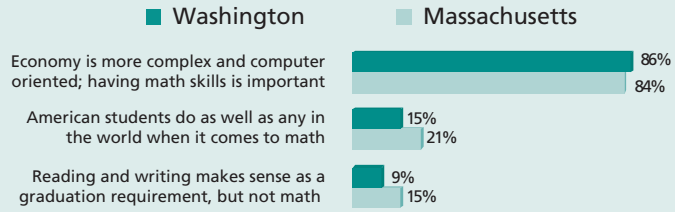


How Are America's High School Graduates Measuring Up?

Surveys from Public Agenda, among others, have noted that business leaders and employers take a dimmer view — and that's putting it mildly — than high school students, their teachers, and their parents take of skill levels in English and math among high school graduates. We would not have been surprised, therefore, to find a fairly significant gap between the executives' and the public's assessment of the typical American high school grad's math skills.

Perceptions of math and math education

Do you agree with the following statements about math education? *(Percentages indicate agreement)*



But in fact:

- **All but two of the business executives polled believe that our students' math skills do not compare well with those of students around the world; and**
- **76% of Washington residents and 66% of Massachusetts residents agree with that dim assessment. Just 15% and 21%, respectively, say our kids are doing just as well.**

Overall, the public and business leaders understand that math abilities play a key role in fueling our economy — and they are in full agreement that much more progress in math will be needed to maintain a competitive advantage against other countries.

Are Higher Standards Making a Difference?

STANDARDS AND TESTS ARE IMPROVING SKILL LEVELS, SAYS THE PUBLIC, AND STIFF MATH REQUIREMENTS ARE KEY

Math achievement may not be improving at the rate that most business leaders and most of the public would like to see. Nevertheless, pluralities of the Massachusetts and Washington residents we surveyed believe that the state standards and tests are leaving students better prepared overall.

In Massachusetts: A majority (56%) of Massachusetts residents feel that as a result of requiring high school students to pass English and math tests, graduates *are* more likely to have those skills today than was the case ten years ago.

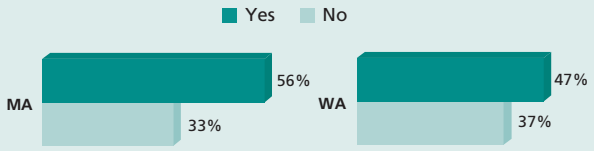
In Washington, where WASL is not yet required as a graduation requirement, just less than half (47%) of residents believe high school graduates are better prepared as a result of the education reform laws passed ten years ago. However, nearly two-thirds (64%) of residents expect that high school graduates will be better prepared in 2008 once the graduation requirement is instituted.

More Math, Please

Residents in both states, meanwhile, show themselves to be pretty tough when it comes to math requirements for high school graduation. More than three-quarters (78%) would require at least geometry and algebra, and a third of that group would also require trigonometry and calculus as well — a signal of the public's awareness that today's economy requires advanced skill sets.

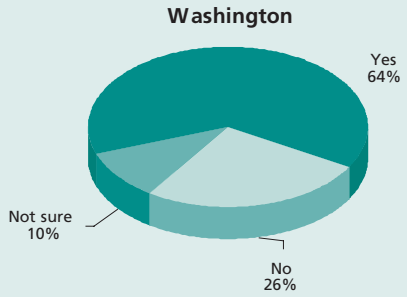
Residents think graduates are better prepared than 10 years ago

With ed. reform laws do you think there is a better chance now vs. ten years ago that a HS graduate has the math and English skills to do college level work or get a job?



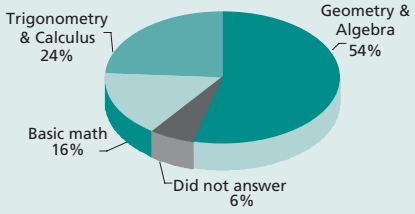
Nearly two-thirds of WA residents think grads will be better prepared in 2008

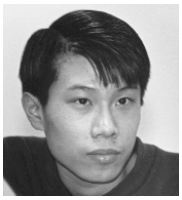
Do you think there will be a better chance in 2008, when students will be required to pass the WASL tests, that a graduate will have the math and English skills to do college level work or get a job?



Most think high school graduates need at least geometry and algebra to succeed

Which level of math education do you think high school graduates should have in order to succeed?





