International Lessons about National Standards

by
William H. Schmidt,
Richard Houang,
and **Sharif Shakrani**
MICHIGAN STATE UNIVERSITY

foreword by
Chester E. Finn, Jr.,
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THOMAS B. FORDHAM INSTITUTE
Advancing Educational Excellence

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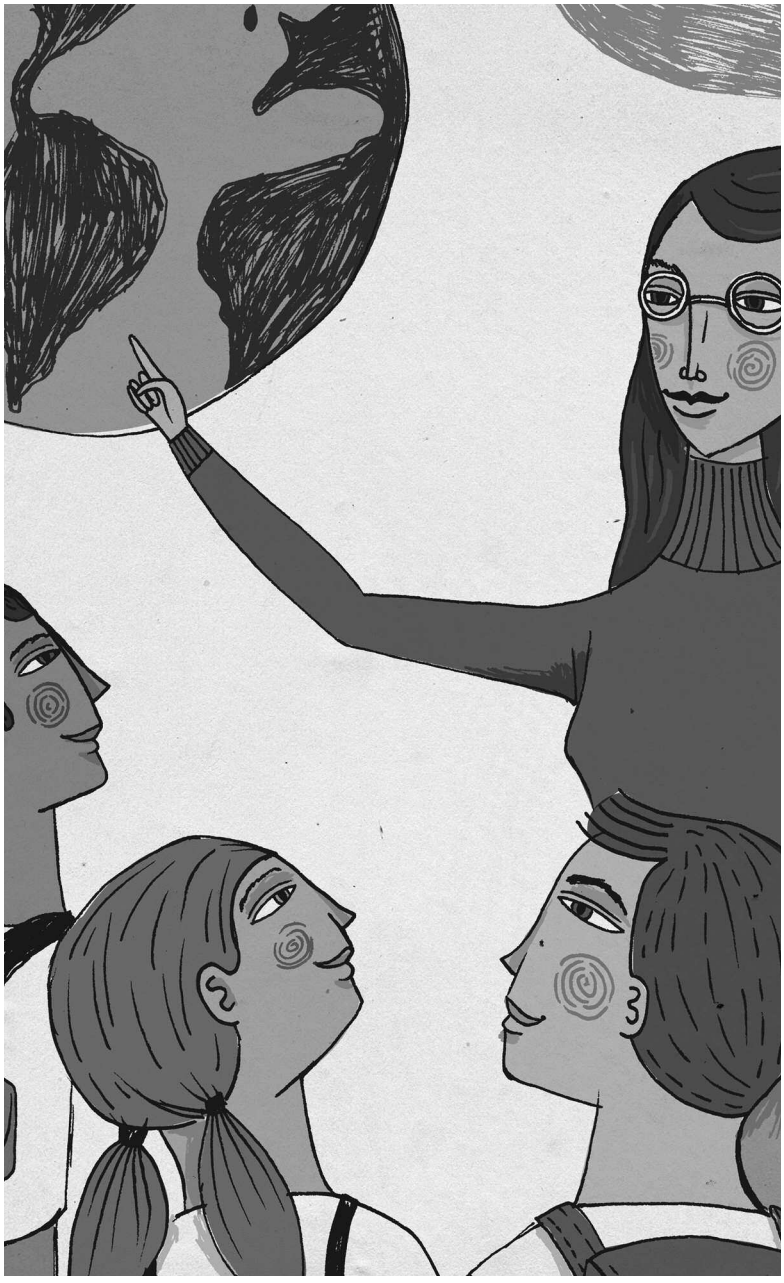

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FOREWORD

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Like comets, elections, Olympics, and the moon, education policy ideas tend to come and go in cycles. One vivid example is our evanescent enthusiasm for national standards and tests. Way back in 1959, President Dwight D. Eisenhower called for "national goals" in education, including "standards." A decade later, President Richard M. Nixon called "the fear of 'national standards'" one of the "bugaboos of education." President George H.W. Bush embraced them in the early 1990s, only to see an angry Senate denounce the draft U.S. history standards. President Bill Clinton pushed for voluntary national testing, only to see an angry House pull the plug on their funding. (The farthest he ever got was a clause in *Goals 2000*, signed in March 1994, which established the "National Education Standards and Improvement Council" to "certify" state content standards voluntarily submitted by states. But that council was never formed; in short order Congress obliterated it.) And now President Barack Obama's administration is prodding states to participate in the Common Core State Standards Initiative, and offering big bucks for the development of assessments to accompany those standards.

Another notion that waxes and wanes is that the U.S. education system might learn something from its counterparts around the world. Anxiety about Soviet scientific progress spurred the National Defense Education Act of 1958. Beginning in 1983, *A Nation at Risk* unleashed a wave of interest in the Japanese school system. Recent commissions and reports, particularly those from the National Governors Association (NGA) and the Organisation for Economic Co-operation and Development (OECD), have made "international benchmarking" all the rage again. And widespread concern about America's economic competitiveness in the 21st century is rekindling interest in how other countries—especially those that seem to be gaining on us—accomplish what they do by way of nurturing and strengthening their human capital.

This report, then, represents the confluence of two big ideas that both attract much attention in the United States in 2009: interest in national standards and curiosity about our international competitors. It seeks to answer this straightforward question: As America contemplates a transition to national standards and tests, what lessons can be gleaned from the experience of our global peers, rivals, and allies?

Readers familiar with the work of the Thomas B. Fordham Institute won't be surprised that we find such a question exceptionally interesting. We have long favored national standards and tests for America's schools. We think that today's fragmented system of 50 sets of standards and 50 testing regimes makes no sense in the modern, interconnected world; that No Child Left Behind and its mandate that virtually 100 percent of students be proficient by 2014 has worsened the situation by encouraging states to keep their "proficiency" expectations modest; and that rigorous national standards could serve as the first step in leveling a lumpy playing field and paving the way for equally demanding national assessments, the results of which could be shared across state lines.

For years, we've been arguing for national standards and tests, but we've also been busy thinking through how such a system would actually work. In 2006, we published *To Dream the Impossible Dream: Four Approaches to National Standards and Tests for America's Schools*, which compiled the best ideas from twelve policy experts about the political strategy for getting from here to there, and suggested some answers to thorny structural questions, too (e.g., what role , if any, should the National Assessment Governing Board, the overseer of NAEP, play in the development of new national standards?).

Heartened by the cordial reception accorded to that report, we wondered if we might glean additional lessons by looking overseas. Do the countries that adopted national standards and tests before us have things to teach us? Did they make mistakes that we could avoid? Identify strategies and solutions that we wouldn't have to discover on our own?

To find out, we turned to America's most trusted expert on international education standards, William Schmidt, a University Distinguished Professor at Michigan State University (MSU) and Co-director of its Education Policy Center. Dr. Schmidt has spent decades studying the standards and curricula of high-performing countries and pushing the U.S. to adopt more rigorous and focused standards to match those of international leaders. He in turn recruited his colleagues Richard Houang, Associate Director for the U.S. National Research Center for TIMSS, and Sharif Shakrani, Professor of Measurement and Quantitative Methods and Co-director of the Education Policy Center at MSU, to round out his research team.

Needing financial support to make such an ambitious project possible, we sought help from the Bill & Melinda Gates Foundation, the Eli and Edythe Broad Foundation, the Spencer Foundation, and our own sister organization, the Thomas B. Fordham Foundation. (This report is a joint effort of the Fordham Institute and Fordham Foundation.) We appreciate the confidence, patience, and intellectual guidance provided by all of these funders. We would also like to thank the Fordham team for conscientiously seeing this report to completion and dissemination, particularly associate editor and policy analyst Stafford Palmieri, media and public affairs staffers Amy Fagan and Laura Pohl, copy editor Quentin Suffren, and designer Emilia Ryan.

■ ■ ■

What lessons did Bill and his team unearth? Briefly stated, there are six:

1. It's not true that national standards portend loss of local control.
2. An independent, quasi-governmental institution is needed to oversee the development of national standards and assessment and produce reports for the nation.
3. The federal government should encourage and provide resources for the standards-setting process but shouldn't meddle inappropriately.
4. We ought first to develop coherent, focused, rigorous standards for English, math, and science.
5. National assessments (including open-ended questions) should be administered every other calendar year in grades 4, 8, and 12.
6. Hold students, teachers and schools accountable for performance.

Two observations can be made about the items on this list. First, the insights are all eminently sensible and not really terribly surprising. Second, the Common Core State Standards Initiative is mostly, though not entirely, in sync with them—but doesn't come close to completing the job.

That state-led effort, shepherded by the National Governors Association and the Council of Chief State School Officers (CCSSO), supported by the Gates Foundation and enlisting (among others) Achieve, ACT, and the College Board, is more akin to what Churchill might term "the beginning of the beginning." It's primarily aligned with lessons one and three. Which is good. "Local control," along with "states' rights," are surely the trolls under the bridge of past moves toward national standards and tests; the Common Core Initiative is striving to demonstrate both its bottom-up bona fides and its independence from the federal government.

Plus, as in most other countries, it's starting with reading/writing and math. (Our authors would prefer for science to be included in this first round, and we'd like to get to history sooner rather than later.) As for the

testing and accountability regimes associated with the standards, well, those are decisions to be made later.

But there's one glaring hole in the Common Core strategy, represented by this report's second lesson: As yet there's not a durable organizational structure for the standards-setting and standards-revising process, much less one to operate an ongoing assessment system based on these processes. It's all *ad hoc*. And that's a big problem that needs to be fixed in short order lest the whole effort collapse under its own weight.

This isn't meant as a criticism of the leaders of the Common Core initiative; it was surely smart politics to build momentum for the common standards before hashing out all the organizational details. But hash out they—and we, and you—must.

The long-term vision is crucial. Someone, or something, must "own" these standards. That means enlisting first-class content experts, educators, and lay persons to develop them. Keeping them up to date and relevant. Adding other subjects. Then, that same something or those same someones (or perhaps a cousin?) needs to shoulder the responsibility for the assessment system. That means developing, piloting, and operationalizing the tests. Refreshing them with valid items. Seeing that they are administered, scored, and reported with fidelity, security, reliability, and timeliness. Rationally relating them to other crucial policies and programs with which they inevitably intersect (e.g., TIMSS, PISA, NCLB, NAEP). Making sure that their financial, organizational, and political underpinnings are solid. And, equally important, fastidiously solving the prickly problems, challenges, and questions that will inevitably (and frequently) arise.

In 2009, the United States of America has no suitable organizational arrangement for handling all this, and we urgently need to devise one. It calls, in fact, for a major act of organizational creativity, not unlike—in various eras—inventing the Postal Service, Pension Office, National Academy of Sciences, National Assessment Governing Board, Securities and Exchange Commission, National Endowment for the Arts, Smithsonian Institution, Education Commission of the States, Tennessee Valley Authority, and National Institute of Standards and Technology. Even our central banking system, the Federal Reserve, was created in response to an urgent national challenge, namely the Panic of 1907 (not be confused with our 100-years-later financial panic).

None of these existed before it was created. Yet we can't quite imagine America today without any of them. (Okay, the post-Civil War Pension Office has morphed into Social Security, Veterans Affairs, and a few other entities.) And note that all of these enterprises have painstakingly crafted relationships with the federal government—often including partial or full funding—but no two of them have exactly the same relationship.

We need a comparable act of organizational creativity to develop and maintain America's national education standards and assessments. Or else we need to make a major decision to entrust that solemn responsibility to some existing and durable entity that doesn't presently have that responsibility. (The National Assessment Governing Board might be a possibility. But it—and every other such possibility that has occurred to us so far—has both pluses and minuses.)

As other countries have learned, something this important cannot be sustained over time in an *ad hoc* fashion. Even as we salute the NGA and CCSSO for getting this off the ground, their joint venture, at least in its present form, doesn't promise long-term stability. Each of those two organizations, for example, is subject to changing leadership that might arrive with different priorities. Indeed, the Common Core initiative itself has revealed certain vulnerabilities, such as concern about "secret" committees and reviewers, vagueness about who exactly will decide what, how external feedback will be considered, and so forth. For all that, the process seems from where we sit to be off to a promising start. We're optimistic about where it will lead. But that doesn't solve the longer term problem of organizational stability, transparency, and durability.

Comets don't come around often. Neither do serious chances to adopt national standards and tests in a country that has previously had mixed feelings and mixed experiences with such endeavors. Our hope is that this report—and the lessons learned from around the world—make it a little more likely that we won't have to wait for another complete orbit before we tackle this national obligation again.

EXECUTIVE SUMMARY

Whether to adopt national standards and tests has long been a subject of lively debate in the United States. With 47 states now participating in the Common Core State Standards Initiative, and a commitment from Education Secretary Arne Duncan to allocate hundreds of millions in stimulus funds to the development of common tests, the country is better positioned than ever before to take the leap. Still, many questions and pitfalls remain.

This report looks beyond America's borders for guidance on how we might best make a transition to an acceptable, workable form of national standards and tests. An examination of the systems and histories of ten countries—Brazil, Canada, China, France, Germany, India, the Netherlands, Russia, Singapore, and South Korea—led to six key insights, described below. Lessons from Germany are particularly salient, as that federal nation recently embarked on a strategy similar to the Common Core State Standards Initiative.

1. **It's not true that national standards portend loss of local control.** Spirited discussion of national standards inevitably turns to their impact on local control of the schools. What we learn from other countries, however, is that national standards are not—at least, need not be—developed in isolation by a distant central government that runs the education system and quashes local control.

2. **An independent, quasi-governmental institution is needed to oversee the development of national standards and assessments and to produce trustworthy reports to the nation**. Can focused, coherent, and rigorous standards for all children be developed without a national institution? Can reliable results be fairly reported without such an institution? All of the countries in this report with national standards say "no." Each has a national institution.

3. **The federal government should encourage and provide resources for the standards-setting process**. Importantly, however, the federal government itself should not set the standards.

4. **We should develop coherent, focused, rigorous standards, beginning with English, math, and science**. All nine countries in our study with national standards have them for mathematics and language arts. Eight also have standards in science. Given these international precedents as well as America's own focus on these three subjects, they are the logical place to start. At a later time, the United States should consider adding standards in such subjects as history, economics, and civics; many other countries have standards for social studies, art, and a foreign language.

5. **National assessments (including open-ended questions) should be administered at grades 4, 8, and 12 every two years**. Most countries do not test every year in every grade. Given that the National Assessment of Educational Progress (NAEP) already tests U.S. students in grades 4, 8, and 12, we suggest retaining that pattern and testing every other calendar year (as Brazil does). Eventually the twelfth-grade end-of-high-school assessment could become a high-stakes test with implications for college admissions, course assignment, and employment (as in Singapore, South Korea, France, the Netherlands, Brazil, and India). Such an assessment, of course, would have to be given annually.

6. **Hold students, teachers and schools accountable for performance.** In the European and Asian countries we studied, accountability is part of a well-aligned system that includes standards, assessments, instructional materials, resources, and teaching-learning strategies. Accountability in these lands spans multiple levels—pupil, classroom, school, regional, and

national. We believe the U.S. should define a model of accountability that includes all five levels. (Because "regional" in America may mean both district and state, the U.S. approach to accountability might entail six levels.)

America today enjoys an historic opportunity to embrace national standards and tests. The case for such a policy is compelling; now, thanks to the experience of other countries, the path to success is a little clearer.

INTRODUCTION

A TALE OF TWO CITIES

In 1997, the Trends in International Mathematics and Science Study (TIMSS), a multi-national testing (and curriculum appraisal) program, released its results comparing the academic performance of children in some 40 countries, including most of Europe and many of the major Asian nations. The eighth-grade results startled both Germany and the United States. Each country found itself mired in the middle of the distribution, performing well below Japan and the other top achieving countries. German and American eighth-grade students performed at essentially the same level—not significantly different from each other but both below the international average. They were outperformed by 20 countries, including France, Switzerland, the Netherlands, Austria, Hungary, Russia, Singapore, Korea, Japan, Hong Kong, Australia, and Canada. Alarming news reports in both nations documented in detail the dismal situation with warnings about the dire implications, both economically and more generally.

