

Standards-Based Education Reform in the Computer Age: Lessons from Boston's Murphy School

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Standards-based education reform is the strategy Massachusetts and almost all other states have adopted to increase the number of the nation's students who master the problem-solving and communications skills they will need to thrive in our increasingly computerized economy.

This approach, which ties increased funding for schools to accountability for performance as measured by standardized tests, has produced dramatic results in many urban schools that serve low-income communities. Boston's Richard J. Murphy Elementary School, for example, has dramatically improved student performance on standardized tests among its largely low-income student body. Achieving these gains was not easy. Rather, it requires seven essential components:

- State tests that are well aligned with high-quality learning standards.
- Good curriculum that translates the state's goals into classroom lessons.
- Good teachers and extensive professional development that focuses on helping the teachers learn how to effectively teach the new curriculum.
- Creative use of student assessment results to identify students who

need extra help and topics that need improved instruction.

- A daily schedule that permits teachers to meet frequently to coordinate and refine what they were doing.
- The money necessary to implement these plans.
- A principal who provides the leadership necessary to keep the effort on track.

Schools like the Murphy that have successfully put all of these components in place make it easy to understand why standards-based education reforms have so many advocates. However, as we show below, this is not easy to do.

The Changing Nature of Work

As the current recession ends, many workers will not be returning to jobs like the ones they previously held because those jobs are gone. At greatest risk are occupations where tasks can be expressed in programmable rules—blue-collar, clerical, and similar work that requires moderate skills and used to pay middle-class wages. In contrast, there is a growing demand for workers who have two kinds of general skills that computers cannot replicate. One is “expert thinking” the ability to solve new problems that cannot be solved by a prior set of rules. (If the problem

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could be solved by rules, a computer could do it.) New problems run the gamut from doing research to fixing a new problem in a car (not covered in the manual) to creating a new dish in a restaurant.

The other is “complex communication”—the ability not only to transmit information, but also to convey a particular interpretation of information to others in jobs like teaching, selling, and negotiation.

Historically, most American schools only taught the skills needed to excel at problem-solving and complex communication tasks to the minority of students aiming for competitive colleges. By the 1980s, however, the students who lacked

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these general skills began to suffer real losses in the marketplace. As opportunities for women expanded, for example, college-educated women saw sharp earnings gains while the earnings of high school educated women remained stagnant. Similarly, between 1979 and 1985, the average real hourly wage of high school educated men had fallen by nine percent.¹ Both trends reflected the loss of rules-based jobs – blue collar and clerical jobs – to computer substitution and outsourcing.

Standards-Based Education Reform

Initially, many reformers thought that spending more money on schools would, by itself, reverse these trends. Between 1970 and 1990, average real-per-student expenditures in American public schools rose by 73 percent.² Student-teacher ratios fell, and new instructional programs proliferated. Yet test scores rose only modestly, and state legislators were losing patience with spending more money and hoping for the best.

By the late 1980s, Republican and Democratic governors and a coalition of the nation’s largest businesses came to embrace standards-based education as the most promising way to improve American education. While each state has pursued these policies in different ways, all standards-based educational reforms include four components:

- Content standards that specify what students should know and be able to do, and performance standards that describe how students should demonstrate their knowledge and skills as well as what levels of performance constitute meeting the standard.
- Assessments that measure the extent to which students meet performance standards.
- Instructional materials and professional development that provide teachers with the knowledge, skills, and materials needed to prepare all students to meet the performance standards.
- Incentives for educators to do the hard work required to prepare all students to meet the performance standards and incentives for students to devote the time and energy needed to meet the performance standards.

Standards-Based Reforms in Massachusetts

The road from these national debates to the Murphy School ran through the Massachusetts State Legislature. Under pressure from the state’s Supreme Judicial Court to equalize educational funding, the state legislature passed the Massachusetts Education Reform Act of 1993. The legislation promised increased financial support for public education and the state backed up this promise over the next decade with more than \$12 billion in new education aid to the state’s public schools. In exchange, the legislation mandated substantially greater accountability for student performance.³

Over the next year a 40-member commission with wide-ranging representation created the “Common Core of Learning,” a statement of goals that declared that all Massachusetts students should be able to “read, write, and communicate effectively,” and “define, analyze, and solve complex problems.”⁴ In the following years, committees developed curricular frameworks that put flesh on the skeleton of learning standards – a contentious process with many fights over priorities and details. By the late 1990s, the basic elements of the curricular frameworks were in place.

