Springing to Life

How Greater Educational Equality Could Grow from the Common Core Mathematics Standards

By William H. Schmidt and Nathan A. Burroughs

In America, education has long been viewed as the main instrument for achieving equality of opportunity. Whatever our differences, the idea that every child deserves a chance to be educated enjoys widespread support. What has been contentious is how to go about promoting greater educational opportunities. Despite many reform efforts over the past several decades, the US educational system has patently failed to ensure equal access for all to the essential knowledge, skills, problem-solving abilities, and reasoning abilities that are necessary to succeed. Instead, American schools exhibit pervasive inequality.

Pervasive inequality. A bold claim, but that's the inescapable conclusion of more than 20 years of examining mathematics and science standards, student achievement, textbooks, standardized tests, and classroom content coverage. In mathematics, for instance, students are exposed to widely varying content not only across states and school districts but within schools. Such inequities in content coverage deny students equal learning opportunities. By the time they enter middle and high school, those students fortunate enough to have been challenged with rigorous, focused, and coherent content in the early grades are placed into courses that continue to challenge them, while their peers who were not

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ILLUSTRATIONS BY LIZA FLORES

exposed to such content are tracked into lower-level courses. And so the differences in learning opportunities that contribute to the achievement gap only continue to grow.

These problems aren't found only in our lowest-performing schools; the *typical* US student does not receive the content coverage needed to compete with students in other nations. While some may want to blame ineffective teaching or unmotivated students for the mediocre performance of US students on international assessments, research comparing states' standards (prior to the Common Core State Standards) with those of high-performing countries shows that a major factor is the lack of opportunity to learn. On average, our state standards have been about two grade levels behind.

Need more convincing? This body of research was examined in the Winter 2010–2011 issue of *American Educator* (see the box on page 5) and was explored in depth in a recent book, *Inequality for All* (see the box on page 6).

Pervasive inequality. That's the inescapable conclusion of 20 years of examining mathematics standards, student achievement, textbooks, tests, and classroom content.

In this article, we move from demonstrating the existence of pervasive inequality to considering what to do about it. In particular, we examine the prospects for the Common Core State Standards for Mathematics (CCSS-M) to reduce inequalities in opportunity to learn. We discuss why the CCSS-M *could* provide greater equality of educational opportunity, and we offer some ideas about how to overcome the principal obstacles to successful implementation.

Inequality in Opportunity to Learn

Educational inequality has hardly gone unnoticed by policymakers, scholars, or the general public. In recent years, efforts to solve this problem have focused on the structure of education (high-stakes testing, market incentives, etc.) and the amount and distribution of educational resources. What actually happens in the classroom is at least as important but has received much less attention.

Exposure to academic content is a prerequisite to learning it. Children can hardly be expected to learn material they have never been exposed to, especially in mathematics. As a consequence, there is a strong relationship between the topics in which students are instructed and the knowledge they acquire. As just one example, our research team* has found that the rigor of mathematical content at both the district and classroom levels has a statistically significant relationship to student achievement, independent of student background.[1]

In principle, every student ought to have the same opportunity to learn challenging mathematics content, but in schools, the content of instruction varies tremendously. Data drawn from the Third International Mathematics and Science Study (TIMSS) and the Promoting Rigorous Outcomes in Mathematics and Science Education (PROM/SE) project† demonstrate dramatic differences in the mathematics content offered in different states, school districts, and classrooms. Of these, the chief source of variation in instructional content occurs in the classroom, especially in eighth grade. In other words, what a student has a chance to learn varies not just between states and districts, but even within the same school at the same grade level. There are stark differences both in the content that is offered and the time spent on particular topics. Even classes with the same course title can offer very different content.[2]

This variation in topic coverage is usually exacerbated by tracking. All too often, low-performing students, who are disproportionately low-income and minority, are assigned to classes offering more elementary content. Rather than helping them catch up, such classes make it more likely that they will continue to lag behind their higher-performing peers. Tracking may have fallen out of rhetorical fashion in recent years, but it remains a very common practice. Data from the National Assessment of Educational Progress (NAEP) indicate that three-quarters of eighth-graders and nearly a third of fourth-graders are assigned to mathematics classrooms on the basis of perceived ability. Given the greater likelihood that disadvantaged students will be assigned to weaker classrooms, the educational system is effectively reinforcing inequality rather than mitigating it.