For Berlin and Washington, this became a tale of two cities as each grappled with the news and attempted to respond to the political and cultural anxiety it created. Both faced similar constraints with governmental structures that gave control of education to the states (*Bundesländer* in Germany), not the federal authorities. Yet for all of these similarities, their policy responses could not have been more different.

When the results became public in Germany, there was grave concern that its once highly regarded, even revered, education system was deteriorating. Policymakers and analysts also worried that there were serious flaws in the structure of the system itself, flaws that had potential negative consequences, both economically and socially. In Germany, authority over education, research, and cultural affairs has long rested with the 16 federal states. Detailed regulations are laid down in their constitutions and in separate laws with respect to all levels of education. As in the United States, the central government in Berlin has no constitutional authority over education.

In West Germany, a conference of state education minister affairs (*Ständige Konferenz der Kultusminister der Länder*, KMK) was established in 1948 to coordinate education issues as well as research and cultural affairs, somewhat akin to America's Council of Chief State School Officers. The KMK has served as a forum but its resolutions amount only to recommendations until they are enacted by the parliaments (*Landtage*) of the federal states.

In direct response to concerns emanating from the TIMSS results, the KMK in 1997 moved for the first time to introduce national standards and standardized testing procedures to evaluate the state school systems. This decision clearly marked the starting point for Germany to monitor and control the outcomes of its education system at the national level, a monumental change in a country that had operated under state control since the end of World War II. Indeed, the states not only controlled the content of instruction but also the financing of schools, the hiring and placement of teachers, and other issues.

As in the U.S., strong opposition was voiced to the federal government wresting control of the schools from the states. Still, the KMK started to develop national standards for several subject matters and grades (*Bildungsstandards*) as well as for teacher education. Central exams were also developed for the end of middle and high school. These examinations would eventually be introduced in almost all states.

In 2001, the results of the Program for International Student Assessment (PISA) also became available. For both Germany and the United States, the results were again similar (and again depressing), much like the findings from TIMSS. This second dose of bad news galvanized German officials and gave them new resolve to implement the national standards and tests launched earlier.

In Washington, meanwhile, a different story unfolded. After the enormous media coverage associated with the TIMSS results, policymakers began to search for an appropriate response. New attention was directed at curriculum, as an international analysis of standards and textbooks revealed a difference in coverage in U.S. eighth-grade classrooms compared to top achieving countries. This relatively new focus on content helped push along the standards movement, but action remained with the states, not the federal government.

President Bill Clinton responded to the TIMSS results with a proposal for a voluntary national test, and initial moves were made to put such an assessment together, but Congress killed the effort. As in Germany, many American leaders were alarmed by the economic and societal implications associated with our students' poor performance, but they were unable to overcome a long tradition of state control. The fear of federal intervention in our schools was a rallying cry around which opponents successfully gathered. Unlike Germany, the American states did not then come together to propose a "bottom-up" approach to national standards. (It didn't help that an effort by President George H.W. Bush to develop "voluntary national standards" in core subjects had gone very badly, leaving a sour taste in the mouths of many officials.)

Several years later, President George W. Bush and Congress teamed up to enact the No Child Left Behind Act, which embraced standards-based reform but again rejected the idea of national standards. In fact, it pushed in the opposite direction, by requiring all states to get virtually 100 percent of their students to a "proficient" level in reading and math by 2014, but explicitly allowing each state to define "proficient" as it saw fit.

Why did Germany move to national standards and a common assessment in response to poor international test scores while the U.S. did not, even though the results and their implications were virtually identical for both countries? Germany rose above its 60 year history and fear of federal interference and control. The U.S. did not and still does not. To understand why is, in part, to understand the relatively short history of education standards in the United States.

It's clear from that history that there has been and continues to be sustained opposition to the notion of national standards. In part, that objection is driven by the ideology that federal control of education is inherently bad, that local control of education is the American way, and that Washington should keep out. We have a cultural belief that communities and parents have the right to control children's education, even though, in practice, states have constitutional responsibility for this public function. Meanwhile, the federal government has been involved in ever-larger and more intrusive ways in K-12 education for more than a half century—including, now, state-by-state comparisons of student achievement via national assessment. In other words, the ideology and the reality have not been aligned for many decades.

Part of Americans' hesitancy about national education standards is the belief that such standards imply a centrally-run school system. Most other developed countries have national standards, and many Americans take for granted that these are accompanied by rigid, centralized control from the national capital. This idea is captured by the sarcastic suggestion that if it is 10:44 a.m. on March 17 in France (which has national standards), then all eighth graders must be on page 84 in the mathematics textbook.

This, however, turns out to be far from reality in most countries. The concept of a centralized system has no meaning until you specify what is centralized and what is not. The distinction is important because the fear

and opposition to national standards arises from the assumption that adopting such standards is the first step to the ultimate control of local schools by the federal government.

Yet as this report illustrates, many high-performing countries with national education standards have education systems that are even more decentralized in their operation than ours, at least in terms of the autonomy enjoyed by school-level educators. This and other lessons are outlined in these pages in an effort to shed light upon how the United States might also tread a path toward national standards, even national testing, without sacrificing our fealty to local control, properly conceived.

Twelve years after the release of the 1997 TIMSS results, another opportunity is at hand. The latest international test scores remind us that the United States remains behind most of the developed world. A new president and education secretary have stated clearly that our current system, with its drastic state-to-state variation in student and school expectations, is no longer tenable. They find themselves with a rare chance to invest in the development of national standards and tests. And organizations representing the states are moving toward a bottom-up approach to "common" standards. Yet, the critics and fear-mongers remain. Will the tales of our two cities converge? Will the United States finally seize this chance to overcome its longstanding angst about national standards?

INTERNATIONAL LESSONS

We have much to learn about the road to national standards, not only from Germany but from countries around the globe. This report presents six key lessons gleaned from in-depth study of 10 countries: Brazil, Canada, China, France, Germany, India, the Netherlands, Russia, Singapore, and South Korea. It also includes relevant information from an earlier report on 28 countries that participated in TIMSS (Schmidt et al. 2001), mini-case study profiles of each country in Appendix A and detailed supplementary tables in Appendix B. Many of these countries are making significant improvement in mathematics and science achievement and operate along a spectrum of national and local educational control. And although the lessons articulated herein build on their examples, they also heed American cultural and political realities, so they are particularly useful in helping us navigate the national standards terrain.

Lesson 1:

It is not true that national standards portend loss of local control.

Spirited discussion of national standards inevitably turns to the relationship between these standards and local control. Let us return to Germany's tale.

Recall that in 1997, Germany's state ministers for education and cultural affairs, known as the KMK, introduced for the first time national standards and standardized testing procedures to evaluate the state school systems. Ironically, this move is viewed by Germans as the starting point of *more* autonomy for individual schools and less influence from the state level. Before the KMK decision, the German school system was tightly controlled by federal states. They not only provided almost all the funding (which is still true today), but they also assigned teachers to schools and prescribed in detail the curriculum.

As part of the political compromise that led to national standards and their accompanying assessment, the once-dominant control by the federal states was loosened. States no longer assigned teachers to schools; individual schools selected their own instructional staff. This is an important point, because the common and most popular notion in the U.S. is that national standards imply less autonomy at the local level. The German experience clearly suggests otherwise (KMK 2004).

When this issue was first studied in 1995 as a part of TIMSS, many countries were described as centralized primarily because they had national standards. The truth was that many of these countries had *multiple systems* within them. In fact, some "centralized" countries had more than 10 different educational systems (Schmidt et al. 2001). Sometimes, systems within the country were differentiated by those who sponsored them: government, religious organizations, private industry, and the like. In other countries, differentiation stemmed from the government authority that had oversight, such as various ministries within the national government or various levels of government. Seen in this way, many of these so-called centralized systems are not monolithic entities at all. As a matter of fact, they are much like the U.S. with its multiple educational systems. (Admittedly, we are the most extreme example with 50 states and 15,000 local school districts.)

Let us be clear then: Centralization is most often *not* synonymous with national standards developed in isolation by the central government, which has total control over the system and clear intention to eliminate local control. When we understand that in other countries with national standards local control still exists, we can begin to tackle the real issue: Which institution (and at what level) should control which decisions?

For answers, we turn to what we've learned from the 10 countries we studied in depth. Except for Canada,

in all 10 countries decisions about goals and content (to varying extents) are made on the national level by a national governing body. Countries differ in how much they allow other levels of the system to be involved and the influence they allow stakeholders to exercise. The prevalent trend across countries is that the governing authority establishes the instructional foundation (e.g., content standards, examinations, instructional hours) and the lower levels assume responsibility for execution, while retaining some discretion to enact their own operational and curricular decisions. One of the most important elements of the educational system, then—the control over curriculum—is shared. (For more on this, see sidebar, pg. 18 *What Does Centralization Mean Internationally in Terms of Curriculum Decision Making?*) The vast majority of curricular goals[1] are decided by the institutional center at the national level, but regions and localities are permitted to supplement the national content with goals and subject matter of their own, and to choose textbooks and instructional methods. Naturally, there are differences in how the national institutions distribute, delegate, or devolve powers to the lower units.[2]

In Canada, the primary decision-making authority rests with its provinces. Canada does, however, have a national institution that ensures communication and exchange of information between provinces.

France, Russia, India, the Netherlands, and Brazil all have national institutions that set the requirements for education at a specified curricular level(s). This may occur, for instance, at the overall national level, for specific programs within the system, and/or for individual courses (via syllabi). But unlike Singapore and South Korea, these countries involve participants from other levels of the educational system in curriculum policy decisions. Since this "inclusive approach" mirrors the political realities in the United States, we focus the remainder of this lesson's discussion on these countries.

France leaves some independence to schools and teachers in developing their school educational programs. This trend has evolved over time; in the past, the French education system was centrally controlled. Specific legislation in 1982-83, however, transferred certain powers and responsibilities of the central government to France's *régions, départements*, and *communes*. The central government, though, still assumes overall responsibility for the core curriculum and the inspection of the education system.

In 2006, the state updated its national core curriculum in its passage of the *Act on the Future of French Schools*. The act introduced new standards (*le socle commun*) consisting of content outlines and outcomes that students are expected to reach upon completing compulsory education. The new standards define fundamental skills, attitudes, and knowledge in the French language, mathematics and science, a foreign language, information and communication technology, civics, and "humanist culture." In 2008, the French ministry issued a new national curriculum for primary education that sets out, for each cycle,[3] the knowledge, skills, and benchmarks to be reached at the end of each academic year in all subjects of the curriculum. The curriculum is intended as a starting point to help teachers plan studies according to children's developmental needs, while leaving the choice of teaching methods to them.

Russia's once standard national curriculum has been replaced in the last 20 years with one that has a national,

[1] The terms *standards, curriculum goals, curriculum, attainment standards* are all used interchangeably in this report and refer to what we in the U.S. call content standards or often just standards. All of these terms are used by different countries to refer to the specification of what children at a given grade level are expected to learn.

[2] Singapore and South Korea, for instance, differ from the other eight countries in that their national institutions exercise strong authority across the board, including school-level decisions (e.g., developing course syllabi and assessments), and in some cases, textbook development and approval (see Appendix A for case study reports on Singapore and South Korea).

[3] A "cycle" in French education means an age range. The "basic" cycle of primary education, for instance, includes 6-8 year-olds, while the "consolidation" cycle of primary education includes 8-11 year-olds.

regional, and local component. Sixty percent of the curriculum is defined at the national level (also called the basic curriculum), thirty percent at the regional level, and ten percent at the municipal/school level.

Decision making occurs on these same levels. Specifically, the federal level establishes the goals, content standards, and requirements relative to what students should know. It's also responsible for policy and strategic planning across the system and for setting textbook requirements. The regions define regional policies, manage teacher training (other than the training provided at universities), and organize and make available teaching materials. The municipal level (similar to our district level) builds, manages and controls schools, implements federal and regional requirements, and develops curricula (in line with federal requirements). Schools assign students to classes, choose textbooks, and make decisions on teaching methods. Regions, municipalities, *and* schools develop (non-national) standards that reflect minority languages and regional history and geography.

The decentralization and diversification in Russian education was accelerated in 1992 with the passage of the *Law on Local Self-Management*, which allowed institutions to make certain decisions on educational programs. In 1996, presumably in the wake of equity concerns, the law was amended to stress "a unified federal education space." This federal space was to ensure an equivalent educational experience across all regions. Still, as discussed above, some discretion was left to regions, municipalities, and schools.

The Netherlands has national "attainment targets" defining desirable outcomes for both primary and secondary school, but—by decree of the Dutch Constitution—significant powers rest with the local school boards to determine specific content. In formulating the national curriculum for basic secondary education, the Minister of Education, Culture, and Science is required to consult with the Education Council (a permanent advisory board), and the Consultative Committee for Primary and Secondary Education (POVO), which comprises representatives of the relevant governmental authorities, lead teachers, classroom teachers, students, and parents (each nominated by organizations representing these groups).

The revised *Primary Education Act of 1998* sets the educational goals for primary education, specifically which subject areas schools must teach and the attainment targets their pupils must reach. Schools are free to decide how much time they spend on the various areas of the curriculum and how to achieve the targets.

The national curriculum of basic secondary education, like the curriculum for primary education, specifies the subject areas, core objectives, and attainment targets. It is revised regularly and governed by decree. Schools are provided with "examination syllabi" that govern the requirements for final exams in compulsory and optional subjects at the end of secondary schooling.

The Netherlands has gradually given schools more flexibility in terms of setting, organizing, and meeting curricular objectives. In fact, in 2005-06, national attainment targets were substantially reduced from 128 targets to 58. This was in response to the evaluation of Dutch education carried out by the government in 1999, which concluded that the national curriculum was overloaded and fragmented. The new attainment targets do not cover the same level of detail for all subjects, resulting in variations in how much emphasis is placed on each (e.g., Dutch and arithmetic have more detailed targets than the creative subjects). Schools decide for themselves how to implement the core curricular objectives although there are independent organizations that provide institutional support and guidance. For instance, The Dutch Institute for Curriculum Development translates the core objectives into more detailed indicators, but the decision on how to reach those objectives rests with the schools.

Though Brazil's Federal Council of Education sets a core curriculum to which all educational systems must adhere, it also grants them the freedom to diversify it to reflect their own regional needs. Traditionally, gover-

nance used to be highly decentralized (due in part to the 1988 constitution that guaranteed independence to Brazil's states and municipalities). Since the 1990s, however, there have been efforts to strengthen the influence of the federal government so as to create a more level playing field. This has been in response to great disparities and inequalities in Brazilian schools and to a system that has historically produced very poor results, even in comparison to other Latin American countries. Low-quality elementary and secondary education, especially in the north and center-west regions of the country, has led to very low college degree attainment levels (9 percent).

The movement culminated with the adoption of the *National Law of Directives and Bases for Education* in 1996 and subsequent implementation of the National Curricular Parameters (referred to as PCN) by the Ministry of Education. The PCN is a comprehensive core curriculum with key student learning outcomes that builds on UNESCO's axes of education.[4] It establishes a common educational framework across the states and municipalities. Like many of the national standards for other countries, it consists of a Common National Base and a "diversified" component that gives schools flexibility to take into account regional and local needs. Brazil set curriculum guidelines for elementary education in 1997 and for secondary education in 1998.

Next we turn to India. Its Ministry of Human Resource Development serves as an umbrella organization for the Central Advisory Board of Education (CABE), which is responsible for planning and monitoring policies and programs, and the National Council of Education Research and Training (NCERT), which is in charge of development of curricula, detailed syllabi, and textbooks. In addition to NCERT, there's also the Central Board of Secondary Education (CBSE), which defines the curriculum in secondary schools, including the "learning conditions" and course of instruction for examinations. India's national curriculum framework for primary and secondary education has existed since 1988 following the National Policy on Education that the country adopted in 1986. However, for most of the 1990s, rather than implement the national curriculum, India's primary concern was to increase access to education and boost school enrollments. Significant progress has been made on these fronts, and India is now more focused on improving the quality of education. The national curriculum framework has undergone several revisions since first drafted and the most recent one (2005) lays the groundwork for the development of new national syllabi and national textbooks—both currently underway. Note that the national curriculum framework suggests rather than prescribes, yet most states have revised their curricula to align with it. The willingness of the states to follow the national curriculum is evidently related to the credibility of the NCERT and the fact that states have been involved in the development of the curriculum.