Beyond the curriculum frameworks, the state faced the problem of assessments: how would the state measure students’ mastery of the new standards? Spurning the low-cost approach of adopting existing standardized tests offered by commercial publishers, the state paid a contractor to develop exams that would be aligned with the new standards in a Massachusetts Comprehensive Assessment System (MCAS). To encourage the development of communication skills, students would be asked to provide open-ended responses to some questions on both the math and English Language Arts (ELA) exams. For the same reason, the ELA exams would require students to write an essay on a specified topic.

Once the students took the tests, how would the scores be used? As a first step toward accountability the state decided to make the test questions publicly available shortly after students completed them each May. This would allow parents and taxpayers to see what the Commonwealth’s students were being tested on. The state would also provide school districts with reports specifying every student’s response to every question that affected a student’s score on each part of the MCAS.⁵ In theory, schools could use the information to identify the skill deficiencies of individual children and weaknesses in instruction. In another step to promote accountability, the distribution of student scores

in each school would be made available to the media and posted on the Department of Education website, giving each school’s performance substantial public visibility.

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In a final, controversial decision, the state announced that beginning with the high school class of 2003, students had to achieve passing scores on the tenth-grade MCAS English language arts and mathematics exams in order to receive high school diplomas. The decision reflected the belief that accountability for schools had to be reinforced by incentives for students. It was also an attempt to restore some value to a high school diploma.

Standards-Based Reforms Come to Boston

The new state accountability system posed enormous challenges for the Boston Public Schools. Most of the 63,000 students attending the city’s public schools were students of color from low-income families who, historically, had scored very poorly on achievement tests. Nor did Boston start off well. Between 1990 and 1995, Boston worked its way through four school superintendents, including two interim heads. The lack of leadership was evident both in low test scores and in the lack of a coherent system-wide plan to improve them.

In 1995 Thomas Payzant became Boston’s superintendent of schools. From his decade-long experience as school superintendent in San Diego and as U.S. Assistant Secretary of Education in the Clinton administration, Payzant understood the logic of standards-based reforms. He believed that the only way to prepare Boston’s students to master the state’s learning standards was to maintain a focus on teaching and learning.

His plan, “Focus on Children,” emphasized literacy and math instruction, and included choosing curricula aligned with the state’s learning standards, sustained professional development to improve the teaching of math and English language arts, and district-wide student assessments to provide more frequent measures of progress than the once-a-year MCAS.

Payzant understood that teaching the new curricula well would require a great many teachers to change how they taught. He placed greater emphasis on asking probing questions, on developing understanding of students’ misconceptions, and on teaching students to explain their ideas and to constructively criticize the oral and written explanations of their classmates.

To help in this transition, Payzant invested heavily in professional development aimed at improving literacy and math instruction. The district’s English and math departments developed workshops that provided opportunities for teachers to see the new curriculum through students’ eyes, and to observe exemplary teaching of Writers’ Workshop and the new math curricula. The district’s central office and its external partner, the Boston Plan for Excellence, provided schools with literacy and math coaches for the teachers, and with money to hire substitutes so that teachers could meet during the school day to learn together how to improve their skills. They piloted a new approach to professional development, called Collaborative Coaching and Learning (CCL), under which groups of teachers worked together with the help of a coach to improve literacy and math instruction. The initial evidence on CCL as a vehicle for improving instruction was sufficiently powerful that in 2002 Payzant mandated that all schools adopt it.

Funding this program required significant new resources. Some came from the new state money. Other funds came from foundations and the business community. In effect, the message the superintendent conveyed to schools was that they would have more resources and that they

would be held accountable for using them to increase students’ mastery of the skills laid out in the state’s learning standards.

Standards-Based Reforms Reach the Murphy School

In some respects, the Murphy School, which is located in Dorchester, is a typical urban school. In the late 1990s, when the MCAS requirements were put in place, four out of five of its students came from low-income families. One in five had a significant disability, and one in seven spoke a language other than English at home.

In other respects the Murphy defied the stereotype of a low-income school. Its physical plant was fairly new – built in 1970 – and includes a large cafeteria and swimming pool. Within the community, moreover, the school had a good reputation. The diverse student population got along well with each other, as did the school’s teachers, some of whom had taught at the school since it opened.