These inequalities have very real consequences for individual students and for the nation as a whole. Workers who earn only a high school diploma and never go to college can expect to earn about 40 percent less than those who earn a bachelor's degree.[3] At the same time, a country with a better-educated workforce can expect to see greater long-term economic growth[4]—growth that depends on the skills not just of its managers and scientists but of all its workers.[5]

The Common Core and Overall Math Achievement

Recognition of the inequities and overall weakness of mathematics standards in the United States helped motivate one of the most ambitious educational reform efforts in recent decades: the Common Core State Standards for Mathematics (CCSS-M). Led by a coalition of state leaders, mathematicians, mathematics education researchers, and other stakeholders, the Common Core initiative aimed to establish high-quality mathematics standards that all states would choose to adopt. Common standards would move the

*Key members of our research team include William H. Schmidt, Nathan A. Burroughs, Leland S. Cogan, Richard T. Houang, and Kathy Wight.

†To learn more about this project, see www.promse.msu.edu.

United States closer to what exists in most other countries.

What distinguishes the CCSS-M from previous efforts is the desire to make the new standards truly common, both within and among states. The CCSS-M have been adopted by 45 states and the District of Columbia, and are in the process of being implemented. A great amount of effort is going into developing common national assessments, with each state able to draw from a pool of items to create its own tests while preserving comparability across states. Ideally, the Common Core will ensure that all participating states possess high-quality standards and establish reasonable criteria for what students should be expected to learn.

To explore the CCSS-M's potential to improve overall math achievement, our research team has analyzed the relationship of the CCSS-M to the standards used by other countries and to the previous state standards, and studied whether states with standards closer to the CCSS-M had, on average, higher math scores.[6] Our first step was to analyze the CCSS-M's organization of topics in each grade. More than a decade ago,* our team did this same analysis of standards in other countries and identified three characteristics that distinguished the standards of the highest-achieving nations: focus, rigor, and coherence. Focus relates to the concentration on a few given topics in each grade so that students can learn for mastery—as distinct from the "mile-wide, inch-deep" curriculum common in the United States, where the same topics are covered shallowly from year to year. Rigor addresses at what grade level topics are covered. Coherence is concerned with matching the logical, hierarchical structure of mathematics with content coverage moving from more elementary topics in earlier grades to more sophisticated topics in later grades.

The second step was to compare the CCSS-M with these high-quality standards from high-achieving countries. Our statistical analysis revealed strong similarities, with roughly 90 percent of topics covered at the same grade levels and for the same number of grades. From an international standpoint, the CCSS-M appear to be high quality.

But are they better than states' previous standards? For the most part, yes. Our third step was to analyze the standards of all 50 states prior to the adoption of the CCSS-M. Verifying our previous work, we found considerable variation in state standards, with some quite similar to the CCSS-M and others quite different.

Finally, our research team explored the relationship between the proximity of a state's pre–Common Core standards to the CCSS-M and then looked at that state's average eighth-grade mathematics score on the 2009 NAEP. This simple comparison showed a reasonably strong relationship: the more similar the standards were to the CCSS-M, the higher student achievement. Adding layers of sophistication to our analysis, we did this comparison a few different ways, taking into account factors like how stringent a state's definition of proficient is and what percentage of students are from low-income families. Once these factors were considered, the relationship between NAEP performance and the closeness of states' standards to the CCSS-M was even stronger.

In sum, the evidence from both a US and an international perspective shows that the CCSS-M have the potential to improve average student achievement. The CCSS-M resemble the standards of high-achieving countries and exhibit the key features of coherence, rigor, and focus. Further, states with standards that resemble the CCSS-M did better, on average, on the 2009 NAEP.