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Though nine of the 10 countries we studied have national standards driven by a national institution (Canada is the exception), the versions found in Germany, France, Russia, India, Brazil, and the Netherlands incorporate elements of flexibility and are not based entirely on a top-down approach (see Table 1 for a summary of how national, regional, and local authority is shared). Though they began in different places and responded to different needs and imperatives, all have converged on a decision-making model that involves a national institution setting national standards and sharing that authority with regional and local authorities. France, Russia, and India moved from highly centralized systems to more flexible ones while still retaining their national standards; Brazil, Germany, and India (at the primary level) moved from highly decentralized models to national standards; and the Netherlands is somewhere

[4] The United Nations Educational, Scientific and Cultural Organization (UNESCO) axes of education are an educational "treatise" that stress educational equality, ongoing learning, development of key competencies and skills, flexibility, cross-curricular themes, and contextualization of knowledge.

in between, albeit even more devolved in national decision making. Perhaps Germany's Federal Ministry describes the national-local balance best: "Leave the individual schools a broad scope to shape and structure their work….especially when the state curricula and framework guidelines [standards] are confined to core curricula. Schools can draw great benefit from this greater freedom and flexibility" (BMBF 2004).

We believe that this is likely the best path for the United States. Based on our research, we would recommend that national content standards comprise 75 to 90 percent of the total curriculum, with states and local districts (and, as appropriate, individual schools) crafting the remaining 10 to 25 percent. States and local entities would align their parts of the curriculum to the national standards, with an eye toward the same degree of quality and rigor. They would also be responsible for choosing instructional strategies, textbooks, and related materials. By approaching national standards in this manner, the United States could also strike a healthy balance.

What Does Centralization Mean Internationally in Terms of Curriculum Decision Making?

"Can policy alone create coherence in educational practice? Traditionally it has been held that this was true and that coherence could be examined by considering educational and curricular policies. More recently some have held that there must be a 'living' institutional center to maintain coherence in the curriculum (Timar, Kirp, and Kirst, 1998)...

For this part of our investigation, thirty-seven countries responded. The data they supplied involved 102 educational systems. An *educational system* is defined as a set of schools that operate with a particular sponsor or under a particular authority or control...We explicitly recognized five categories of educational systems in this sense. These included

1. National public schools—a single or several corresponding to different branches of government or to separate linguistic or cultural groups
2. Regional or provincial public school systems
3. Locally operated public school systems—for example, school districts, city school systems, and so on
4. Nonpublic school systems of national, regional, or local scope
5. Nonpublic schools or systems that operate essentially as independent enterprises...

With this context of system multiplicity, we can now more reasonably address the question, "What was the institutional center in most countries for curriculum decision making?" [Out of] the 102 systems for which data were provided, [we] asked how many of these had a national institution (most often a national ministry) as their central authority for curricular decision making. Almost 70 percent of systems (70 of 102) systems were reported to have this structure. This was, of course, true in all 19 of the countries reporting only 1 system.

The same was even true for two-thirds of the countries [twelve of eighteen] that indicated that they had multiple systems...This means that in those twelve countries, each of the multiple systems—for example, private schools, religious schools, and so on—had the same national institutional center for curriculum even though control and authority sponsorship resided with multiple entities such as the national government and the church. In one of the six countries that reported not having a national center for all systems, a center was the same for many but not all of its educational systems.

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Policy analysts and those who conduct research in educational policy often speak of centralized systems as a monolith according to a simple prototype—a single national system headed by a national ministry. In fact, based on the sample of TIMSS countries that supplied data, this was true for only about one-half of the countries. Other versions of centralization existed. For example, one country had 12 different systems headed by different institutions and government agencies, but all of the various systems had the same institutional center for matters related to curriculum.

Essentially then, the idea of educational centralization is far more subtle and ambiguous than is typically envisioned. Any cross-national investigation or report of educational practice that divides countries into two or three categories—for example, centralized or not—should be considered immediately suspect. They should be suspect as not providing a clear picture of the true range of organizational diversity and as making distinctions that are too superficial to have much valid explanatory potential. It would merely be reification for such a study to find that centralization seemed not to be linked to any meaningful distinction in education practice or achievements...

The other six countries not yet discussed had systems in which the institutional center was typically regional and for which there was a separate one for each distinct system. This was true for five of the six—that is, distinct systems were simply for different regions of Australia, Germany, Switzerland, Canada, and Belgium.

All of this suggests that a new image might emerge when speaking of centralization. This is an image of religious or ethnic school systems, of several public and private school systems, each sponsored and run by its own sponsoring agency—for instance, the Catholic Church or the national or regional government. However, within that context of multiple sponsors, in matters of curriculum all systems still turn to one institutional center for their coherence. Is such a system the same as one with a single public school system headed by a national ministry? That hardly seems likely in any effective sense. A more refined conceptual framework seems essential to describe such variation and thus to find something more than the traditionally ambiguous use of the term *centralization*.

The key question would seem to become "centralization with respect to what?" That is, what specific role does the institutional center play? Is it advisory, or does it have final authority? For which of the elements and facets of curriculum and educational practice previously described does it have which type of authority? Exploring these questions should yield a far more refined, effectual concept of centralization.

This is further complicated by the fact that even in countries with an institutional center defined at the national level, there are other institutional centers at regional or local levels involved in curriculum. Thus, the questions about the specific role an institutional center plays become more complex: Who is responsible for what? Who plays what role in shaping, articulating, and implementing curriculum?

In those systems with a national ministry or its equivalent, 75 percent (52 of 70) also have regional or provincial government agencies involved, and about 60 percent (40 of 70) also have local government centers as well. All of the systems without such a national center have some form of subsystem. Obviously the curriculum policy context is complex in most countries. Simplistic labels must be avoided. Perhaps it is time to call a moratorium on the use of the term *centralization* until it could be used to call forth more subtle forms of institutional arrangements."

Excerpted from Schmidt et. al., 2001., p. 44-47

TABLE 1: Role of the national, regional, and local levels in five countries

COUNTRY	ROLE OF NATIONAL LEVEL	ROLE OF REGIONAL LEVEL	ROLE OF LOCAL LEVEL
France	*The Ministry of National Education* The Ministry drafts the curriculum and oversees educational "coherence." It also ensures that curricula and training related to it are available to the teaching staff. The Ministry's Evaluation division sets content and performance standards. Advisory assistance is provided by the High Council of Education, which has members from many interests groups (parents, teachers, educational organizations, etc.).	There are 31 *académies* that act on behalf of the Ministry and oversee the regional application of national policies.	Schools are independent in their administrative and teaching activity. They choose their own teaching methods and textbooks.
Russia	*Ministry of Education and Science of the Russian Federation* The Ministry sets standards and time allocations for instruction, develops basic curriculum that constitutes 60 percent of the overall curriculum, and approves textbooks (the number of competing textbooks is restricted to three).	Regions retain a portion of curricular decision making (30 percent) that complements the national standards and accommodates local differences and needs.	Schools retain a portion of curricular decision making (10 percent) that complements the national standards and accommodates local differences and needs.
India	*Ministry of Human Resource Development (includes National Council of Education Research and Training and the Central Advisory Board of Education); Central Board of Secondary Education.* The National Council of Education Research and Training develops the national curriculum framework, detailed standards, syllabi, and textbooks. The Central Advisory Board of Education designs and monitors education policies and programs. The Central Board of Secondary Education prescribes the course of instruction in secondary schools and the content of secondary examinations.	State governments collaborate with the central government and the national organizations on matters related to education. The Central Board of Secondary Education operates regional centers that are in charge of day-to-day communications with schools, including arranging administration of secondary exams.	A small degree of discretion and decision-making authority rests with districts and village councils.
The Netherlands	*Ministry of Education, Culture and Science* The Ministry drafts national standards, sets attainment targets, and coordinates its policies. Specifically, it determines the types of schools that may exist, which subjects are required or optional, the number of teaching periods per year, and the length of the courses.	Regional authorities have a limited role in school management because they are not the "competent authorities" of educational institutions. Their responsibilities include ensuring the availability of adequate numbers of schools, allocating resources for "eliminating educational disadvantage," and monitoring compliance with the Compulsory Education Act.	Though the Ministry sets the standards, schools decide how to implement the core (curricular) objectives and what content will be taught. School boards (or other competent authorities) administer and run the schools, which involves managing costs and determining the curricular policy.
Brazil	*The Federal Ministry of Education (MOE)* The MOE develops a common core national curriculum which comprises roughly 75 percent of the total curriculum. The common core guidelines specify the minimum and maximum hours to be spent teaching various subjects in the curricula, the required number of school days, and the content of the final course tests. The MOE via its National Institute for Education Studies and Research and its agencies administers a national test every two years to a sample of students in the country.	Regional and local entities, called governing units, are responsible for making education available to all students and ensuring that regional differences and local culture are respected in the curriculum.	Roughly 25 percent of the curriculum is determined by individual schools.

Lesson 2:

Create an independent, quasi-governmental institution to oversee the development of national standards and assessment and produce reports to the nation.

This lesson really has two components: the creation of an independent national center and the articulation of what that center should do. We start with the first.

We believe the data support the creation of a national center, yet some oppose the idea on constitutional grounds.[5] They would prefer that states simply share their standards with one another in hopes that common standards would evolve over time. Alternatively, some hope that a national organization of academics or teachers could lead this effort without the need for another national organization.

Recall that in Germany each of the federal states had standards which, via the KMK, were shared with the other states—an approach similar to Canada's. Ultimately, this technique was deemed inadequate primarily due to the country's concern with large "disparities that continue to characterize the German education system: between regions, between children of different social backgrounds, and between immigrants and those who have grown up in Germany" (BMBK 2004). Germany concluded that such discrepancies could only be reduced if the KMK established common standards linked to a quality assurance system, including regular assessments and/or school evaluations (BMBK 2004).

In fact, the rationale that national standards address educational inequities is a common one. Brazil and India (at the elementary level) have recently moved to national standards since their ministries believe they assure equality of educational opportunity. Recent legislation (2006) in France emphasized the importance of developing a common knowledge base to ensure success for all students. China, too, emphasized educational equality as its rationale for moving away from developing examinations—which have historically determined the content of instruction—to specifying curriculum standards through the national ministry. The equality issue is especially relevant to the United States where fragmentation and curriculum gaps exist and create (or result from) differences in opportunity related to regional location or social class.

So can focused, coherent, and rigorous standards for *all* children be developed without a national institution? All of the countries in this report with national standards say "no." Each has a national institution.[6] The question becomes then, where within the educational system should it reside?

If it were housed at a lower level within the system (i.e., the state or district level), we would continue to have a hodge-podge of loosely coupled educational visions, each advocated by its own actor. (See sidebar, pg. 23, "The Consequences of Fragmentation in U.S. Mathematics and Science Education.") The absence of a coherent vision would have severe consequences, particularly the continuing promulgation of patchy and imprecise standards—and, as Brazil, India, and France have discovered, unparalleled inequality.

The key to attaining national standards is determining the nature of the national institution and its relationship to other parts of the system, each of which play a role in curricular decision making. Most of the nine countries have a national institution that is a part of the national government, with which at least one or more federal governmental agencies are involved.

[5] To pretend that education is only a state or local issue denies its importance as a national public good. For example, we have a national interstate system of highways and toll roads even though they are controlled by the states (though the standards by which they're built are national). We talk of a national economy even though it varies by region within the United States. Furthermore, Hanushek's work (2008) shows that our national economic growth is related to the knowledge created by our educational system. So our national economic growth, national security and other national concerns are dependent on our national educational output, no matter where or by whom those schools are built.

[6] Even Canada has a national institution, though it only serves to coordinate education policy among provinces.

Their actions are often supported by laws arising from the federal legislative process. Unlike the other nations, Germany began in a very different position in 1997. It moved toward national standards in response to the grim realities reflected in the TIMSS and PISA results, but with a decentralized system of education already in place.

There are multiple possibilities, but we'd recommend building on Germany's "decentralized" example. This means that the national center would not be a component of the federal government (i.e., not part of the U.S. Department of Education), but rather an independent quasi-governmental institution—like the National Assessment Governing Board or the National Academy of Sciences—created by the states to oversee the development of national standards. It would include an apolitical board of academics, educators, teachers, and representatives of the public. Appointments would be made through the states, led by the governors. Specific qualifications would vary for academics, teachers, and professionals but would generally include subject matter expertise and/or experience working in the field. This new institution could serve a role much like KMK did in Germany, a quasi-governmental organization created by the federal states in which state participation is voluntary.

The national institution would be responsible for updating them periodically, and setting policies for carrying out the development and administration of a national assessment based on those standards.

These national policies and national test would replace state policy and state assessments for those states that volunteer to participate. We recommend that the roles of National Assessment of Educational Progress (NAEP) and the National Assessment Governing Board (NAGB) be integrated in some way with the newly proposed national center. The details of how this center develops and operates will necessarily evolve as the process unfolds, especially when the number of states to be involved becomes clear.

Lesson 3:

Position the federal government to encourage and provide resources for the standards-setting process.

Again, we look to the German model primarily because its structure of governance is very similar to that of the U.S. (i.e., states have the primary responsibility for education). As explained earlier, Germany's KMK became the national institution that moved the country toward national standards. That council, however, is not part of the federal government. It is made up of representatives of the 16 states.

In response to the concerns cited earlier, the Federal Ministry of Education and Research (BMBF) commissioned the German Institute for International Educational Research to convene an interdisciplinary group of experts charged with developing a blueprint by which policymakers could move to national standards. The membership of this committee included highly regarded academics and policymakers. This initial development work, supported by both the federal government and the states, resulted in a national report. Public comment on the proposed approach within the report was solicited from various educational organizations, including teachers unions, business organizations and the general public.

The process of obtaining buy-in from states and schools was not automatic. In exchange for participation, schools were given greater freedom in how they managed instruction. (This was also the case in the Netherlands, India, Russia, and France—where each loosened national control over schools.) In addition, teachers unions were assured that schools would not be punished for poor results. These compromises, along with the strong push from the KMK, convinced all states, via their own legislative processes, to join the effort.

We recommend that this be the role of the federal government in moving the United States to national standards and a national assessment—encourager and resource provider, not standards setter.

The Consequences of Fragmentation in U.S. Mathematics and Science Education

"...There are no single coherent, intellectually profound, and systemically powerful visions guiding U.S. mathematics and science education. An ephemeral aggregate of fragmentary intentions stands in [their] place as it does in few other nations. Reform efforts in mathematics and science education have offered coherent and powerful visions. However, they have yet to achieve the consensus and lack of variant interpretations that would allow them to [stand alone], one for mathematics and one for science, [which would] consistently and profoundly shape U.S. educational practice. Perhaps we do not need consistency in guiding visions. Perhaps the value of diversity outweighs that of a focused, unified pursuit of a few key goals. However, while some would have this remain an empirical question, given the effects of unclear visions and goals revealed by our data, the importance of seeking more coherence should certainly be a question for public discussion.

We have no shortage of visions of how U.S. mathematics and science education are "supposed to be." Partly this is because we have no shortage of [sources] articulating [different ones]. In the U.S., shareholders in the "official" vision enterprise include over 15,000 local school districts and boards and 50 state education agencies—as well as various federal offices, committees, boards, and administrators. Others with a stake in the enterprise join official shareholders. These include textbook and test producers, members of professional organizations in mathematics and the sciences , teachers' organizations, special interest groups with educational goals, governmental officials at all levels who state policy broadly but not in detail, etc...

Formally, this situation is a loose coupling of several relatively independent "actors." What is the basis for their actions and decisions, and how does this affect the aggregate coherence of emerging policies? One possible organizational model is a classical, "rational actor" model. This model considers each actor to behave rationally in making individual decisions with an eye to the cumulative effect of those decisions on the whole. The strong mutual concern and sense of shared responsibility implicit in this model do not seem characteristic of our situation today.