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But the Murphy’s test scores were low. In 1998, the first year the MCAS was administered, 54 percent of Murphy’s fourth graders scored at level 1 on a scale of 1 (warning) to 4 (advanced) on the MCAS math exam and 37 percent did so on the English language arts exam. Projecting ahead, these students would be unlikely to score well enough on the MCAS tenth grade exams to be eligible for high school diplomas. The scores, of course, could be rationalized. Eighty-three percent of the Murphy’s students were eligible for a free or reduced price lunch, and the scores of other Boston public schools serving similar students were no better. But in today’s economy, the Murphy’s students were headed for economic disaster.

Mary Russo became principal of the Murphy School on July 1, 1999. Her career included a successful tenure as principal at Boston's Samuel Mason School, and two years with the Boston Annenberg Challenge, helping Boston Public Schools to implement the system's new curricula. During the summer of 1999, many Murphy parents and teachers dropped by to welcome her to the school. They brought a common message: if Mary wanted to succeed at the Murphy, she should not change anything. Russo did not agree with this view. Her work at the Mason School convinced her that the Murphy's students could learn the skills to do well on the MCAS. The issue was how to engage the Murphy School faculty in this endeavor.

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The state had assumed that detailed MCAS scores would help schools to improve teaching. But few schools had ideas about how to take advantage of the new information. The delivery in late fall of boxes and boxes of paper providing item-level scores on tests students had taken the previous May provided few schools with a stimulus for change. However, the Murphy was one of those few schools.

Change began at the first faculty meeting of the 1999-2000 school year, when Russo showed the school's teachers a set of May 1998 MCAS questions that a majority of the school's fourth graders had answered incorrectly. For many of the school's teachers this was a new experience. Even though the school's fourth grade students had taken the MCAS for two years, many of the teachers had never looked at the exam. Russo asked the teachers to discuss three questions:

- What do the results tell us about our instructional program?
- How should we respond as a school faculty?
- What are the implications for my grade level?

Some teachers reacted defensively to the new principal's questions, arguing that they had worked hard and that the patterns were what you would expect given the school's students. Others were puzzled, pointing out that they had taught the skills needed to answer the MCAS questions. This faculty meeting marked the start of a process to focus the school on improving math and literacy instruction.

By the end of the school year the school's Instructional Leadership Team had devised a school-wide improvement plan that, following Payzant's lead, focused on improving literacy and math instruction. One element was a change in the school's schedule so that the first two hours of every school day were focused on literacy, with the next seventy minutes focused on math. A second element was the creation of time slots during the school day in which the teachers at each grade level would meet every week to work together on improving instruction. The schedule changes were important substantively and because they signaled to teachers, students, and parents a new focus for the school.

The Murphy School's math specialist, Jack Flynn, took on the job of exploiting the information in the MCAS scores. Learning to use Excel from one of his grown children, he spent dozens of hours entering detailed student-specific MCAS results into a spreadsheet. With the scores in this format, he could highlight the columns pertaining to questions that more than half of the Murphy fourth graders answered incorrectly and the rows pertaining to students who scored at level 1. The result were charts that provided the impetus for conversations among teachers about just what needed to be done to improve students' performance on the test.

While Russo and the Murphy teachers found that much could be learned from the MCAS results, the time lag between giving the test in May and receiving the results in late fall created a problem. The school needed more timely information on students' skills and on the effectiveness of instruction. Implementing the more regular assessments mandated by the central office provided this information. At the Murphy each grade-level team chose a question that students would write about in their fall, winter, and spring writing assessments. The faculty chose a scoring metric that rated each essay in two dimensions: topic development and use of writing conventions – the same dimensions used in scoring the essays students wrote for the MCAS. The teachers graded the students' essays in their grade level team meetings and Jack Flynn recorded the grades on a spreadsheet. The chang-

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es in scores between the fall and winter essays enabled teachers to assess how well their teaching had taken root and which students needed special help. The teachers used student scores on the mid-year district-wide math exams in a similar way.

To be sure that students did not slip through the cracks, Murphy teachers developed an Individual Success Plan (ISP) for every child who received a “1” on either the MCAS math or ELA exam. Using information from students' perfor-

mances on the formative assessments as well as on the MCAS, the plan listed the particular skills these students needed to develop.