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The Common Core and Inequality

Most of the public attention about the CCSS-M has concerned whether they represent better standards than the status quo, yet one of the key features of the new standards is that they are *common*. Because they have been adopted by nearly every state, some reduction in the differentiation across states seems inevitable. The creation of common assessments—which will increase comparability across states, districts, schools, and classrooms—should also reduce variation in content coverage within states, giving all administrators and educators much stronger incentives to ensure that all students have equitable opportunities to learn mathematics.

Although no full-scale empirical study can be conducted on the effect of the CCSS-M on educational inequality until they are fully implemented, we have some empirical evidence that these new standards could reduce it. Our research team has verified that (1) students in low-income school districts are generally exposed to less rigorous mathematical content, and (2) a stronger mathematics curriculum can reduce the relationship between socioeconomic status and achievement.[7] As a consequence, ensuring equal content coverage to low-income districts has the potential to improve student learning for underperforming groups who have thus far not been exposed to such focused, rigorous, and coherently presented mathematics.

This is no guarantee, of course. Opportunity to learn is only one

*For our early work comparing state standards with the standards in high-performing countries, see "A Coherent Curriculum: The Case of Mathematics," by William H. Schmidt, Richard T. Houang, and Leland S. Cogan, in the Summer 2002 issue of *American Educator*, available at www.aft.org/pdfs/americaneducator/summer2002/curriculum.pdf.

of several influences on student achievement. However, unlike community poverty or student background characteristics, the content of instruction is quite malleable. As such, policymakers have a special obligation to rectify the dramatic inequalities in what students have a chance to learn. Under the status quo, schooling is reinforcing background inequalities rather than ameliorating them. The CCSS-M, by attempting to provide more equal opportunities to learn, have the potential to reduce this one source of inequality.

Factors Influencing the Implementation of the CCSS-M

We have been very careful thus far to emphasize the Common Core's *potential* to reduce inequality and improve student achievement. Our restraint arises not only out of the habitual caution of researchers (particularly regarding any definitive statement that one thing clearly causes another), but also because of concerns about effective implementation of the new standards. The CCSS-M represent a fairly dramatic break with the status quo, and as such there are very real questions about whether there is sufficient commitment from policymakers and educators, and support from the public, to overcome barriers to the CCSS-M's progress.

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I. Local Control of Curriculum

The first and most evident risk to the CCSS-M's realization is that they directly challenge the long-standing tradition of local control of the curriculum in American education—a structure that is itself one of the major factors related to educational inequality. Since their inception, each of the more than 15,000 local school districts has enjoyed wide latitude in curricular decision making. Incursions by other levels of government on local autonomy with respect to the curriculum, most especially by the federal government, usually have been met with skepticism at best and hostility at worst. Some quarters perceive the new standards as a transgression by the federal government against localism, as a "takeover" of education by national authorities. Even the recognition that the Common Core is a state-led initiative has not appeased all critics, in part because many state-led reform efforts also have aroused considerable opposition.

To some extent, the CCSS-M do not break with precedent: after all, every state has educational standards laying out (with varying specificity) expectations for grade-level content coverage. But these standards have not typically been realized.[8] Far too many states seemed to think that adopting standards and buying loosely aligned tests were all that was needed to join the standards-based reform movement. If the CCSS-M are treated the same way, then we can expect them to have little impact on either student achievement or inequality.

The Common Core does remove responsibility for one piece of educational policy from local school districts. If the CCSS-M were fully implemented, school districts would no longer be responsible for deciding what mathematics topics would be taught to students each year. However, it must be made clear that leaving curricular decision making up to local school districts is a major contributor to educational inequality. As it stands now, students' chances to learn challenging content depend on whether they are lucky enough to attend a school that provides it. In effect, a defense of localism in questions about content amounts to a defense of inequality in opportunity to learn.


Equality of Educational Opportunity
Myth or Reality in U.S. Schooling?