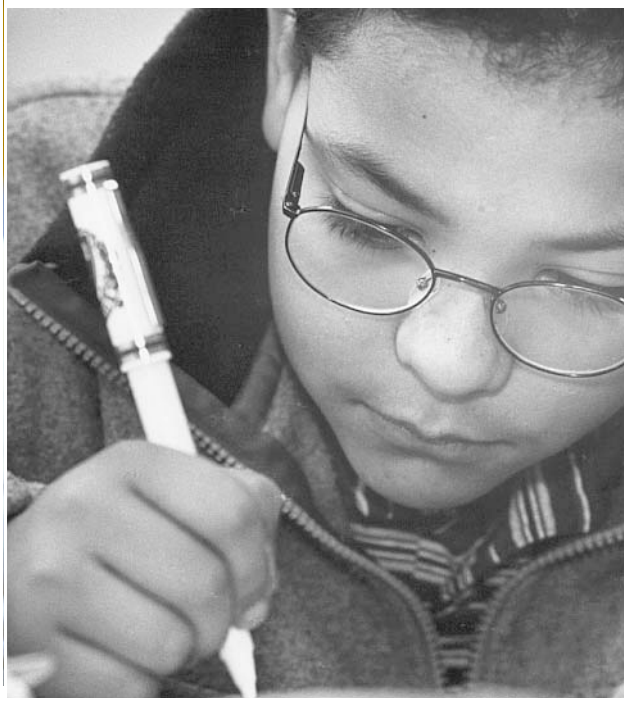
Are We Math Phobic?

IN BOTH STATES, THE PUBLIC SHOWS LITTLE "MATH PHOBIA" AND MUCH UNDERSTANDING OF MATH'S IMPORTANCE

*A*re we math phobic? We probed this general question in several different ways, asking about Massachusetts and Washington residents' views of math's relevance and importance (reported earlier), the ways they view their own math education and skills, and (among parents) the degree to which they believe they can help their own children with math homework.

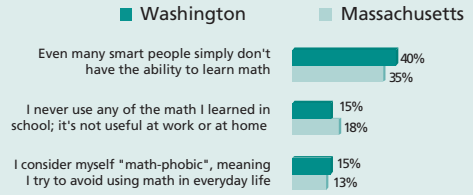
Both states: The answer — in Massachusetts and Washington anyway — appears to be "no," with some caveats. These two states are not math phobic, certainly not to the degree that conventional wisdom would have it. As a whole, residents tend to agree that math is a vital skill to learn; that the math education we received was on a par with other subjects; that we use it in our everyday lives; that we disavow any feeling of "math phobia"; and that math skills are important to the health of the economy.

Persistent gender gap: That said, some demographic subgroups — women, residents with no college education, and those earning less than $50,000 — are somewhat less likely to express those positive sentiments than the general public, as is shown in the charts on this and the following pages.



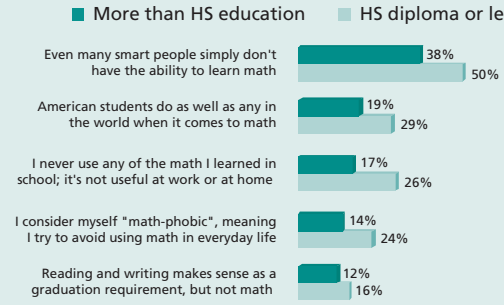
Perceptions of personal math ability

Do you agree with the following statements about math education? *(Percentages indicate agreement)*



Perceptions of math differ among residents with a high school education or less

Do you agree with the following statements about math education? *(Percentages indicate agreement)*



MA residents earning less than $50,000 annually are less likely to use the math they learned in school.

Do you agree with the following statements about math education? *(Percentage indicates agreement with the statement below)*

Is Math Harder to Learn?

MATH IS NOT GENERALLY PERCEIVED TO BE HARDER TO LEARN THAN OTHER ACADEMIC SUBJECTS — THOUGH MORE WOMEN THINK SO

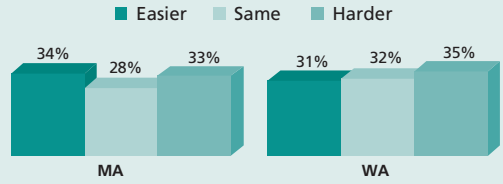
This one surprised us. Do people think math is harder to learn than other subjects? Most of the Washington and Massachusetts residents we polled simply don't see it that way. Residents in both states appear evenly split about whether math was harder for them to learn, easier, or about the same.

There is a definite gender split here: Women are more likely than men to remember math being more difficult to learn.

But across gender lines, adults in both states believe that the quality of math teaching they received was equivalent to other subjects. Whatever the skill outcomes in each of the major academic areas, today's adults generally rate the quality of the teaching they received as excellent or good.

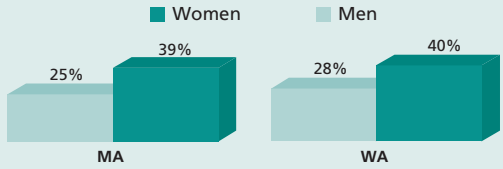
Residents remember math as presenting similar difficulty as other subjects

Thinking back to your own elementary and high school days, did you find math easier, harder, or about the same as other subjects?