The school took several steps to assure that students with ISPs received the help they needed to improve their performance. One was the development of an after-school program in which the first 75 minutes were devoted to homework and extra help. Jonna Casey, a teacher with a background in business who had moved to the Murphy with Russo, played a key role. She wrote grant proposals that raised money to supplement the modest fees Murphy School parents could pay for after-school. She recruited Murphy School teachers to teach in the program. She and Russo worked with the after-school teachers to be sure that every activity, from puppetry to music to chess, had a lesson plan that tied each element of the curriculum to one or more of the state learning standards. The school also developed a summer school program to keep children learning and a voluntary Saturday program that focused on MCAS preparation.

None of the activities at the Murphy School is unique. However, relatively rare are the coordination of all of the school's activities around learning standards, the focus on continual improvement, and the consistent measurement of students' progress toward meeting learning standards. Also relatively uncommon is the creation of a culture in which all adults are expected to contribute to the development of children's literacy and math skills. At the Murphy all administrators participated in learning to teach the new math and English language arts curriculum, as did all teachers, including bilingual education, special education, music, art, and physical education teachers.

Because it took time for teachers to learn to teach the new curriculum and for students to learn what was expected of them, students' skill in mastering the new standards-based curriculum did not come quickly. But the students' MCAS scores suggest the consistent focus on standards-

based skills is taking root. Where 54 percent of Murphy fourth graders scored on level 1 (warning) on the math exam in 1998, only 5 percent did so in 2004. And while 37 percent received a Level 1 ranking on the ELA exam in 1998, only 6 percent did in 2004.

Looking Beyond the Murphy School

While progress at the Murphy was exceptional, schools across Massachusetts have been making progress, according to the National Assessment of Educational Progress (NAEP), a set of skill assessments administered to a national sample of students by the U.S. Department of Education. On the 2002 NAEP writing assessment, 42 percent of Massachusetts eighth graders scored at or above “proficient” in writing, a figure second only to Connecticut, and an increase of 11 percentage points over the 1998 figure. Other states that have been working at standards-based reform for more than a decade—such as Connecticut, Kentucky, Maryland, North Carolina and Texas—have seen the achievement of low-income students and students of color rise on both the NAEP and state-mandated assessments.⁶

Given this evidence it is not surprising that people from many perspectives support standards-based educational reforms. For example, the civil rights lawyer, William Taylor, writes,

Today, new forms of accountability and assessment are the best tools we have to ensure quality education for all children. When schools and districts are held accountable for the achievement of all students, the means are at hand to force them to improve the quality of schooling provided for previously neglected students. Standards and accountability expose the sham that passes for education in many heavily minority schools and provide measurements and pressure to prod schools to target resources where they are needed most.⁷

Taylor is describing standard-based reforms when they go well. But as the Murphy School’s list shows, there are many opportunities for things to go wrong, and this is why standards-based reforms are controversial.

Sources of Controversy

Starting from the top, a state can develop vague academic standards that do not provide educators with clear guidance on the knowledge and skills students should master. Alternatively, a state can write good standards but then undercut them by adopting tests that do not measure well students’ mastery of the standards. For example, standardized multiple-choice tests may measure students’ mastery of grammar, but they do not assess whether students can write a coherent essay. Reliance on such tests creates incentives for teachers to spend time drilling students on grammar and little time helping students to learn to write well.

Financial incentives can also backfire in accountability systems. A study of North Carolina’s reward system shows that the criteria for a financial reward are much harder to meet for schools

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serving large percentages of disadvantaged children than for schools serving more affluent children. The unintended result is that teachers and administrators are discouraged from working in these schools.⁸

Education Week, a widely respected weekly newspaper that rates state standards and accountability systems gives the Massachusetts’ system a grade of A-. However, it rates those in four other states as F and those in another seven

states as D.⁹ The many low grades helps to explain why standards-based educational reforms have many critics.

The problems can continue at the school district where resources are not focused on improving instruction either because money is misallocated or money isn't there in the first place. The needed leadership can be equally scarce. More than half of urban school district superintendents stay in their jobs fewer than three years – far too short a time to organize and implement a coherent strategy for improving the performance of all schools.

Critics cite all of these problems in arguing that standards-based reforms are a step backwards – a series of exercises that actually divert schools from improving education. The critics' most damaging piece of evidence is one even proponents concede: the evidence of standards-based progress is confined almost entirely to elementary schools. High schools, particularly in urban school districts, have not shown much progress and making high schools work for most students—not just those preparing for competitive colleges—remains the most pressing problem facing American K-12 education.