For more on the dramatic differences in content coverage across classrooms, schools, districts, and states, see "Equality of Educational Opportunity," by William H. Schmidt, Leland S. Cogan, and Curtis C. McKnight, in the Winter 2010–2011 issue of *American Educator*, which is available for free at www.aft.org/pdfs/americaneducator/winter1011/Schmidt.pdf.

II. Teachers

Whether districts embrace the CCSS-M or not, we must also question how much of today's curricular decision making really is in the hands of school district administrators, or even principals. Statistical analyses suggest that the greatest source of variation in instructional content—by an overwhelming 80 percent or more—is not the district, or the school, but the classroom. Whatever district curriculum guides or state standards call for, as a practical matter teachers decide what is taught in their classrooms.

Some critics of the CCSS-M suggest that the new standards impose on teachers, stripping them of hard-won professionalism at a time when so many educators feel under siege by budget cuts and other reform efforts. However, we question the degree to which teachers should really want to be responsible for deciding what topics they will teach. Because most states have not taken implementation of their pre–Common Core standards seriously, teachers have been forced to act as content "brokers." They have had to pick and choose among competing signals about what to teach from poorly aligned state assessments, textbooks,

state standards, district-mandated standardized tests, and (if they are lucky enough to be in a district that offers any guidance) district curriculum guides. But teachers are not necessarily trained content experts, and they shouldn't be expected to make these decisions. In elementary grades, they are usually generalists, and many have only a limited background in each of the subjects they must teach. In later grades, even if they are mathematics specialists (usually the case in middle and high school), the chief orientation of many teachers is not in selecting content but in developing the skills needed to help students learn.*

It cannot be said often enough that the CCSS-M only address what topics should be taught, not *how* they should be taught: pedagogy is absent from the Common Core. In fact, freed from their role as content brokers, teachers will be able to focus on tailoring their instruction to the needs of their particular students. And, by reducing the number of topics that students are expected to learn, the CCSS-M also give teachers more time to prepare and carry out rich lessons. Another advantage of the CCSS-M is that they open up the possibility for cross-classroom and cross-grade collaboration by teachers, allowing them to teach for mastery, share lesson plans, provide long-term support to struggling students, and track each student's learning trajectory.

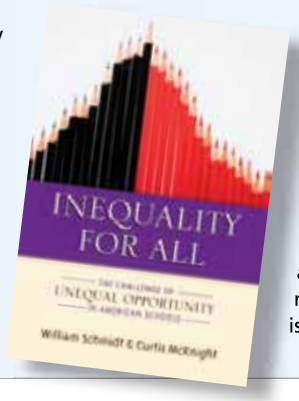
However, research suggests that, without support, many teachers will find it challenging to develop the deeper mathematics knowledge called for in the CCSS-M. Surveys of teachers in Ohio and Michigan conducted as part of PROM/SE indicated that a majority of elementary mathematics teachers did not feel well prepared to teach all of the mathematics topics included in the CCSS-M, either in their own or later grades. Likewise, the US sample of the Teacher Education and Development Study, which included nearly 3,300 future teachers from 81 preparatory institutions, showed that US teachers were in the middle of the interna-

*Even if most teachers did have such content expertise, the act of selecting which topics to teach and organizing them across grades simply cannot be done in isolation. It must be coordinated across grades—and since many children move frequently, it must be coordinated across schools.

Inequality for All

For a detailed look at variations in mathematics and science content across the country, see *Inequality for All: The Challenge of Unequal Opportunity in American Schools*, by William H. Schmidt and Curtis C. McKnight. Schmidt and McKnight have been working for more than two decades to identify and understand differences in mathematics and science achievement across developed countries and in the United States. From standards to textbooks to classroom-level content, they have tracked the many ways that students do not receive equal opportunities to learn the core content that is essential to thriving in modern society.

These scholars not only provide overwhelming evidence of inequities, they also offer a thoughtful look at how the Common Core State Standards could be the beginning of a more equitable education system. Implemented well, these standards will provide teachers with sound guidance on essential content and flexibility in how to support students as they learn that content. Schmidt and McKnight emphasize equitable—not identical—learning opportunities. As they write, "educational contexts differ, and providing the same content in the same way would not necessarily secure equal opportunities to learn for different students."