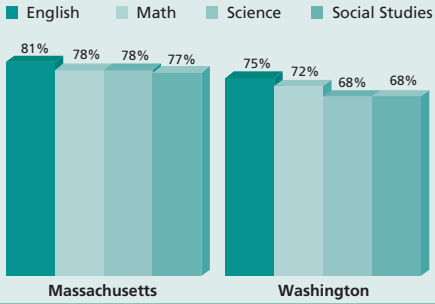
Women remember having greater difficulty in math than men did

Thinking back to your own elementary and high school days, did you find math easier, harder or about the same as other subjects? *(Percent who found it harder)*



Adults remember little variation in the quality of teaching they received

How would you rate the quality of the teaching you had in school in the following subjects on a scale of excellent, good, fair or poor? *(Percent saying excellent or good)*



Are Parents Keeping Up?

PARENTS SAY THEY'RE GAME TO HELP WITH HOMEWORK— BUT FIND IT MORE DIFFICULT IN MATH THAN WITH OTHER SUBJECTS

Survey respondents who are parents (of school-age or older offspring) were asked if they helped their children with homework. The good news is that just about nine out of every ten parents responded that they did.

Parents who indicated they helped their children with homework were asked how often they helped with math and English. As the charts to the right indicate, there is very little difference between the two.

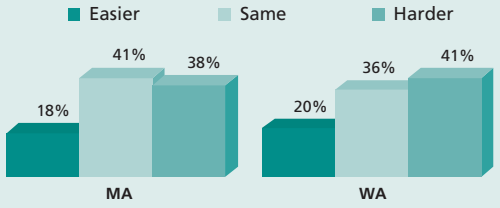
However: about two of every five parents in both states also told us they find it harder to help with math than with other subjects. Parents who said they did not help at all on math were most likely (especially in Massachusetts) to say the reason is that the math curriculum is too complicated these days.

Happy to Help, *But....*

Parents are helping their children with math homework, but find it harder than helping with other subjects. Most think the math curriculum is more complex today.

Math help related to other subjects

Do you personally find it easier, harder or about the same to help your children with math homework as with other subjects?

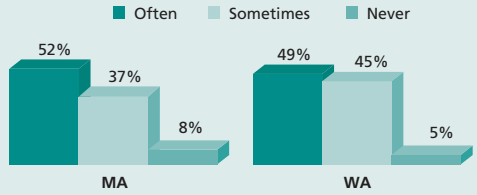


Nearly 9 in10 parents help with homework

As your kids have gone through school, even if they're older now, have you helped them with their homework?

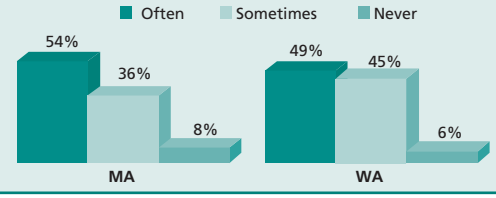
Frequency of helping with English

Were/are you helping them often, sometimes, or never in English?



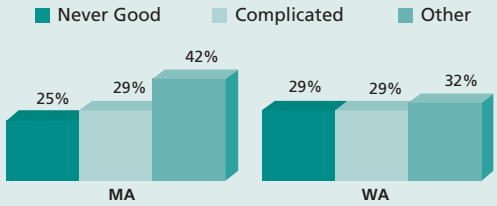
Frequency of helping with math

Were/are you helping them often, sometimes, or never in math?



Reasons for not helping with math

Which of the following reasons are closest to describing what kept you from helping in math: I was never very good with math, so I couldn't be of much help, or math these days is too complicated for me to help?



Survey Methodology

This Mass Insight Education survey was conducted by Opinion Dynamics Corporation of Cambridge, Massachusetts. The survey was conducted using standard market research and statistical methods. Interviews were conducted with 1000 adults in all: 500 randomly selected adult residents of the state of Massachusetts between October 17 and October 21, 2003, and 500 adult residents of the state of Washington between October 20 and October 23, 2003.

Sampling

The sample for the survey was drawn in several stages. First, interviews were allocated to Massachusetts and Washington cities and towns based on the proportion of the total population living within those jurisdictions. A sampling of telephone prefixes within each community was then taken, and the last four digits of all numbers were randomly generated. This random digit dialing method ensures that all households — even people with new or unlisted phone numbers — are equally likely to be selected to participate in the survey.

Interviewing

All interviews were conducted from Opinion Dynamics' calling center. Trained, professional interviewers conducted each interview using Computer-Assisted Telephone Interviewing (CATI). To prevent bias, interviewers are deliberately made unaware of the purpose of the study and highly trained not to lead respondents.

Margin of Error

A sample size of 500 results in a margin of error of +/- 4.4% given a 50/50 distribution of the data at a 95% confidence level. This means that if 50% of the sample is in favor of something, we can be 95% confident that in the actual population, the actual percentage of residents who are in favor of something is between 45.6% and 54.4%. As the distribution moves from 50% to 0% or 100%, margin of error decreases.

When looking at smaller groups in the survey, the margin of error is larger. For groups where the sample size is about 200, margin of error is +/- 7%. For samples of 100, margin of error is +/- 9%.

The surveys of business leaders were distributed separately by Mass Insight Education in conjunction with the Massachusetts Business Roundtable, the Washington Roundtable, and the Partnership for Learning. Thirty-two executives completed and returned the surveys.