Despite progress in elementary schools, Massachusetts is not immune to this criticism. More than 4,000 Massachusetts high school students in the class of 2003 did not obtain diplomas because they did not pass the MCAS exams, even after five tries spread across two years. In Boston the percentage of the Class of 2003 passing the MCAS increased from 40 percent on the first test administration (when the students were in the tenth grade) to 78 percent on the fifth try. While this is clearly progress, critics point to the 22 percent of Boston high school students who were denied diplomas. They argue that standards-based reforms unfairly penalize these students, who are disproportionately students of color attending urban schools, because the students did not receive the consistently high quality instruction.

The Future of Standards-Based Educational Reforms

The problems cited by the critics are real but there is reasonable hope for improvement, particularly in light of the fact that no state has much more than a decade's experience with educational standards. As evidence comes in and problems surface, many states are responding. Some have increased the clarity of their standards. Some have improved their assessments. Some are investing more heavily in improving teachers' skills. Some are revising incentives for students and educators.

Districts are also responding. In Boston, Payzant has designated improving schools like the Murphy as Effective Practice Schools. The Boston Plan for Excellence is working with these schools to clarify the conditions necessary for success and to help other Boston schools achieve these conditions. Payzant has replaced many principals who have not been successful

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in implementing standards-based reforms and has developed a Leadership Academy to develop the skills of aspiring principals, all of whom serve internships in Effective Practice Schools. To facilitate the efforts of schools to learn from student assessment results, the central office has partnered with the Boston Plan for Excellence to create user-friendly software that enables teachers and administrators in every school to do the types of analyses of MCAS scores and scores on the district-wide math exams that proved impor-

tant in guiding instructional improvement at the Murphy.

As they hone their efforts, however, states and school districts should exercise caution in extending accountability systems beyond the enabling skills of reading, writing, and mathematics. Fields such as social studies are so vast, state-mandated tests of students' knowledge of these fields are likely to emphasize recall of facts – such as the date of Drake's battle with the Spanish Armada – rather than students' understanding of complex relationships – such as why the battle marked an important turning point in European history. Tests that push instruction toward broad coverage rather than helping students to develop in-depth understanding of interrelationships will not help students to acquire the mindset and habits that characterize expert thinking. In addition, requirements that high school students pass standardized examinations in fields such as social studies and science in order to acquire a high school diploma are likely to push instruction in high schools toward preparation for these tests. Given the failure of American high schools to develop the skills of a great many students, it is important to encourage innovation rather than to create incentives to focus instruction on test preparation.

Endnotes

1. The wage data come from the following Economic Policy Institute website: http://www.epinet.org/content.cfm/datazone_dznational.
2. Expressed in constant 2000-2001 dollars, the relevant numbers are # \$4,427 for the 1969-1970 school year and \$7,653 for the 1989-1990 school year. These figures are taken from the Digest of Education Statistics 2001, Table 167, page 191.
3. The \$12 billion figure represents the cumulative increase in state aid over the period 1994-2003 over the 1993 level. The figure is not inflation-adjusted. We are indebted to Robert Costrell for providing this information.
4. The Massachusetts Common Core of Learning, available at: <http://www.doe.mass.edu/edreform/commoncore/thinking.html>.

5. The only questions not made public were those being tried out for possible inclusion on next year's exams. Students' scores on these questions did not count toward their grade on the exams.

6. This information is taken from the following U.S. Department of Education website: <http://nces.ed.gov/nationalsreportcard/writing/results2002/statearchive-g8-compare.asp>.

7. Taylor, William L., "Standards, Tests and Civil Rights." *Education Week*. Washington D.C. 20, (2000); 56, 40-41.

8. Ladd, H.F. and R. P. Walch, "Implementing Value-Added Measures of School Effectiveness: Getting the Incentives Right," *Economics of Education Review* 21 (2001).

9. Week, E. "State of the States," *Education Week*. Washington D.C. 75-15, p. 84.

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Wednesday, March 2, Taubman AB, 5th floor Taubman Building 12:00 - 2:00 p.m.

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Commentary by State Senator **Jarrett Barrios**, State Senator and Co-Chair of the Massachusetts Joint Committee on Public Safety, commentator.

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Commentary by **Daniel P. Schrag**, Faculty Director of the Harvard University Center for the Environment, Professor of Earth and Planetary Sciences

Courts, Schools and Education Reform: Lessons from Massachusetts

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