An alternative model seems likely to be more germane. This is an "organizational process model" that views government as a conglomerate of many loosely allied subunits each with a substantial life of its own (Allison, 1971). This certainly seems more characteristic of the loose federalism guiding science and mathematics education locally, at the state level, and nationally. This is especially true when we include secondary actors, such as professional organizations and textbook and testing organizations, in the picture. Each "actor" pursues his or her own "life"—his or her goals, visions, plans, processes, and efforts to satisfy those to whom he or she is accountable. The aggregate effect of these separate lives is a secondary concern for most.

The decisions, policies, and documents that flow from this conglomerate of "subunits" should be considered not so much as deliberate choices contributing to an aggregate effort. Rather, we may better consider them "outputs of large organizations functioning according to standard patterns of behavior" (Allison, 1971). Thus, the parts of our federalism not only act with primary reference to their own internal life, but they operate by traditional patterns. These patterns vary in how integrally they include attempts at "rational" decision making and concerns for aggregate effects beyond their own particular concerns.

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In the U.S., states and school districts create curriculum frameworks, standards, objectives, and other curriculum documents. Commercial publishers develop textbooks for use in science and mathematics classrooms. National associations suggest reforms. Test publishers develop tests that have curricular implications. Teachers make day-to-day classroom plans and implement them. The federal government develops a "national report card" based on NAEP findings that has implications for the success of curriculum efforts. Some national boards and programs struggle to influence coherence in the aggregate vision of science and mathematics education. However, little of this is coordinated, and what little exists is deliberately noncompulsory.

In this kind of situation—various organizations loosely joined into a larger enterprise...—the organizational process model predicts that the component organizations will not always work towards common goals. They will not always aim at producing important combined results. Individual organizations tend to act parochially and are more concerned about their own agendas and responsibilities. [As Allison (1971) explains, the] actual results are a consequence of 'innumerable and often conflicting smaller actions by individuals at various levels of bureaucratic organizations in the services of a variety of only partially compatible conceptions of national goals, organizational goals and political objectives...'

Many people have a tendency to assume a model of rationally acting organizations that somehow share a coherent enterprise. This would allow clear assessment of cause and effect and the ability to assign praise and blame to various "actors" for why things are as they are. Many in the U.S., for example, would seek to blame teachers or textbook publishers for the current state of mathematics and science education. However, the more realistic model seems to be one of independent organizations pursuing their own properly parochial goals, but often with little concern for or insight into the composite U.S. science and mathematics curricula."

Excerpted from Schmidt et al., 1997, p. 89-93

Lesson 4:

Develop coherent, focused, rigorous standards, beginning with English, math, and science.

This lesson is gleaned not only from the 10 countries included in this study but also from the 30-plus countries examined as a part of the original TIMSS report (Schmidt et al. 2005). That report found that the curricular standards in the top achieving countries were focused, rigorous, and coherent. In general, U.S. state standards are not.

The reason is simple. The word "focus" refers to the practice of concentrating instruction at each grade level around a reasonably small number of topics. Such concentration allows for those topics to be covered in depth. Having so many topics in the curriculum as the U.S. does means that each topic is covered superficially—and, often, repeated grade after grade.

Further, school subject matters are a reflection of the formal academic discipline from which they're drawn. As such, when particular topics are organized within and across the grades, their sequence must be consistent with the inherent logic of the discipline itself. That certain topics are prerequisites for others must be acknowledged. What has typically characterized state standards are topics put together arbitrarily in a process governed

more by politics than substance. Thus middle school mathematics in most high-performing countries focuses on algebra and geometry, but in the U.S. these areas are typically deferred to the high school level. Indeed, our middle school mathematics is largely a repetition of the arithmetic topics covered in grades 1-5.

Recent research has shown that coherent, focused and rigorous standards are related to cross-national differences in mathematics achievement (Schmidt and Houang 2007). Other than this work, though, little research exists to demonstrate the effect of standards on academic performance. Part of the problem is that most countries already have national standards, so studying the relationship is difficult at best. That said, Germany is beginning to see some improvement in their performance after its move to national standards.

Development of quality standards necessitates grounding in an intellectual and academic basis, not a political or ideological one. This means that subject matter scholars play a major role in their development, as well as others with deep subject matter knowledge who are engaged in related professional, business, and vocational fields (including teachers). Their deliberations should be informed by international benchmarks where available. This does not mean copying another country's standards—a practice we strongly advise against. It does mean, however, examining common characteristics across the curricula of high-performing countries to glean guiding principles for our own standards development, trimming the number of topics covered, and eventually arriving at consensus once competing ideas have been considered. Concise, grade-level standards are best if specific.

TABLE 2: Subjects in which various countries have standards at the primary school level

	Brazil	China[4]	France[7]	Germany	India	Netherlands	Russia	Singapore	South Korea[10]
Art	x		x						
Environmental Studies					x	x			
Foreign Language	x[2]	x[5]	x	x		x	x		x
Geography	x		x						
History	x	x	x						
Ideology and/or Morality		x							x
Math	x	x	x	x	x	x	x	x	x
Native Language and/or Language Arts[1]	x	x	x	x	x[8]	x	x	x[8]	x
Physical Education	x[3]	x	x			x	x	x	x
Science	x	x[6]	x		x			x	x
Social Studies and/or Social Sciences					x	x	x[9]	x	x

1 - Native Language and/or Language Arts refers to the official language(s) of that country
2 - Brazil's foreign language standards are for years 6, 7, 8, and 9
3 - Brazil's P.E. standards are for years 2, 3, 4, and 5
4 - China also has standards for "ethics and life" and "ethics and society"
5 - English is a required foreign language in China
6 - Science in China is an integrated "common knowledge" subject in the early grades
7 - France also has standards for civics and technology
8 - English is one of the official languages in India and Singapore and is included in Language Arts testing
9 - Social sciences in Russia includes subjects such as foreign languages, Russian history, world history, law, and political science
10 - South Korea also has standards in "music fine arts"

TABLE 3: Subjects in which various countries have standards at the secondary school level

	Brazil[2]	China	France[5]	Germany	India[6]	Netherlands[8]	Russia[8]	Singapore[8]	South Korea
Art		x				x		x	x
Biology	x	x			x				x
Chemistry	x	x	x	x	x				x
Environmental Studies									
Foreign Language	x	x[3]	x	x		x[3]			x
Geography	x	x	x		x				
History	x	x	x		x				x
Ideology and/or Morality									x
Math	x	x	x	x	x	x	x	x	x
Music		x							x
Native Language and/or Language Arts[1]	x	x	x	x	x[7]	x	x	x[7]	x
Physical Education		x	x			x	x	x	x
Physics	x	x	x	x	x				x
Political Science		x[4]			x		x		
Technology and/or Computer Science		x	x						x
Social Studies and/or Social Sciences	x		x		x	x	x[9]		x
Sociology	x				x				

1 - Native Language and/or Language Arts refers to the official language(s) of that country
2 - Brazil also has standards for philosophy
3 - English is a required foreign language in China and the Netherlands
4 - Political science in China includes political ideology and morality, history of social development, political philosophy and political economy
5 - France also has standards for civics
6 - India also has standards for economics (grades 9 and 10), psychology and business studies and accounting (grades 11 and 12)
7 - English is one of the official languages in India and Singapore and is included in Language Arts testing
8 - Some countries have standards for science more broadly, instead of biology, chemistry, and physics standards. In this table, three countries qualify: The Netherlands ("man and nature"), Russia ("natural sciences"), and Singapore ("science")
9 - Social sciences in Russia includes subjects such as foreign languages, Russian history, world history, law, and political science

All nine countries with national standards have them for mathematics and language arts, and most have them for grades 1-10, though some go on to grade 12 (see Tables 2 and 3). Eight of the countries (though not Germany) also have standards in science (sometimes broken down into chemistry, physics, and biology). Given these international precedents as well as our own country's emphasis on these three subjects, they are the logical place to start. Moreover, these standards should be for all students; none of countries we studied had tiered, modified, or "accommodated" standards for subgroups of students (such as those in gifted or special education).

At a later time, the United States should consider adding standards in such areas as history, economics, civics, and so on—though arriving at consensus here will require additional effort (and patience). Yet many

other countries have standards for social studies, art, and a foreign language.[7]

Lesson 5:

Administer national assessments (including open-ended questions) at grades 4, 8, and 12, every two years.

Most countries do not test every year in every grade. For instance, Brazil tests a sample of students every two years, Canada tests every three, and Germany tests every five at the primary level and every three at the secondary level. Given that we already have in place NAEP testing in grades 4, 8, and 12, we suggest keeping that pattern and testing every other year (as Brazil does). Eventually the twelfth-grade assessment, if done right, could become more of a high-stakes test with implications for college admissions, course assignment, and employment or job placement (as is done in Singapore, South Korea, France, the Netherlands, Brazil, and India). Such an assessment, of course, would have to be given annually.

Who gets tested also varies greatly by country. In China, students are tested in every compulsory level (grades 1-9). Throughout compulsory education, Chinese pupils are required to take end-of-term exams after each semester and all students take a graduation exam at the end of secondary school. In Singapore, students take an exam in the fall of sixth grade and then either in tenth or eleventh grade depending on which curricular track they are in. The purpose of the exam in sixth grade is partly to determine which school a student will attend and which curricular track he or she will pursue. The secondary exams are used to determine further study at the higher secondary and post-secondary levels.

Like their peers in Singapore, students in South Korea take an exam in the fall of sixth grade to partially determine their secondary curricular track; they also take exams in the fall of ninth and tenth grades, and one in twelfth grade that partly determines college admissions. In the Netherlands, students take an exam at the end of primary school (sixth grade), which partly determines their secondary track; the exam is not required, but over 80 percent of students take it. Dutch pupils also complete national exams at the end of secondary schooling.

French students take a national assessment when they are 8 and 11 years old (i.e., at the beginning of upper primary school, grade 4, and at the beginning of lower secondary school, grade 6). It is used to evaluate whether or not they are meeting standards. Students also take an exam for graduation at the end of twelfth grade. In Canada, a sample of 13 and 15 year-olds (typically in eighth and tenth grades) take a national assessment called the Pan-Canadian Assessment Program (PCAP), which functions much like the United States' NAEP assessment. In India, students take a national assessment at the end of tenth and twelfth grades, and in Germany at the end of third, eighth, and ninth grades. Finally, Brazilian students take exams at the end of the fourth, eighth, and eleventh grades, but results are not used to steer children into specific curricular tracks.

In recent years, there has been a significant increase in the use of multiple-choice or objectively scored questions on national assessments in European and Asian countries. This is primarily because these types of questions are easily scored with accuracy and objectivity and provide fast feedback at relatively low costs via computerized scoring and reporting.

This increase has been coupled, however, with strategic use of open-ended items. Except for China, *all* of the countries for which we have assessment information supplement multiple-choice items with open-ended questions on their national tests. In fact, it's now stan-

[7] One other issue related to standards development bears mentioning. Before developing high school standards in mathematics, the U.S. should examine its current practice of dividing them into separate courses by topics (such as algebra, geometry, trigonometry, and calculus). Few countries, if any, other than the U.S. (none of the 10 studied in this report nor any of the 30-plus studied in the TIMSS research) organize high school standards this way. How this is resolved would impact future development of high school mathematics standards.

dard practice in most countries to include a mix of multiple-choice, open-ended, and essay-type assessment items. The emphasis on open-ended questions is particularly prevalent at the secondary level, where reasoning, analytic, and communication skills become even more important.

Because there are fewer open-ended questions on the national examinations, they typically carry more weight in the overall scoring. In almost all the countries we studied, the open-ended (and essay) items are read and scored by teachers and other local educators according to established guidelines. These countries view the scoring of open-ended items as professional development for their teachers and as legitimate parts of their work responsibilities.

We recommend the inclusion of a variety of test questions—open-ended, multiple-choice, perhaps even a few reliable performance-based items—on our national assessment. (What percentage is open-ended would obviously be influenced by budget considerations.)

Lesson 6:

Hold students, teachers and schools accountable for performance.

Results-driven accountability is defined in terms of student learning. As has been the case in the United States, testing around the world has expanded beyond an instrument for decision making about students into a lever for holding schools (and to some extent, their personnel) accountable. When properly aligned to national standards, assessment results in many countries help to determine whether students should progress from one level of schooling to the next, how administrators and teachers are deployed and rewarded, and how resources are allocated among schools. In the European and Asian countries we studied, accountability is part of a well-aligned system that includes standards, assessments, instructional materials, resources, and teaching-learning strategies.

Accountability across these countries spans multiple levels—student, classroom, school, regional, and national. We believe the U.S. should define a model of accountability that includes all five levels.

Internationally, end-of-course and national exams typically "have teeth." In China, students must pass end-of-course exams to be promoted to the next grade level. In Singapore, South Korea, and the Netherlands, exams at the end of primary education determine (in part) students' secondary curricular track. All three of these countries also give graduation exams. In Russia, students take a national exam at the end of secondary school that is used for college admissions. Once again, we recommend that twelfth grade results, after proven reliable, be used in post-secondary decisions, much as is done in Russia, Singapore, South Korea, France, and the Netherlands.

In some countries, the teeth are sharper than others. In China, for instance, schools are ranked according to their students' assessment results, which in turn impact their level of state funding. In Singapore and the Netherlands, parents use schools' published assessment results to help them decide which school their children should attend. In other countries, results are used to compare different regions. For example, in Brazil, India, and Canada, data from students in various regions, states, and provinces are compared to one other and with overall national results. Often, the results prompt questions among educators across regions regarding how to better reach and teach students. The French, for instance, use school-level and classroom-level results for diagnostic purposes and for instructional improvement purposes.

Assessment results should also be made public in a variety of ways. In Singapore, schools are ranked by those results and the information is widely published in newspapers and education reports. In the Netherlands, schools must inform parents of assessment results and a national report card is issued for each school. India publishes a statewide education report and distributes district-wide report cards. And Canada and Germany release national reports that allow for state and regional comparisons.

SOME FINAL COMMENTS

It is time for the United States to have its epiphany as Germany did some 10 years ago—and bring the two tales to a similar ending. The most recent results from international studies have been no kinder to the U.S. than the 1995 TIMSS or the 2000 PISA. Our children's performance continues to lag that of most other major countries in the world. Economists and CEOs tell us that this is a threat to the nation's economy and security. To ignore all of these data is to imperil not just our nation but our children who depend on us to give them what they need to function as future adults in the 21st century.

We know that the top achieving nations have national standards and we know what they look like. They are focused, coherent, and rigorous and they stem from systems that are also coherent. They are delineated by a national center that seeks the input of university scholars who understand the discipline that spawns the school content and of teachers who know how to teach content and children.

We know this same coherence will not occur in the U.S. by simply letting the process play out on some 50 stages. If we performed in the top spots on international comparisons, perhaps we could defend what we uniquely do. But given our impoverished performance internationally, we should question our approaches and look to what others are doing more successfully.

We have shown that having common standards does not require national or federal control of the local school systems. It follows logically that the United States can craft its own sharing of authority that is uniquely American. National standards should be set by some quasi-governmental organization created by the states (as in Germany). This organization would develop, control, and regulate the process while all other responsibilities—including some with respect to the curriculum itself—would remain at the state or local district level. The choice to adopt national standards is not an all-or-nothing decision.

We believe the focus of the debate should be on what is best for our children and their futures in a complex world. It is hard to imagine defending our current approach when we know the consequences: low standards by international comparisons, mediocre student performance (especially at eighth and twelfth grades), and huge inequalities in curricular opportunities (Schmidt and McKnight 2009). The absence of common standards further exacerbates the achievement gaps that social class influences in the early years. PISA data in the U.S. show substantial inequities in achievement among our student populations. Today the performance gap between the highest and lowest achieving students in the United States is among the largest of all OECD countries (OECD 2007). Rigorous, coherent and agreed upon mathematics, English, and science standards must form the basis for student's learning—regardless of socioeconomic status or geographic location.