Schmidt and McKnight are fine writers, so we leave it to them to invite you to read more. Here are the first two paragraphs of their important book:

> This is a story about schooling in America and, thus, a story about children—the nation's greatest resource. It is also, at a more personal level, a story about our own children. We know that the content, skills, reasoning ability, and problem solving children develop in school are important both to their future and to the nation's; every country in the world understands this. However, in the United States, one of the wealthiest and most democratic nations on earth, the reality is that the opportunities many children have to acquire such knowledge—especially in mathematics and science—are not guaranteed. As they walk into school, children become players in a game of chance, one that is dangerously invisible to both child and parent, and one with very high stakes. Sadly, therefore, this story has no fairy-tale ending.
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> The opportunities of too many students are arbitrarily determined by factors outside of their control, such as the state and local community where they live, the school they attend, the teacher they have, the textbooks the school has purchased, and the tests they must take. There are no villains in this story; everyone acts with the best of intentions, if not always with the greatest of wisdom. All of these factors conspire to create a very inconsistent and uneven system, one in which chance plays a major role and, as other countries have demonstrated, chance has no place in the education of children. The telling of this as a story is not just a literary device to make a more abstract point; it is, at its most basic level, a real story about real children.

—EDITORS

tional distribution, and that future middle school mathematics teachers took fewer mathematics courses than did those in higher-achieving countries.[9] In short, there is reason to believe that major investments in mathematics professional development and pre-service teacher preparation will be necessary in order for teachers to be fully prepared to teach the CCSS-M.

III. Textbooks

Considerable pressure is on textbook publishing companies, which must quickly develop materials compatible with the CCSS-M. US textbooks have long been problematic; much longer and less focused than those used in other countries, they implicitly encourage teachers to teach all topics in a fairly summary fashion (a feature of the "mile-wide, inch-deep" phenomenon). Unfortunately, textbooks serve as a key intermediary between the standards and classroom teaching.[10] Inexperienced and underprepared teachers often rely on the materials provided by textbooks, and in some cases even follow them literally, as some school districts expect their teachers to do, beginning on page 1 and moving in strict accordance with the book. Better prepared and more experienced teachers may recognize the problems with their textbooks and, when permitted, may reorganize the material presented in the textbook or search for supplementary materials. Textbooks thus play a key role in the implementation of any standards, including the Common Core.

Given the new approach of the CCSS-M and the relatively short time available, textbook publishers will be strongly tempted to simply issue supplementary guides or to rearrange their old books and label them "aligned with the Common Core." Either of these would make implementing the new standards more difficult, since teachers are already likely to hesitate before removing any topics they previously taught, fearing students will not learn the material elsewhere. From what we have seen so far, policymakers, educators, and parents will need to put an enormous amount of pressure on textbook publishers, demanding new books written from scratch for the CCSS-M.[†]

IV. Assessments

The adoption of the CCSS-M will also necessitate entirely new assessments. Because states continue to rely on high-stakes testing as a strategy for educational reform, Common Core–aligned assessments are in the process of being created. Two assessment consortia—the Partnership for Assessment of Readiness for College and Careers (PARCC) and the Smarter Balanced Assessment Consortium—are developing these new tests. Not only must a range of new items be piloted in a very short time, but one of the consortia has also decided to use a computer-adaptive model of testing, which invites a number of challenges. For example, schools will have to be equipped with and trained to use computers capable of running these assessments, which is difficult in a time of restricted budgets. Like revamping textbooks, the assessments should mainly be a transitional problem. Assuming that time and resources are forthcoming, there is every reason to expect adequate assessments can be put into place.

V. Parents and Voters

Last but not least, the attitudes of parents and voters toward the Common Core are crucial for long-term sustainability. The development and adoption of the CCSS-M has been led by state governments—not by a popular outcry demanding common standards. Implementing any new policy comes with an opportunity cost; selecting the CCSS-M as a high priority inevitably comes at the expense of other educational (and noneducational) efforts, both in terms of resources and personnel. Teachers and administrators will have to explain the new standards to parents, and in particular how they will affect students. Whether as parents or as voters, the response of the general public ultimately will determine the viability of the Common Core.