The process of establishing national standards will take time to develop and to implement. We have an effort underway right now for mathematics and reading standards, led by the National Governors Association and the Council of Chief State School Officers. It's an important step that should be followed by others in quick succession. We can hardly afford to postpone our future.

APPENDIX A

COUNTRY PROFILES

BRAZIL

Governance

The movement towards a national system of education in Brazil was inaugurated with the 1996 *National Law of Directives and Bases for Education*. Prior to 1996, Brazil's mostly decentralized model of education was rooted in the 1988 constitution, which granted individual states and municipalities a significant degree of autonomy. The 1996 law aimed to create a more level playing field in this multicultural nation with 26 states and more than 4,500 municipalities, each with their own education systems. Further, it set out to do so by increasing student enrollment and improving the quality of education in a system that had neglected schooling for decades. Importantly, the law defined the educational responsibilities of the central government, state governments, and municipalities. The central government's primary responsibility would be to provide financial and technical support; it would also set curriculum guidelines and minimum core content for primary and secondary schools. State governments would oversee secondary education and municipalities would be responsible for providing primary education.

Shortly thereafter, Brazil's central government fulfilled one of its new primary responsibilities when it introduced the National Curriculum Parameters (referred to as PCN)—the country's first national standards. These efforts produced a set of centralized curricular standards and policies that placed administration and policy implementation at the state and municipality levels.

Curriculum Goals

The Ministry of Education drafted the PCN to establish coherence in educational policies across the states and municipalities. It delineates the core areas of curriculum content and identifies key student learning outcomes.

The 1996 launch of the PCN initiative was followed by the development of the first national curriculum for elementary education in 1997 and for secondary education in 1998. Each national curriculum consists of a "Common National Base," which comprises 75 percent of the total content; the remaining 25 percent is to be determined by individual schools. The 1996 reforms also instituted a large-scale training program for teachers in order to apply the curricular changes therein.

In addition to the 1996 law, the federal government drafted several resolutions that provided detailed directives for the national curriculum from pre-kindergarten to tenth grade. These directives determined the subject areas required in the national common core: Portuguese, history, geography, science, mathematics, arts, and physical education for years 2-5—and one or two foreign languages (usually English and/or Spanish) for years 6-9. As explained above, schools supplement the core curriculum according to the needs of the students and region.

Assessment

Efforts to strengthen the national influence in education also included the revival of the National Institute for Educational Research (INEP), an agency responsible for statistics, evaluation, and assessment in Brazil. INEP oversees three large assessments in education—the National System of Basic Education Evaluation (SAEB), the National Secondary Education Examination (ENEM), and the national examination for undergraduate programs.

Since 1995, SAEB has been administered every two years to a representative sample of students from state and municipal public and private schools in each of the 26 states and the federal district. The SAEB, which is aligned to the national standards, evaluates students at the fourth and eighth year of primary education and the third year of secondary education (grade 11). Students are tested in Portuguese language arts and mathematics.

The ENEM assessment is voluntary and has been used since 1998 for assessment of students after eleventh grade. It is a single, multidisciplinary test consisting of an essay and multiple choice questions. Like the SAEB, it is aligned to the PCN.

Both the SAEB and the ENEM serve as important evaluation tools in monitoring the quality of education in Brazil. The SAEB assessment is primarily diagnostic, generating data that informs policymakers about the conditions of education in Brazil. The ENEM results are typically used to gauge schools' success in meeting the demands of curricular reforms. However, universities are increasingly taking the results of this voluntary (and free) test into account when accepting students. Because the test is aligned with the curriculum and assesses what should be taught, primary and secondary schools also pay attention to it.

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Since 2001, early childhood, primary, secondary, and adult education have each acquired national curricular guidelines. Despite this, Brazil's college attendance rates remain a problem. Only 9 percent of all Brazilians are able to obtain a university education degree, one of the lowest rates in South America. The challenge of increasing these college success rates will depend heavily on the current movement to improve the quality of education at the elementary and secondary levels. Though this has taken place in all parts of the country, there has been a special emphasis on the north and center-west regions of Brazil, where student achievement is significantly lower than other regions of the country.

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CANADA

Governance

Authority over education is a historically local affair. Ministers of Education in each of Canada's 13 jurisdictions (10 provinces and three territories) oversee the organization and provision of education, as well as the development of curricula and standards. In fact, the Canadian Constitution provides that "in and for each province, the legislature may exclusively make laws in relation to Education." Accordingly, there is neither a federal department presiding over nor federal dollars funneled to early, primary, or secondary education. In addition, funding for elementary and secondary education is provided by provincial and municipal agencies; the portion of the federal transfer payments made each year to provinces and territories for education is nominal.

Canada is province-centric. But though education is the responsibility of provinces and territories, there are efforts to coordinate individual educational systems on the national level through the Council of Ministers of Education (CMEC), which serves as a means of cooperation between the provinces on issues of mutual interest. Thus CMEC, founded in 1967, provides a forum for the respective education ministers of each province or territory to discuss policy issues and consider ways in which they can collaborate. CMEC's duties, however, are limited; it has no involvement in the day-to-day running of the schools.

For the most part, CMEC is concerned with research and design initiatives; national data collection and statistics—such as overseeing the Pan-Canadian Assessment Program (PCAP); Canadian representation in international forums (like participation in PISA); and providing a vehicle by which the provinces can collaborate on projects and programs of common interest. In April 2008, CMEC released a new statement of national goals entitled *Learn Canada 2020*. This document guides the work of CMEC and provides a framework for education reforms in each of the provinces and territories. It defines "four pillars of lifelong learning," which the council believes to be integral to the preparation of all Canadians for the 21st century: early childhood education, primary and secondary education, tertiary education, and adult learning and skills development. *Learn Canada 2020* instructs provincial and territorial reforms in the following areas: increasing literacy rates, closing the achievement gap between aboriginal and non-aboriginal students, increasing access to postsecondary institutions, and formulating comprehensive long-term education data and research strategies, among others. The ministers meet twice a year.

Curriculum Goals

Curricular considerations are perhaps the area in which the provinces and territories have the most in common. Although each of the provinces and territories develops and uses its own curricula for each subject, the jurisdictions have formed two consortia in which curricular considerations are agreed upon: the Council of Atlantic Ministers of Education and Training (CAMET, also known as the Atlantic Protocol for Education), and the Western Canadian Protocol for Collaboration in Basic Education (WCP).

CAMET is the fourth iteration of a council of government officials from the eastern Canadian provinces and currently exists under the purview of the Council of Atlantic Premiers (CAP), a collective of provincial leaders from New Brunswick, Newfoundland and Labrador, Nova Scotia, and Prince Edward Island. CAMET's grandfather organization was the Maritime Provinces Education Foundation (MPEF), founded in 1982. When Newfoundland and Labrador joined MPEF in 1995, the name was changed to the Atlantic Provinces Education Foundation (APEF), which published its first curricular framework in 1997. In April 2004, the group morphed again and became the Council of Atlantic Ministers of Education and Training (CAMET). In December 2008, CAMET released a set of strategic directives for 2009-2012 in response to CMEC's *Learn Canada 2020*. A central part of this

new initiative is the review and improvement of CAMET's literacy and numeracy standards as well as guidelines for teacher and principal training.

Unlike CAMET, the WCP is less of a body than a document. Signed in 1993, the protocol's signatories include Manitoba, Saskatchewan, Alberta, British Columbia, Yukon Territory and Northwest Territories. The territory of Nunavut, which was created in 1999 by splitting off part of the Northwest Territories, joined in 2000. The document covers grades K-12 and the effort released its first framework in 1995. In each of the areas covered by the document—social studies, for example—one or two provinces or territories took the lead in developing a common curricular guide. As the social studies framework explains, "As intended by the Western Canadian Protocol agreement, each jurisdiction will decide how and when to use the Framework to accommodate provincial or territorial needs." In other words, the frameworks developed through WCP collaboration are a floor, not a ceiling. One of the particular interests of the WCP is aboriginal education, specifically Inuit education, as large portions of the populations in the signatory jurisdictions are native.

Despite these curricular consortia, *specific* curricular goals are still decided at the provincial or territorial level. The ministries of education in each jurisdiction are responsible for producing curriculum guides, which outline intended learning outcomes by grade, year, and subject. These guides are usually developed by teams of teachers under the direction of the jurisdiction's ministry.

In the late 1990s, CMEC also adopted the Pan-Canadian Protocol for Collaboration on School Curriculum to facilitate cooperation between provinces and territories and to improve the overall quality of education in Canada. Numerous curricular initiatives have been developed under this protocol, including the Common Framework for Science Learning Outcomes—K to 12, the Western Mathematics Curriculum, and the Atlantic Common Curriculum. Again, compliance with these national curricula is voluntary at the provincial and territorial levels.

Assessment

Yearly student-level testing in specific content areas is conducted by the provincial or territorial ministries of education. Each jurisdiction uses their own test and many jurisdictions publish the results of the tests for the general public.

In addition to these local tests, Canada has a national assessment based on a national sample of students in reading, math, and science: the aforementioned CMEC-driven Pan-Canadian Assessment (PCAP). Canada also participates in international assessments like PISA. Similar to the U.S. National Assessment of Education Progress, PCAP tests a random sample of 30,000 13 and 16 year-olds every three years. The first administration of PCAP was in 2007; it replaced the School Achievement Indicators Programme (SAIP). SAIP, which covered reading, writing, math, and science, was developed in 1989 and administered every three years from 1993-2004. CMEC decided it needed to revise SAIP in 2003 to better align with international assessments such as PISA, to set a higher standard for the provincial and territorial assessments given each year across Canada, and to respond to provincial and territorial curricular changes. Like PISA, PCAP focuses on one content area each testing cycle (i.e., students only take one of the three subjects each testing cycle, and "focusing" on one subject means a larger number of students take that subject). The 2007 test focused on reading. PCAP is not a student-level or school-level test. Instead, it sets a benchmark on the provincial and territorial level, by providing jurisdictional-level average scores as well as a pan-Canadian mean. In 2007, the only province to score above the Canadian mean was Quebec. The test is given in both English and French, although a greater proportion of students take it in English (about two thirds). The PCAP is heavily reviewed by translators to ensure that the English and French versions are comparable; the next administration will be in 2010.

Accountability

Though students are tested regularly at the jurisdictional level, most provincial and territorial tests are not "high stakes," meaning that a poor score does not carry consequences other than public pressure to improve. The PCAP, and SAIP before it, serve as "sunshine and shame" accountability tools, but territories that score poorly on the PCAP are not held accountable to any federal body or CMEC.

Recent Developments

CMEC has taken a more active voice to encourage Canada to work collectively on common objectives. For example, CMEC led the movement to adopt a common way of reporting that provides students, parents, and the public with comparable information on the performance of schools and school boards, including such factors as the rates of grade to grade promotion, high school graduation, and graduation in postsecondary education. According to CMEC, these moves reflect the reality that all provinces and territories are stakeholders in today's competitive global economy.

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Canada is not trying to move towards national education standards, but it does have a single pan-national institution that ensures that the provinces communicate with one another on issues related to education. Though the U.S. has various national organizations that may take on some of the same activities as CMEC (e.g., the U.S. Department of Education, the 50 state departments of education, the National Governors Association, the Institute of Education Sciences), there is no American movement to bring all aspects—testing, standards, data collection, etc.—under one umbrella. In particular, what makes Canada distinctive is that the provinces and territories have come together of their own volition to collaborate and align standards, and they have a single body to lead the effort.

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CHINA

Governance

China, like many countries profiled in this report, has been steadily moving to a more decentralized management of the educational system—a move that parallels its embrace of market-based economic principles in the 1980s. In 1985, the central government issued the *Decision of the Reform of the Educational Structure* and with it transferred some of its powers to the lower levels.

Unfortunately, decentralization meant increased funding of schools by the local governments. So while the latter gained more fiscal responsibility, they also paid the majority of costs. In the vast and diverse China, the new funding policies exacerbated educational inequalities, already entrenched partly due to the country's traditional focus on examinations and exam-driven curriculum. Consequently, critiques from parents, teachers, and educators led to a series of reforms that were launched in 1993 by the central government, known as the *Program for China's Educational Reform and Development* (and followed in 1999 with the *Decision on the Deepening of Educational Reform and the Full Promotion of Quality Education*). The primary outcome of these reforms (and others like them) was to further decentralize education in China through significant restructuring of the curriculum and of decision-making responsibilities.

But control over what children *learned* did not stray too far from Beijing. In short, the central government introduced a three-tiered curriculum design system in which power sharing was divided between the national, provincial, and school levels. The national level (i.e., the Ministry of Education or MOE) sets educational policy, develops national standards, facilitates information sharing, and—via bodies like the National Educational Supervision Agency—ensures that the lower levels meet the national requirements. Provincial authorities develop education plans, enact educational decrees as needed, distribute funds to counties, and directly administer a few key secondary schools. County authorities distribute funds to each township government and supervise education and teaching in senior middle schools. Local governments carry similar responsibilities for elementary schools.

The MOE brings together a panel of specialists that examines, approves, and sets the national curriculum standards. The standards stipulate which subjects will be taught and how much instructional time will be allocated to each. The subjects of compulsory education include the following: Chinese language, mathematics, foreign language, physical education, science, history and society, ethics and life, ethics and society, and ideology and morality. Interestingly, the central government agreed that local governments could reserve a small portion of the national standards pie to suit regional needs and preferences. Previously, localities were allowed to "adjust" 7 percent of the national curriculum; after the new three-tiered system was instituted, they could adjust up to 16 percent or more.

Curriculum Goals

The reform movement seeks to downplay China's traditional exam-oriented education and push towards rote learning and memorization of facts. The buzz word of the reform is *suzhi jiaoyu*. The term does not easily translate into English but can best be understood as a quality education, an all-round education, or character education.

Building on the "buzz," the Ministry of Education introduced in 2001 a new curriculum as part of its tenth Five-Year Plan (national curricula are revised in five-year cycles). The new curriculum emphasizes creativity, active participation of students in the learning process, life-long learning, and the learning of practical skills. Implementation of the reform started in a small number of experimental schools and gradually expanded to include more schools and districts.

The reform era also supported more diversification of textbooks, something that started in the late 1980s. China's State Education Commission now allows local

publishers and education bureaus to develop their own curricular materials. The government, however, still engages experts to review teaching materials and grants approval to authorized textbooks. Lists of approved materials are publicized and schools make their choices as to what textbooks they will use. So even though schools are encouraged to utilize a wider range of teaching materials, all instructional materials must nonetheless be aligned with the national curriculum standards (and sanctioned by the central government).

Assessments

Examinations play a key role in education in China and as such, they have exercised a strong influence on the content of education. Examinations determine students' promotion from grade to grade as well as students' access to secondary and higher education. Students in the nine compulsory subjects must complete end-of-course exams, and pass the Chinese language and mathematics exams in order to advance to the next grade. Other subjects are tested but are primarily used as "check-ups." At the end of junior high school, students may take entrance examinations if they wish to enter secondary school. Access to higher education is also conditioned by selective entrance examinations.

In the absence of a national evaluation system, student assessments are also used to monitor school effectiveness. School-level assessment results are published in what are known as “league ranking tables” for the public to see, with the purpose of increasing competition and school performance. School enrollment quotas are based partially on students' exam scores, so the better the students perform within a school, the more students (and *funding*) a school can receive.

As indicated, the exam-oriented system has been heavily criticized on equity grounds. In fact, in 2008, the gross enrollment in senior high schools in China was only 42.8 percent—much lower than in developed countries (The rate in the United States is about 78 percent). The Chinese government has recently identified senior high school education as a primary target for improvement. Current curricular reforms have been designed to reorient the system away from excessive focus on exams and toward issues of quality. Still, they have yet to revamp the system. The traditional tests, despite pleas to use them to measure student creativity, still focus on factual knowledge and more importantly, still wield considerable influence on the fate of students. Chinese officials recognize that the tests contradict the principles of curricular reform and present a major obstacle to change. Toward that end, China is in the process of developing the National Assessment of Educational Quality (NAEQ) that will serve purposes similar to the National Assessment of Educational Progress (NAEP) in the United States. (Unlike NAEP, however, the NAEQ is being developed by the central government.) It is based on the Chinese national standards in mathematics and English, among other subjects.

Accountability

As indicated, examinations determine students' promotion from grade to grade as well as their access to secondary and higher education. Also, the league tables and funding attached to school performance constitute informal accountability mechanisms. Formal accountability is embedded in the legal provisions that have ruled education in China since the 1980s. Various laws require compliance, which is monitored on all levels: The National Educational Supervision Agency is in charge of overseeing that lower levels of the government are following state education regulations and standards; provincial governments oversee county compliance; and the county governments oversee township compliance.

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China’s test-based educational system appears to be struggling with an image problem. Though there’s disdain of the exam-centric culture from many stakeholders, it’s proven difficult to transform. It is still too early to tell whether or how the country’s newest national test (NAEQ)—aligned to China’s more student-centered and skill-based standards—will impact Chinese students’ performance.

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FRANCE

Governance

For nearly 30 years France has been navigating the balance between centralizing and decentralizing power in education. It is divided into 31 administrative units known as académies, each headed by a rector who acts on behalf of the minister. Each local government has specific responsibility for a certain type of educational institution: The municipality (*commune*) is responsible for the primary schools, the province (*département*) for junior high (*collège*), and the region for secondary school (*lycée*).

The education system in France has traditionally been centralized at the national level. But the closing quarter of the 20th century saw the passage of various pieces of national legislation, which resulted in significant decentralization. In 1982-83, for example, new federal laws transferred some previously centralized power down to the lower levels of government, while increasing the power of the regions, provinces, and municipalities.

In 1989, the decentralization trend continued. A new education law commonly referred to as *Loi Jospin* introduced *Projet d'École* (the school project), which gave schools more leeway to incorporate local needs into the curriculum. This legislation was followed in 1990 with *Conseil d'École* (the school council), which gave more power to local school councils. In particular, they were granted the authority to set internal regulations, determine the school's timetable to meet academic benchmarks, select textbooks, and formulate and approve the local components of the curriculum.

In 2003, the minister of education launched a "national debate" on the future of education in France. Results from the debate led to the introduction of the 2006 *Act on the Future of Schools*. The act reiterated the educational objectives of the European Union (e.g., ensuring equal opportunities for all students) and stipulated that a common knowledge base be established (including mastery of the French language, mathematics, a foreign language, information and communication technologies, and "humanist culture"). So though individual schools have gained substantial autonomy since the 1980s, the central government still prescribes the national curriculum for each subject and level of education.

Many stakeholders, however, assist the government in developing the national curriculum. These stakeholders include the National Curriculum Council, higher education specialists, teachers, educational inspectors, associations, and trade unions. The ministry also establishes educational policies, conducts school inspections, and handles the recruitment, training, and management of teaching staff—including allocating schools their appropriate staffing quota and regulating teaching salaries. Further, it schedules examinations and awards national qualifications. Finally, textbooks must be approved by France's Ministry of Education. Private publishers are obliged by law to follow the national curriculum and observe the official recommendations of the ministry, though textbook selection is left to the schools.

Curriculum Goals

In February 2002, the Ministry of Education announced the gradual introduction of reforms to the primary level curriculum. These reforms placed an explicit emphasis on literacy, as well as on *le socle commun*, which are competency-based standards that define essential content and skills.

Following the introduction of *le socle commun*, the central government began redesigning educational programs for the primary and secondary levels. At the primary level, they devised new content outlines (organized by subject area) and student expectations. The statutory national curriculum for primary education covers French, mathematics, science (physics, chemistry, biology, and geology), history/geography, civics, technology, modern foreign languages, physical education and sport, and art. In particular, the 2002 reforms placed greater emphasis on literacy, and in so doing, changed the proportions of time allocated for other subject areas.

Though the curriculum and time spent on subjects are the same for all primary students, there are variations at the secondary level. Lower secondary students receive the same general education during the first three years and then choose between a language or technology sequence for the last year (when they are 14-15 years old). Upper secondary students also receive the same curriculum in the first year of compulsory education. For their last two years, though, they are granted more course-taking freedom, depending on the track they've chosen (e.g., hard sciences, economics and social sciences, humanities). Mathematics is compulsory during all three years of upper secondary, as is French for two years.

Assessments

National examinations are developed and administered by the national *Direction de l'Evaluation de la Prospective et de la Performance* (DEPP) of the Ministry of Education. National diagnostic exams are administered to students aged 8, 11, and 15 at both public and private schools.

The purpose of the assessment is to gauge students' progress and help teachers design appropriate instructional strategies. In other words, the tests do not carry consequences for students or teachers. Designed by teams of teachers, they assess students in French language arts and mathematics. Teachers normally administer and mark their own students' tests according to a common rubric. The tests assess the competencies required by the curriculum and change each year so results cannot be compared.

At the lower secondary level, there is a school-leaving national examination (*diplôme national du brevet*) that is aligned to the national curriculum. The examination covers French, mathematics, and history/geography. In addition, the first compulsory tests in civics education were introduced in 2000.

Students take a graduation exam (the *Baccalauréat*) at the end of secondary education (grade 12), also aligned to the national standards. The baccalaureate exam has both oral and written components. Though it is a national examination, it is organized and implemented by the *académie* rectors. Students' satisfactory completion of the graduation exam is a prerequisite to entry to higher education. In 2008, the *Baccalauréat* celebrated its bicentennial anniversary.

In 2007, newly-elected President Nicolas Sarkozy presented his educational reform plan, which placed standards and testing at its core. He wants to expand the assessment system in France so that students are tested at the end of each level of schooling—and he pointed to the *Baccalauréat* as proof of students' ability to pursue and excel in higher education.

The president's other reforms include enhancing school choice options, offering greater student choice over subjects taken, and shortening the time required to obtain the *Baccalauréat professionnel* (the vocational version of the general *Baccalauréat*). In an effort to strengthen the higher education system, he has also recommended that university professors be made to submit their research for review every four years to university officials. Educator's unions have been particularly vehement in their opposition to the president's proposals, viewing them as devices to eliminate teacher and faculty positions.

Accountability

As explained above, most tests are diagnostic in nature, though results of nationwide assessments guide broad policy decisions at the national level. Individual region's results are also published to allow for comparisons across the country.

Additionally, France has several inspectorates that supervise the entire system. Inspectors perform school evaluations and monitor the performance of teachers.

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France has approached the decentralization of education carefully and gradually, negotiating powers among the central government, regions, provinces, and local

authorities. The United States should do likewise. Their national exams (administered to students aged 8, 11, and 15) serve a strictly diagnostic function, but they culminate in a high-stakes graduation exam—the *Baccalauréat*—which functions as a college entrance test. If President Sarkozy's reform agenda passes, more students will be tested more frequently, presumably with exams similar in rigor to this school-leaving exam.

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GERMANY

Governance

Germany's governmental structure is much like that of the United States. This similarity and the fact that they've moved quickly over the last decade to implement national standards makes them an ideal country from which the U.S. can learn. Germany is a federation of 16 states and educational authority rests with each state, meaning they have 16 separate educational systems. Each state has a ministry of education, cultural affairs, and science that is responsible for the organization of the schools, development of broad curricular principles, and the supervision of teachers and other education staff. States issue policy guidelines in these areas, but allow local school districts considerable discretion in recruiting staff, choosing textbooks, and determining course content.

Although each state has authority over its educational policies, together the states have joint responsibility for education in the federation. Such responsibility obliges them to cooperate with one another and work together with the federal government. The cooperation is facilitated by a group of state education ministers, officially known as the Standing Conference of the Ministers of Education and Cultural Affairs (*Ständige Konferenz der Kultusminister der Länder* or KMK). (The group is similar to America's Council of Chief State School Officers.) Established in 1948, the KMK coordinates issues in education, research, and cultural affairs.

In 1997, amid concerns of Germany's dismal performance on the Trends in International Mathematics and Science Study (TIMSS), the KMK moved to introduce national standards and standardized testing procedures to evaluate the state school systems. As a quasi-governmental entity, they created positive pressure for the federal government to support such efforts—so much so, that in 2002, the Federal Ministry of Education and Research (BMBF) commissioned the German Institute for International Educational Research to develop a blueprint by which policymakers could move to national standards. They convened an interdisciplinary group of content experts, highly regarded researchers, and policymakers for the task. This initial development work, supported by both the federal government and the states, resulted in a national report. Public comment on the proposed approach within the report was solicited from various educational organizations, including teacher unions, business organizations, and the general public.

The process of obtaining buy-in from states and schools was not automatic. In exchange for participation, schools were given greater freedom in how they managed instruction. Primary teachers also viewed national standards as a way for them to obtain greater social status and greater pay, similar to the status (and pay) that Germany grants its secondary teachers. Finally, teachers unions were assured that schools would not be punished for poor results. These compromises and understandings, along with the strong push from the KMK, convinced all 16 states, via their own legislative processes, to join the effort.

Content of Instruction

National standards for primary education (ending with grade 4) cover German and mathematics. Secondary schools are ranked into three types: *Hauptschule* (lowest), *Realschule* (middle) and *Gymnasium* (highest). Any student who attended a German elementary school can go to a *Hauptschule* afterwards, but students who wish to attend a *Realschule* or *Gymnasium* must have high marks. Standards for *Hauptschule* (grades 5 to 9) include the German language, mathematics and a first foreign language (usually English, sometimes French). Standards for the *Realschule* and the *Gymnasium* (grade 10 on) cover German, mathematics, a first foreign language, biology, chemistry, and physics.

Local schools and teachers are given significant autonomy in selecting textbooks and teaching materials, but they must chose textbooks from an approved list released by the regional government.

Assessments

Many states use assessments to determine students' readiness to begin school. Traditionally, teachers have administered diagnostic assessments to students in the absence of standardized exams, although some states have school-leaving examinations.

Recently, standardized comparative tests (*Vergleichsarbeiten*, referred to as VERA) have been introduced in some federal states; they test students in German and mathematics (and in English in the higher grades). Half of the items on these tests are prescribed by the states and half are selected by schools from a pool of items. Students are assessed roughly one year before they complete a respective educational level. This means that on the primary level, assessments are carried out at grade 3, and on the lower secondary level, at grade 8 (for *Hauptschule*) and grade 9 (for *Realschule* and *Gymnasium*). At the elementary level, students are assessed in math and language arts, and at the secondary level they are assessed in math, language arts, and science. A national report is produced one year after the assessments are administered, and individual states post the data on their websites. The results from these assessments are used for diagnostic purposes rather than to hold schools, districts, or regions directly accountable for student performance.

The organization responsible for developing national assessments is the Institute for Educational Progress (*Institut zur Qualitätsentwicklung im Bildungswesen* or IQB) founded in 2004, presumably for this purpose. It is a joint research institute of the federal states located at Humboldt University of Berlin. Similar to how the national standards were developed, the IQB convened a number of experts to devise the tests. Norming of the tests began in 2006, and the first nationwide assessment is scheduled to be administered in 2009-10. It will allow for comparisons between the federal states, but not between localities. Local or regional agencies will help administer the assessments.

When assessments in the lower secondary levels will be launched in 2009-10, they will be re-administered every three years. Assessment cycles for the primary level will begin in 2011 and be re-administered every five years. All assessments will be aligned to the national curriculum standards.

The introduction of national standards and tests has generated wide public debate in Germany about their efficacy and validity. Recent reviews of the mathematics standards at the ninth grade level, for instance, revealed rigorous coverage of content (including number systems, measurement, geometry, and computational skills) as well as problem-solving and mathematical modeling; but some researchers contend that the content is far beyond the reach of ninth grade students, particularly in the lower and intermediate tracks. Future revisions of the standards will likely be influenced by the 2010 assessment results.

Accountability

The purpose of the nationwide assessments is to monitor school performance in relation to the new national curriculum standards and gather data that will inform policy. As indicated, the assessments are not intended to carry consequences for individual students. One year after the assessment cycle, reports will be released and made available to the public.

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Having a quasi-governmental group to spearhead the standards process was vital to the development of national standards in Germany. The federal government supported and financed the development in critical ways, but did not lead the effort. Buy-in from the states was easier to obtain with the promise of "no negative consequences" for schools, students, and teachers.

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INDIA

Governance

India, the second-most populous country in the world, comprises twenty-five states and seven union territories within a parliamentary democracy. Provisions regarding educational governance are set in the constitution. Until the 1970s, primary and secondary education was controlled by the states, but amendments to the constitution in 1976 introduced educational governance as a shared responsibility between central and state governments. This enabled the central government to set national education policies and parliament to legislate them. On the national level, education falls under the Ministry of Human Resource Development. The ministry oversees numerous organizational bodies that play a pivotal role in educational decision making at the national level, including the Central Advisory Board of Education (CABE) and the National Council of Education Research and Training (NCERT).

CABE is a statutory board responsible for planning and monitoring educational policies and programs. NCERT is in charge of developing curriculum, syllabi and textbooks, as well as conducting teacher preparation and education research on a variety of topics. CABE is comprised of 106 members that include government ministers from the seven union territories, state leaders, heads of educational organizations, professors, academics, and prominent citizens from various states. The institution was revived in 2004 (it was originally founded in the 1920s, then dissolved, then revived and dissolved again in 1994). Reportedly, CABE was resurrected to balance the political influence that the Indian government was exercising on education through NCERT. For instance, in the year 2000, NCERT proceeded with the development and implementation of a massive and highly controversial revision of history textbooks. The new textbooks, seen by many as an attempt by the central government to politicize education, were accused of presenting "Hindu" culture rather than Indian culture. CABE is now charged with approving any policy decision before it is carried out.

Still, educational governance in India is much more complex than this short synopsis can illuminate. While it is true that the central government determines national policies, these work more as suggestions than prescriptions. As mentioned above, the constitution grants joint governance between the central government and the states, so states also have a say. This means that, although there is a *voluntary* national curricular framework, model syllabi, and textbooks, there are also various state boards that have their own curricula, which may (or may not) be based on the national frameworks. State boards of education also have the authority to conduct their own state examinations (which students can take instead of the national exams—more on this below).

Curriculum Goals

In 1986, the central government issued a new National Policy on Education (NPE) that stressed free universal elementary education up to age 14 and encouraged decentralization of education, aimed at increasing local community involvement in education. The central government saw these changes as a way to strengthen India's national cohesion and identity. Thus the NPE culminated in a decision to create a national curriculum framework. The framework would comprise a set of national guidelines for core academic content areas along with flexible local components. The central government would convene various expert committees and commissions, and upon consensual agreements with the states and union territories, produce a national curriculum framework that states could choose to follow or adapt to their needs.

The first National Curriculum Framework for Elementary and Secondary Education was drafted in 1988. It outlined a common educational structure across the nation that included 10 years of primary education as general education. Since then, the curriculum has undergone several revisions—in 1992, 2000, and most recently, 2005. The 1992 revisions established two additional years of secondary education. The new framework of 2005 emphasized child-centered ap-

proaches, real-world applications of knowledge, and critical thinking skills, as opposed to rote learning.

Importantly, the national curriculum framework is not mandatory and not all states have adopted it. In fact, some of the framework's recommendations appear unrealistic given the lack of basic educational infrastructure in some parts of India.

The current national curriculum framework addresses all levels of education (grades 1-12) and recommends what subject areas should be covered and how much instructional time should be allocated to each. For primary education, NCERT develops syllabi for Hindi, Sanskrit, English, mathematics, environmental studies, science, and social science. For the secondary level, syllabi exist for languages, science (broken down into chemistry, physics, and biology for grades 11 and 12), mathematics, social science, history, geography, political science, and economics for grades 9 and 10. For grades 11 and 12, the syllabi also cover sociology, psychology, business studies, and accounting.

Textbook selection is mostly the responsibility of the states, but the NCERT develops exemplar syllabi and textbooks as a model for the states and union territories. The NCERT is also presently engaged in a three-phase program for development of textbooks aligned to the 2005 framework and syllabi. Completion is targeted for 2009.