A defense of localism in questions about content amounts to a defense of inequality in opportunity to learn.

What Stakeholders Think about the Common Core

In the previous section, we laid out the principal threats to the CCSS-M's implementation. All of these concerns are somewhat speculative, however. What we really need are facts. To establish a baseline on key stakeholders' attitudes toward the Common Core, in 2011 we commissioned nationally representative surveys of curriculum directors, teachers, and parents.

We surveyed nearly 700 curriculum directors of local school districts in the 41 states that had adopted the Common Core at the time, with representative samples in each state. The good news: nearly all of those questioned had heard of the Common Core and knew their state had adopted the new standards. Despite concerns by some that the Common Core might threaten the autonomy of school districts, nearly all (90 percent) of those surveyed supported the new standards. Strong majorities of the curriculum directors believed that the CCSS-M provided clear goals for what students needed to learn, were of high quality, would improve student achievement, would help teachers, and would promote more-equal opportunities. Curriculum directors, though, did identify a major risk to successful implementation: the lack of assessments, textbooks, and other instructional materials properly aligned with the CCSS-M. As we mentioned earlier, although very real, these obstacles to implementation hopefully are *transitional* rather than *fundamental*.

Now the bad news: a majority of curriculum directors thought

[†]For more on the problems with textbooks, see "Phoenix Rising: Bringing the Common Core State Mathematics Standards to Life," by Hung-Hsi Wu, in the Fall 2011 issue of *American Educator*, available at www.aft.org/pdfs/americaneducator/fall2011/Wu.pdf.

the new standards were basically the same as the previous state standards—something our research team has found is only true in a few states.[11] Only about a quarter of curriculum directors thought the Common Core standards were substantially different from the content provided in their own districts. In addition, when asked to describe what topics their districts taught at each grade, respondents indicated a very large variation in content coverage across school districts, even within the same state. In short, although curriculum directors support the Common Core, we question how well they understand the new standards and the magnitude of the task ahead.

The sample for the teacher survey comprised more than 12,000 respondents in the same 41 states as the curriculum directors' survey, with a mix of elementary, middle, and high school teachers. As with the curriculum directors, the vast majority of teachers had some familiarity with the CCSS-M, varying somewhat by state. Over 80 percent stated that they had read the standards for their grade. A preponderance of teachers thought the CCSS-M were similar to the previous standards (77 percent) and said they liked the new standards and would teach to them (94 percent). The quality of the CCSS-M and more-equal opportunities were the most cited reasons for supporting the Common Core.

The questions targeted specifically to teachers point to several potential pitfalls. When asked what they needed to implement the CCSS-M, most named professional development and other forms of support. Teachers cited a lack of properly aligned textbooks and assessments, and concerns about parental support, among the potential obstacles to implementation. Further, questioned about which topics they currently teach, roughly 80 percent of teachers are teaching topics that are aligned appropriately with the CCSS-M, but about 40 percent also are teaching topics that the CCSS-M assign to a different grade level. This result is reason for concern, since about a quarter of teachers said they would refuse to drop a topic that they currently covered but that the CCSS-M recommend be skipped, while a majority were unsure. Given the centrality of teaching for mastery in the design of the CCSS-M, teachers' ambivalence about narrowing their content coverage is troubling. We can only hope that teachers will be more willing to drop topics once they better understand that focus and coherence are key attributes of the CCSS-M.

An even greater issue is the lack of teacher confidence in teaching CCSS-M topics. Depending on the grade level, somewhere between 25 percent and 37 percent of teachers felt unprepared to teach CCSS-M topics, and a substantial proportion did not feel well prepared *even if they were already teaching those topics*. Also of concern: only about a third of teachers (35 percent) had thus far participated in professional development for CCSS-M, and just a fifth (20 percent) in textbook reviews for CCSS-M. At the time of the survey, 35 percent of teachers had not participated in any preparation for the CCSS-M whatsoever. It might be that the pace of implementation efforts by districts and schools increased during 2012, but the lack of early planning could make the transition to the CCSS-M difficult for some districts.