Assessment

There is no national assessment at the primary level although some states administer tests to students at the upper primary levels (grades 5-8). The situation is different for secondary schools, for which there are two major examination bodies, each of which are autonomous. The Central Board of Secondary Education (CBSE) conducts national examinations at the end of grade 10 and 12 and updates and designs curriculum for secondary schools. The Indian Certificate of Secondary Education (ICSE) conducts three examinations, one at grade 10 and two at grade 12 (one of which is vocation-oriented). Some states also administer state exams at the secondary level. Examinations in grades 10 and 12 typically measure students' performance in language arts, math, science, and social science. Assessment questions include both open-ended and multiple-choice items. Regional reports are produced based on the test results; test scores also help to determine students' future educational choices.

In June 2009, the new Minister of Human Resource Development, Kapil Sabil, announced his intention to eliminate the tenth-grade exit examination and have only the twelfth-grade exam. Citing student stress, Sabil remarked, "Sleepless nights over [the] Class X examination are not needed. We will reform it and make [the] Class X examination optional. We should not traumatise [sic] education. It is unacceptable."

Further, the Ministry is considering supporting the development of a single autonomous body to accredit, conduct, and develop all curricular syllabi and examinations at the central government level. This proposed body would replace groups such as NCERT, CABE, and other central educational boards and councils.

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Perhaps the most notable development in Indian education over the past 10 years has been the institution of a common structure of schooling throughout the country (comprised of five years of compulsory primary education, three years of upper primary schooling, and two years of high school). Science and mathematics have been incorporated as a common core for all students, particularly at the high school level. Because of this, technical education in India is often regarded as the best in the world. Every year, India graduates a large number of engineers, scientists, and mathematicians from their regional and national higher education institutes.

Still, education in India stands at a crossroads today. Recent improvements in education cannot meet the needs of India's vast population. The rural areas, with

poor infrastructure and educational services, are especially vulnerable to disparities. The states are supposed to provide financial resources and technical assistance to their schools, but many are unable to do so. In short, the education system in India does not function in isolation from the society of which it's a part. Hierarchies of castes, economic status, gender relations, cultural diversities, and uneven economic development between regions all deeply influence access and equity in elementary and secondary education.

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THE NETHERLANDS

Governance

The Dutch system has a decentralized model for administering and managing schools but centralized laws and policies to steer such operations. Federal oversight, which is situated within the Ministry of Education, Culture, and Science, controls areas such as the types of school that may exist; the length of courses in each type of school; mandatory and voluntary subjects; the minimum and maximum number of teaching periods per year; standards of competence for teaching staff; the maximum number of teaching periods per staff member; the salaries of teaching staff; arrangements for admitting pupils to special schools and secondary schools; and the norms for establishing and closing schools, among others.

Though there is an intermediate level of governance, namely the twelve provincial councils, decision making over what actually happens inside of schools rests with local school boards. The school board takes care of operational and administrative costs as well as sets policy on curricula, personnel matters (appointment and dismissal of staff etc.), and admissions.

Interestingly, all schools in the Netherlands—public and private alike—are *equally* funded by the government. Further, private providers are allowed to open schools that align with their religion or philosophy and have them funded by the government under the following conditions: They have a legally recognized competent authority (also referred to as the school board) to administer and manage the school; they adhere to all "state and non-state" laws about the condition of the buildings, teacher qualifications, and curriculum and secondary requirements; they do not charge mandatory tuition (though they can ask for contributions); they do not select students to attend (though they can reject students whose parents do not ascribe to the religious or philosophical orientation of the school); and the school can prove that it will attract students. Basically this means that virtually anyone can apply to open a school *as long as* they adhere to the national requirements and standards as well as take the national tests. Unlike in the United States, there appears to be little concern regarding using public money to fund parochial schools. In short, the Netherlands have broad parameters around what and who are considered legitimate providers of education.

Curriculum Goals

As explained above, education authority in the Netherlands is a balancing act between the schools and the central government. Schools are free to determine what to teach in terms of subject matter and areas of study, but the central government sets attainment targets for various subjects that schools are expected to reach. Schools must design their courses in alignment with the centrally established targets. Primary and secondary curricular development is run by the National Institute for Curriculum Development (its acronym in Dutch is SLO).

In the 1990s, a core curriculum was introduced which had fifteen compulsory academic subjects and 128 attainment targets. In 2005-06, the number of targets was reduced to fifty-eight in response to a government-sponsored evaluation of the education system that found the curricula was overloaded and fragmented. The new attainment targets specify knowledge and skills that students must attain when they complete individual education levels. In addition to these broad level targets, the Ministry of Education, Culture, and Science has also developed intermediate targets and instructional guidelines for primary school teachers. The *Secondary Education Act*, which was introduced in 1999, mandates that secondary level attainment targets must be reviewed and updated every five years. The current targets are expected to be revamped in 2010.

The 2006 revision of the *Primary School Act* requires schools to provide instruction in six curriculum areas: Dutch, English, mathematics, social and environmental studies, creative expression, and physical education. Schools must draw up a school plan and determine which subjects will be offered to cover these areas, how much time will be allocated to each, and how to achieve the goals set by the national attainment targets. The tar-

gets vary in level of detail for different subject areas. For example, Dutch and arithmetic are more detailed than creative expression. The new attainment targets now also cover citizenship, technology, and cultural education.

Assessment

The National Institute for Educational Measurement (*Centraal instituut voor toetsontwikkeling* or CITO) develops assessment tools that schools use across the whole education system. The best known CITO-developed test, and the one that shares its name, is the primary-school leavers' attainment test, taken at the end of sixth grade. Schools are free to choose what tests they will use to measure their students' attainment but over 80 percent of primary schools use the CITO and the number of students taking it is increasing every year.

At the secondary level, school-leaving written exams, which consist of school based exams and a national exam, are combined to determine whether a student passes. Students are divided into three tracks: vocational training and theoretical education; technical training; and literary, scientific, and artistic studies. Their track determines the combination of school-based tests a student must take to graduate.

Accountability

On an individual level, student assessments are used to monitor students' performance and regulate their progression from grade to grade. School leaving examinations at the secondary level, as explained above, determine whether a student graduates.

But student assessments are also related to school evaluation. The national primary school leaving examination provides data that compare schools' average scores with national averages and with those of other schools. This test is also used as part of a student monitoring system called LOVS (*leerlingen onderwijs volgsysteem*), which also consists of tests for grades 3, 4, and 5 in Dutch, mathematics, and study skills. Schools can use the LOVS results to compare themselves with other local schools and nationally. Since parents are free to choose a school for their children, the test results also help them make informed choices.

School evaluation is controlled by both the Ministry of Education and the Education Inspectorate. Separate from the ministry, the Inspectorate ensures compliance with statutory regulations and monitors key outcomes related to the learning process, such as the content of the curriculum, the school climate, teacher pedagogy, and the administration of tests and exams. Legislation in 2002 increased the autonomy of the Inspectorate and shifted its role from one of purely monitoring to enhancing school improvement. Thus when assessing individual schools, the Inspectorate follows a framework of norms and indicators, and issues report cards that reflect school quality.

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The Netherlands balance educational power between the schools and the central government. Unlike tests in Germany that are used for strictly diagnostic purposes, results from Dutch exams determine whether students proceed to the next educational level. The Netherlands also has fewer issues than the United States when it comes to government funding of private schools.

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RUSSIA

Governance

Since the split of the Soviet Union, education in the Russian Federation has undergone major changes. In 1992, the *Law on Local Self-Management* decentralized the government system writ large while the *Law on Education of the Russian Federation* distributed power between the federal Ministry of Education and Science, regional and municipal governments, and schools. Notably, municipal governments gained the right to produce their own curricula and materials.

The federal government is responsible for policy and strategic planning. This involves setting standards, developing curriculum, and establishing textbook requirements. Regions define regional policies and make teaching materials available. Municipalities build, manage and control schools, implement federal and regional requirements, and develop curricula in line with the federal requirements. Schools assign students to classes, choose textbooks, and make decisions on teaching methods.

Content of Instruction

The *Law on Education of the Russian Federation* stipulates that the federal government devise a "Basic Curriculum" and provide assistance to states in developing additional national and regional components to supplement it. Proportionately, the federal basic curriculum constitutes some 60 percent of the overall curriculum; regional components (i.e., local languages, local history, etc.) make up 30 percent; and 10 percent is devised by individual schools.

The basic curriculum designates the compulsory fields of study: humanities with a special emphasis on Russian language, literature, social sciences, and physical education; natural sciences with priority given to mathematics; and technology. Social sciences can include foreign languages, Russian history, world history, economic and social geography, law, political science, and economics. The natural sciences include biology, physics, astronomy, chemistry, and ecology, among other subjects. Technology includes technical drawing and a number of professional skills such as home economics, sewing, cooking, metalwork, and carpentry.

The process for textbook adoption in Russia is fairly regimented. The federal ministry regulates, approves, finances and supplies textbooks to the regions. It allows the regions to select from just three textbook options, each of which has been approved by disciplinary specialists. Selection is restricted to three since it's believed to ameliorate funding gaps between regions and lessen the ministry's workload in terms of ensuring high-quality content and standardization among courses.

Assessment

In 2001, the Ministry of Education first introduced a national standardized assessment (the Unified State Exam); it was expanded to all regions in 2006. It is both a school-leaving and college entrance examination given in both the ninth (end of compulsory education) and eleventh (end of secondary education) grades. Students are tested in a foreign language, Russian literature, history, mathematics, chemistry, biology, physics, and geography. The test includes both written and oral components. In addition, a student's score on the Unified State Exam partially determines the amount of merit-based financial help that they receive for university. Tests given in grades K-8 are solely local or regional and are not moderated or controlled by the federal government.

Recent Developments

Decentralization has also resulted in growing discrepancies across and within Russia's 89 regions in terms of per-pupil spending for compulsory education. Since there are no mechanisms for addressing inequities (e.g., redistribution of revenues), access to quality schools varies widely.

This has become particularly apparent in the mathematics and science fields, areas viewed by many Russian officials as critical to enhancing the country's economic growth and meeting the needs of its labor market. Recent PISA results show Russian 15 year-olds scoring below average among OECD (Organisation for Economic Cooperation and Development) countries. Such findings informed Russia's most recent revisions of elementary and secondary standards in math, science, and technology.

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Though nationalization in all areas has declined since the fall of the Soviet Union, these decentralization efforts have focused mostly on management. In other words, while Russia has given control of many social services (like education) back to local and regional governments, it still heavily regulates and guides them from Moscow.

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SINGAPORE

Governance

In 1965, Singapore, a small city-state with an ethnically and racially diverse population of over 4 million, centralized its education system to strengthen its multiethnic and multilingual population. The most notable of these changes included the creation of universal primary education, more equal treatment of the Chinese, Tamil, Malay, and English languages, and the development of a common syllabus for all school subjects.

A mid-1980s recession forced Singapore's Ministry of Education (MOE) to strategically decentralize the system once again in pursuit of greater efficiency and increased quality. In 1988, eight select "distinguished schools" gained independent school status with increased autonomy and flexibility in hiring staff and managing fiscal and management responsibilities. Lessons learned from that experience encouraged the MOE to establish 18 "autonomous schools" in 1994 and provide them with funds to encourage innovative programs. Then, in 1997, the ministry began clustering schools to benefit from the subsequent economies of scale; under this model, 10-14 schools typically fall under the jurisdiction of one superintendent. Decentralization can be seen at the school level, too, where principals have autonomy to plan, coordinate, and manage the school's educational program.

Despite this decentralization, the MOE has continued to control matters related to standards, course syllabi, and assessment. In other words, since the 1980s, schools have gained more autonomy in implementing policies, but the central authorities still determine the rules of the game. But one element of Singapore's educational system that has remained centralized is its teacher training program. Since 1971, there has been one institution in charge of teacher preparation (though it's had various names). Today it is the National Institute of Education (NIE) located on the campus of the Nanyang Technological Institute (NTU).

NIE prepares new teachers, provides ongoing professional development to existing teachers and school leaders, and conducts extensive educational research. Most of its graduate programs for primary and secondary teachers last a year. Traditionally, NIE admits only the highest performing students to train as teachers, resulting in a program that is highly respected and a profession that is quite desirable. The program typically includes foundations in education, pedagogical training, and in-depth coverage of at least one academic discipline.

Curriculum Goals

Singapore's centralized curriculum is aimed at providing students with a common educational experience. In 1997, the ministry presented its new strategic vision for education entitled "Thinking Schools, Learning Nation." Though it built on the fundamental structure of education in Singapore—which had proven efficient and well functioning—it also presented some conceptual changes in the system. In particular, it emphasized creativity, lifelong learning, and greater flexibility in students' learning opportunities. One area that has largely benefited from this flexibility is Singapore's tracking system ("streaming"). In the past, students were streamed into ability tracks, taking all of their classes in the same stream. But since the publication of "Thinking Schools, Learning Nation," some of the streams have been merged and students are now allowed to take subjects of varying difficulty levels according to their needs.

Though the ministry remains the ultimate authority over the curriculum, curricular decisions are made in consultation with teachers, principals, lecturers from tertiary institutions, inspectors, examination officers, and curriculum specialists. Where relevant, people in industry and business, religious organizations, and politicians are also consulted.

Since 1980, the development of curricular standards, subject syllabi, and instructional standards was undertaken by the MOE-established Curriculum Development Institute of Singapore (CDIS). In 1996, the

MOE replaced CDIS with the Curriculum Planning and Development Division (CPDD) and opened the market to commercial textbook publishers. CPDD designs and reviews syllabi, monitors their implementation, and briefs publishers on the specifications for textbooks. All textbooks that are developed outside of the ministry must be authorized before they are added to the list of approved instructional materials from which schools choose. Textbooks typically remain on the list for five years before they are revised and reauthorized. Despite the entrance of commercial publishers, CPDD retains control over developing instructional materials for some subjects such as civics, moral education, native languages (Chinese, Malay, and Tamil), and social studies.

The standards set by CPDD include all grades, first through twelfth, and are very detailed. For primary education, there are four core areas: mathematics, English language, native languages, and science. Students are also required to complete co-curricular activities which are non-academic but are aimed at nurturing resilience, tenacity, confidence, and perseverance; these include sports, clubs and societies, and the performing arts.

Assessment

At the end of primary and secondary education, Singaporean students take national examinations, which are developed by the Singapore Examination and Assessment Board (SEAB, formerly the Examination Division of the Ministry of Education)—a testing and assessment service established in 2004.

The national examination at the end of primary education is the Primary School Leaving Examination (PSLE). Students sit for this exam in the latter half of sixth grade, completing it over a period of three months, towards the end of the academic year. The exam is both written and oral, and assesses students' performance in English, their mother tongue, mathematics, and science. The results help to determine students' placement in secondary education. Parents also have some say in where their children attend secondary school, but schools with integrated government programs (such as the International Baccalaureate program) have full discretion over who is admitted. By contrast, the aforementioned "autonomous" and "independent" schools can set aside 10-20 percent of their spaces for discretionary admission.

Lower secondary education is divided into normal and express tracks. The normal track is a four-year curriculum with the possibility of a fifth year. At the end of the four years, students may sit for the GCE N-Level Exam, which is an exam in six to eight individual subjects. If they perform well on the exam, they may take an additional year of classes and prepare for the GCE O-Level Exam. Students in the express track sit for the GCE O-Level Exam in seven to nine individual subjects. The examinations are developed by SEAB and the University of Cambridge, and the subjects covered include compulsory as well as elective subjects that may be of interest to students for future study. Though the national examinations are not mandatory, most students take them because they determine students' access to the next level of education.

In addition to these national tests, schools are also responsible for conducting continuous formative assessments according to the guidelines set by the Ministry of Education.

Accountability

The MOE uses the test results of the continuous formative assessments to evaluate school performance. School results are published in league ranking tables as a way of promoting inter-school competition. Secondary school statistics, for example, include: overall composite results for O-Level exams; the school's "value-added," which is a comparison of the exam scores of students who are leaving with those who entered; and a weighted index of results from a test of physical fitness. Since students in Singapore are placed in schools based on parental choice and test scores, and

schools vary in the programs they offer, some critics claim, perhaps rightly, that the playing field isn't level.