Finally, our survey of parents covered all 50 states. We found that though awareness of the CCSS-M has increased in the last year, even after a brief description, only a bare majority had heard of them and very few knew whether their state had adopted them. Despite the lack of publicity about the CCSS-M, more than two-thirds of parents supported common national standards in mathematics. Strong majorities (roughly 80 percent) thought that all elementary and middle-grades students should be exposed to the same mathematics content, across states, school districts, and classrooms. Teachers' fears that parents would not support higher standards may be misplaced: substantial majorities of parents said that they supported more-demanding math, even if it required more studying, more homework, or their child struggling early on. When it comes to mathematics, there is a strong appetite among parents for common, rigorous content standards.

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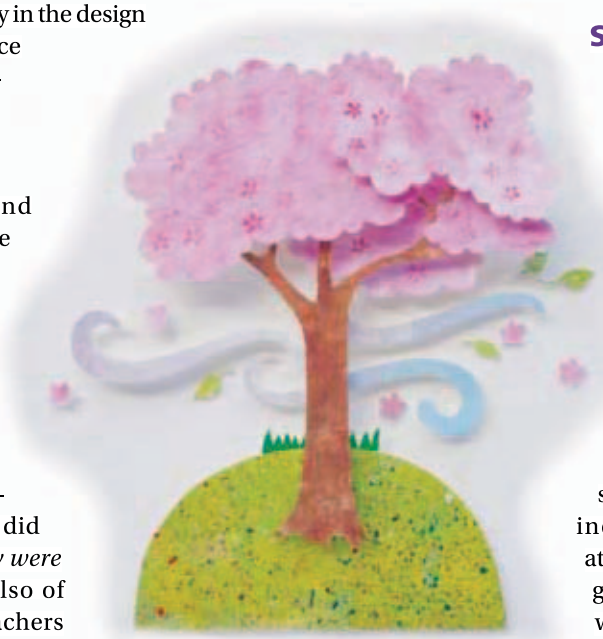

Strategies for Implementing the Common Core

Empirical research provides some evidence that the CCSS-M have the potential to increase student achievement. Survey results suggest that stakeholders are open to adopting common standards in mathematics to improve the competitive position of US students and to foster more equal opportunities to learn. The question is whether policymakers and educators will capitalize on public support and successfully manage the inevitable obstacles that arise when attempting major changes. Research suggests that teachers and administrators will need a great deal of support if they

are to realize the new standards. Because of budgetary constraints and competition from other reform efforts, educators and district personnel need cost-effective methods for preparing teachers and aligning instructional materials. At the end of the day, successful implementation of the CCSS-M requires a focus on changes in *instruction*, not just assessments.

To aid this effort, our research team has begun to develop tools that might prove useful in implementing the new standards. These tools are not the be-all and end-all of reform efforts (and, unfortunately, these tools will not be available to educators outside our research projects in the foreseeable future). We describe them only as an example of the kinds of technologies and strategies necessary if the CCSS-M are to have a chance to succeed. There is a tremendous need for innovative thinking about the challenge of aligning day-to-day mathematics instruction to the CCSS-M.

First, we are developing an online tool to help teachers align their instructional materials (including textbooks) with the CCSS-M. In previous research, we analyzed the mathematics instructional materials of a cross section of school districts. Textbooks stood out as problematic. Most were not well aligned to the CCSS-M. Each CCSS-M topic tended to be distributed throughout the textbook rather than being combined—they lacked coherence. In addition, textbooks covered a great deal of material that was not part of the CCSS-M—they lacked focus. Some important topics were not even covered at all. Realizing that revised textbooks will not be available soon (because of both publishers' resistance and states' and districts' budget problems), we are developing an online tool for teachers to map their textbooks onto the CCSS-M. A number of textbooks have been coded so that lessons are matched with CCSS-M requirements, making it much easier for teachers to modify the sequence and amount of instruction focused on any given topic. So far, our research suggests that this approach holds promise.

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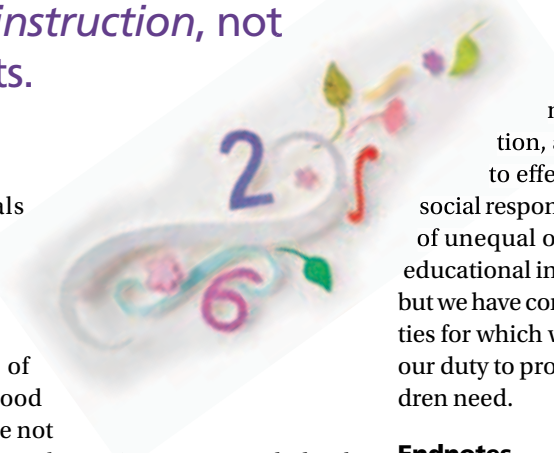

Second, as part of a research study of early CCSS-M implementation efforts, we provided teachers in selected districts with an online tool to track which mathematical topics they had covered each day. Teachers were asked to record the content covered, amount of time devoted to each topic, materials used, and mathematical practices used, as well as how prepared the teacher felt to teach each topic. A key feature was that the topics presented in the online tool were explicitly matched with the CCSS-M. What began as a means for tracking the content of instruction soon became something rather different. Through feedback from teachers, we learned that the daily act of recording how their topic coverage matched the CCSS-M made them much more familiar with the standards and actually altered the pattern of instruction. Many teachers found that they were teaching topics well ahead of or behind what the CCSS-M called for. In a spontaneous process, teachers began sharing insights with one another, seeking greater understanding of the CCSS-M and modifying their patterns of topic coverage. We are now in the process of building on these findings to develop an intervention that uses the online topic tracking system as a relatively low-cost professional development tool.

The Challenge of Inequality

Public education is widely considered one of the keys to economic prosperity and social stability in the United States. Until very recently this country boasted the world's best-educated population, and this human resource helped the United States take full advantage of its natural resources. Today, as other countries have outstripped us educationally and are gaining on us economically, we must address the inequalities inherent in the structure of US education.

The CCSS-M represent an opportunity to address this inequality. We as a nation created unequal learning opportunities with our fragmented curriculum, inadequate teacher preparation, and low-quality instructional materials. If we fail to effectively implement the CCSS-M, we abdicate our social responsibility and become complicit in the perpetuation of unequal opportunities. The CCSS-M will not eliminate all educational inequalities or guarantee a fair chance to everyone, but we have concrete evidence that they may reduce those inequities for which we, as a society, are most acutely responsible. It is our duty to provide the equitable learning opportunities all children need. ☐

Endnotes

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2. Leland S. Cogan, William H. Schmidt, and David E. Wiley, "Who Takes What Math and in Which Track? Using TIMSS to Characterize U.S. Students' Eighth-Grade Mathematics Learning Opportunities," *Educational Evaluation and Policy Analysis* 23, no. 4 (2001): 323–341.

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5. Eric A. Hanushek and Ludger Woessmann, *The Role of Education Quality in Economic Growth* (Washington, DC: World Bank, 2007).

6. William H. Schmidt and Richard T. Houang, "Curricular Coherence and the Common Core State Standards for Mathematics," *Educational Researcher* 41, no. 8 (2012): 294–308.

7. Schmidt, Cogan, and McKnight, "Equality of Educational Opportunity."

8. William H. Schmidt and Curtis C. McKnight, *Inequality for All: The Challenge of Unequal Opportunity in American Schools* (New York: Teachers College Press, 2012).

9. William H. Schmidt, Richard T. Houang, and Leland S. Cogan, "Preparing Future Math Teachers," *Science* 332, no. 6035 (2011): 1266–1267.

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11. Schmidt and Houang, "Curricular Coherence and the Common Core State Standards for Mathematics."