The assessment results also constitute a part of a School Excellence Model (SEM), which is a quality assurance system that the government introduced in 2000. The SEM emphasizes leadership, staff management, and strategic planning. Schools are required to assess themselves using the SEM; the ministry validates their self-reported results every five years by cross-checking the data they provide as evidence.

■ ■ ■

Though Singapore has substantially decentralized its education system over the last 30 years, it has done so smartly, maintaining central control over national standards, curricula, and assessment, while conceding the more difficult-to-monitor implementation to schools. The city-state has also retained a single centrally-driven teacher preparation system, which ensures that Singaporean students are taught by the highest-caliber and best-trained teachers. The result has been a paring-down, not dismantling, of the nationally controlled elements of education with an emphasis on excellence.

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SOUTH KOREA

Governance

For the last quarter century, South Korea has been slowly moving away from a highly centralized education system, and more recently, towards increased transparency regarding individual school performance.

The Korean education system is controlled on the national level by the Ministry of Education and Human Resources Development (MOEHRD). In 1991, a law was passed that decentralized some of the government's authority and increased the administrative autonomy and decision-making powers on the local level. With this law, 16 Metropolitan and Provincial Offices of Education (MPOEs) were established as well as 180 local offices of education (LOE) to carry out routine functions as determined by MOEHRD and MPOEs.

The ministry is responsible for the national curriculum, while the MPOEs oversee its implementation and develop standards-related regional guidelines for the LOEs and the schools within their jurisdictions. These guidelines help elementary and middle schools with implementation at the classroom level. In other words, the Korean prototype is a centrally-established curriculum, regionally-developed guidelines, and locally-administered operations and curricular programs.

Curriculum Goals

Since 1954-55, the national curriculum has undergone seven revisions; the last one was introduced in 2000 (it is periodically revised in five- to ten-year cycles). In revising the national curriculum, the ministry convenes various committees comprised of academic scholars, researchers, and education specialists.

This latest has two parts: the National Common Basic Curriculum for compulsory years (grades 1-10) and the Selected Curriculum for the high school level, which includes several elective courses. It loosens some of the more rigid components of the centralized frameworks (e.g., by decreasing the number of compulsory subjects) and cedes a considerable amount more curricular autonomy to regions, districts, and schools. In fact, roughly 30 percent of the content has been reduced to make room for local adaptations. The new curriculum also eschews teacher-centered instruction, in favor of student-centered approaches and individual talent, aptitude, and creativity.

The national curriculum and national exams are managed by the Korean Institute for Curriculum and Evaluation (KICE). More specifically, KICE is in charge of curriculum development, textbook development, and national assessment of students. It also promotes best instructional practices, though schools are still free to develop those based on MPOE and LOE guidelines.

Compulsory subjects in the national standards include Korean language, moral education, social studies, mathematics, science, physical education, music, fine arts, and a foreign language (English). Science and social studies are taught as integrated subjects until upper secondary education when they are divided into physics, chemistry, biology, history, and so on. All core subjects are differentiated, meaning they include different levels of study based on ability, and in-depth and supplementary courses. The curriculum also specifies optional activities and extracurricular activities, like community service projects.

Assessment

Since the late 1990s, the aforementioned KICE has administered national assessments, in particular the National Assessment of Educational Achievement (NAEA). This criterion referenced assessment (with both open-ended and multiple-choice questions) is given during sixth grade (covering content from fourth to sixth grade), ninth grade (covering content from seventh to ninth grade), and tenth grade (covering tenth grade content); it tests students in Korean, social studies, mathematics, science, and English. Students also take end-of-semester exams, and their exam grade and rank are placed in their student transcripts.

Tests results from the NAEA have traditionally been published at the national level until recently. But South Korea is now undergoing substantial changes in how it chooses to publish exam results. In 2007, the country decided for the first time to test all students in grades 6, 9, and 10 with plans to release the results at the regional, district, and school levels. (Korea has had a national assessment since 1998 that's been administered to a national sample of students in grades 6, 9, and 10; the publication of its results was limited to the national level.) It seems President Lee Myung-bak was persuaded by key advisors that comparisons and competition among the regions and schools was necessary for Korea's educational and economic advancement. Still others in his administration viewed the "sunshine and shame" approach as crucial to successful exercise of school choice. Unfortunately, some are not sold on the merits of transparent and disaggregated student reports. Teachers and teachers unions, for instance, have vocalized vehement opposition, even organized demonstrations. They argue that since Korean students already do a fine job on standardized measures (such as TIMSS and PISA), they would be better served by sharpening their "creative" skills. Tighter focus on exam results, they say, will only retard such progress.

The Korean government, treading lightly (at least for now), is taking a piecemeal approach to open disaggregation of test results. Results from the 2008 national assessment, in fact, were broken out by province (not school) and only results from *high-performing* provinces were presented. But that's not supposed to last long. School-level results (presumably for the high-, mid-, and low-performing schools) are scheduled to be publicly released in 2011.

Interestingly, exam results in Korea are reported according to roughly the same groupings that the American NAEP uses (i.e., at or above three achievement levels: basic, proficient, and advanced). Korea's new school-level accountability plan rests on the percent of a school's pupils who are at or below basic and on getting fewer of them in that category. Similar to provisions in the No Child Left Behind Act in the U.S., Korea's core plan is to provide additional support to schools with lots of children who are underperforming, but only for a specific period of time. If schools don't remedy the situation within a certain (as-yet undetermined) number of years, a set of also as-yet undetermined "sanctions" will kick in. Finally, there is some intention to use student results to evaluate metropolitan and provincial offices of education, but those details are sketchy, too.

Accountability

As discussed above, the national ministry has thus far not communicated how regional and school-level results will be used going forward for accountability purposes. Assessment results *now*, however, are used for several purposes: They help place students within differentiated curricula, inform promotion decisions from one level of education to the next, and assist high schools in selecting middle school students for enrollment in specific high school academic tracks.

Test results take on even greater importance for tertiary education. Korea has a college entrance exam (College Scholastic Ability Test or CSAT), which the vast majority of high school seniors take. There is a strong social and economic incentive for students to get into the best schools, since this determines their chances of snagging a coveted position with a reputable large company or the Korean government. Many students spend the pre-test weeks studying around the clock. All seniors take the test on the same day and business offices, streets, and even the stock market typically open late that morning so that traffic won't prevent students from arriving punctually to their testing sites. Even Korea's national utility company is on alert; it places roughly 4,000 crew members on standby in the event of a test center power emergency.

As is the case in China, there's concern that colleges rely too heavily on the exam scores for admissions. The Korean government, in fact, has provided funding to 40 universities to hire admissions officers whose role is to consider essays and other criteria in determining student entry. Still, others believe additional measures

would only add subjectivity to an already objective entry process.

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The South Korean government is embarking on changes that, if implemented, could considerably impact its schools and students. How will educators and other stakeholders respond to public reporting of school-level results? And if test-induced sanctions are to follow, what will they look in this high-performing Asian country, simultaneously grappling with its time-honored exaltation of the college entrance exam? Only time will tell.

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APPENDIX B

SUPPLEMENTARY TABLES

TABLE B-1: Who is involved in setting standards?

COUNTRY	Key decision makers	Parties involved in standards development
Brazil	The Federal Ministry of Education and the National Education Council	According to the National Education Bases and Guidelines Law (*Lei de Diretrizes e Bases da Educação*), the Federal Ministry of Education sets guidelines for the national curriculum, while regional and local government are responsible for the interpretation of those guidelines in respect to their local and regional cultural heritage. States used to have considerable control over curricula until the federal government strengthened its involvement. The Federal Ministry of Education's guidelines are called the National Curriculum Parameters (PCN), which were shaped by various groups of consultants, university professors, school directors, and educators. More specific National Curricular Guidelines were developed based on the PCN and approved by the National Education Council and the Ministry of Education.
Canada		Education is the responsibility of each province.
Alberta	Ministry of Education, Alberta Education	Alberta is a member of the Western Canadian Protocol for Collaboration in Basic Education (WCP), which produces a curricular framework of the same name for grades K-12 for provinces that participate in the WCP. The document is intended as a springboard for curriculum developers and ministries of education.
British Columbia	Ministry of Education, British Columbia	British Columbia, like Alberta, is part of the Western Canadian Protocol for Collaboration in Basic Education (WCP).
Ontario	Ministry of Education, Ontario	In 2007, the Ontario Ministry of Education brought together a group of community leaders and educational experts to provide advice on curriculum in elementary and secondary schools. This group, known as the Curriculum Council, represents parents, educators, employers, and professors who offer insights on the improvement of Ontario's curriculum.
China	Ministry of Education (formerly the State Commission of Education)	The Chinese system is top-down. Key policy decisions, reforms, and guiding principles for the overall system are formulated by the Ministry of Education but implementation is delegated to regions, provinces, and local governments, which have some flexibility in adjusting the curriculum to their needs.
France	Ministry of Education	France has a highly centralized system. The ministry is responsible for developing the curriculum. It also provides guidelines for teaching, although teachers are free to adopt their own methods of instruction. The ministry consults with a number of various advisory committees on the national, regional, and provincial levels.

TABLE B-1: Who is involved in setting standards? *...continued*

COUNTRY	Key decision makers	Parties involved in standards development
Germany	The Standing Conference of Ministers of Education and Cultural Affairs (KMK)	The Standing Conference of Ministers of Education and Cultural Affairs is a supra-national council of German education ministers. Backed by the Federal Ministry of Education, the council in 2002 resolved to draw up national standards. The Federal Ministry of Education initiated a report on the development of national standards and the KMK commissioned a number of working groups across Germany to develop the standards. These groups included curriculum developers, educators, and experts from state institutes for teacher education.
India	Ministry of Human Resource Development and Central Advisory Board of Education (CABE)	Policy decisions are made by the Ministry and carried out by various bodies affiliated with the Ministry—primarily the National Council of Education Research and Training (NCERT), which drafts and publishes the national curriculum, textbooks, and model syllabi. Decisions of the Ministry, however, must be approved by the Central Advisory Board of Education (CABE). CABE is comprised of 106 members, including representatives from other federal ministries, both houses of Parliament, and state and union territorial administrations (India has 28 states and 7 union territories), as well as prominent citizens, professors, and other academics.
Netherlands	Ministry of Education, Culture, and Science	The Ministry broadly defines core objectives and attainment targets that students need to achieve to complete each level of school. The Ministry considers the recommendations of several advisory bodies (e.g., the Education Council) and consultative bodies (made up of school board representatives, teachers, parents, and students).
Russia	Federal Ministry of Education and Science	Though the Ministry sets the national curriculum standards, it has repeatedly announced "competitions" for the development of the curriculum. Groups of academics, various types of project developers, and educators with practical experience have participated in these competitions, but the authority to make decisions regarding standards ultimately lies in the hands of the Ministry.
Singapore	Ministry of Education	The Ministry of Education directs the formulation and implementation of education policies. Curriculum is developed specifically by the Curriculum Planning and Development Division of the Ministry. The latter gets feedback from other stakeholders, but ultimately decisions around standards are made at the national level.
South Korea	Ministry of Education and Human Resources Development	Although the Ministry of Education is responsible for the national curriculum, it is, in practice, a product of various committees of academics, specialists, and research institutes associated with the Ministry, such as the Korean Institute for Curriculum and Evaluation (KICE).

TABLE B-2: How often are national standards revised?

COUNTRY	
Brazil	The National Curriculum Parameters for basic education were first published in 1997 and for secondary education in 1998. They serve as guidelines for regional and local school curricular development. It is not clear whether the original standards have been revised since their adoption.
Canada	Curricular standards are set by two regional consortia, the Western Canadian Protocol for Collaboration in Basic Education (WCP) and the Council of Atlantic Ministers of Education and Training (CAMET). Most—though not all—provinces and territories are members/signatories of one or two others.
Alberta	Programs of study are revised to keep the curriculum current and relevant. The dates of the revisions vary from subject to subject, but generally occur every 10 years.
British Columbia	Curricula for required areas of study are periodically revised. The dates of the revisions vary for individual subject areas and for grades. The Ministry of Education publishes the implementation schedule on its website.
Ontario	In 2003, the Ministry of Education established a schedule for ongoing curriculum review. Each year, a number of subject areas enters the review process to ensure that they are kept current, relevant, and age-appropriate. The most current curricula and changes in curriculum are published on the Ministry's website.
China	Curricular updating traditionally follows a Five-Year Plan. The most recent curriculum reform was launched in 2003 as part of China's tenth Five-Year Plan.
France	Over the past decade, primary and secondary curricula have undergone changes. The most recent changes occurred in 2002 and in 2006, when new competency levels were introduced and curricula redefined. The new curricula were implemented in 2008.
Germany	Each federal state has its own curriculum regulations. At the local level, curricula are usually developed by teachers commissioned for that purpose. Drafts of new or amended curricula can take over a year to produce and three to four years to implement the proposed revisions for all subjects and grade levels. Once they are completed, the curricula are submitted to schools for a pilot period. Currently, new national curriculum standards are being introduced and implemented across the country.
India	Secondary curricula and examination content are revised periodically depending on the state board with which schools are affiliated. The national curriculum framework was first adopted in 1988; it was revised in 2000 and again in 2005.
Netherlands	Since August 1993, a set of "attainment targets" has determined the formal content of primary education. The quantity of these targets was recently cut in half, and roughly 60 new attainment targets for primary level education were introduced in the 2005-06 school year; schools have until August 2009 to implement them.
Russia	The Russian Federation is currently still transitioning from the 1998 curricula to revised curricula approved in 2004. Recent PISA results prompted Russia to reevaluate how it was considering curricular changes, and the next iteration will focus more heavily on science, math, and technology as a result.
Singapore	The curricula were last revised in 1999. Dates of revisions vary from subject to subject as Singapore cycles through each subject. Textbook reauthorization occurs every five years.
South Korea	Standards are revised approximately once each decade. Since the 1950s, there have been seven revisions; the most recent occurred in 2000.

TABLE B-3: What subject matter is tested in the primary grades?

COUNTRY	Math	Language Arts*	Social Studies	Science	Notes
Brazil	●	●	●	●	Assessments in primary education are part of the National Basic Education Evaluation System (SAEB). SAEB assessments are given to a sample of students in fourth and eighth grades. In Brazil's case, "social studies" means history and geography.
Canada					The Pan-Canadian Assessment (PCAP) tests 13- and 16- year olds. Occasionally, students will reach the testing age of 13 in their last year of primary school.
Alberta	●	●	●	●	Students take the Provincial Achievement Tests (PAT) in grades 3, 6, and 9. In grade 3, they are tested in English language arts, French language arts, and math; in grade 6, science and social studies are added. Math, science, and social studies tests can be administered in English or French.
British Columbia	●	●			Students in grades 4 and 7 take British Columbia's Foundation Skills Assessment (FSA), which tests reading comprehension, writing, and mathematics.
Ontario	●	●	●	●	Students take Ontario-specific tests in reading, writing, and mathematics in grades 3 and 6.
China	●	●			Throughout nine years of compulsory education, students are required to take end-of-term examinations and examinations in language arts and mathematics to advance to the next grade. Tests are given at the school level.
France	●	●			France administers national diagnostic tests to students age 8 and 11. The purpose is to provide information to teachers so that they can respond with appropriate instructional strategies.
Germany	●	●			Centralized tests are administered in grade 3 and in the lower secondary level in grade 8 in assessment cycles that serve diagnostic purposes. In parallel to these national tests, some states also use standardized comparative tests in grade 4 where schools have some say about the particular items tested.
India					There is no national assessment on the primary level, although some states administer tests to students in the upper primary level (grades 5-8).
Netherlands	●	●	●	●	Most students sit for a test (known as CITO) developed by the National Institute for Education Measurement, but a small percentage of schools use other tests. Most students take the test at the end of sixth grade.
Russia	●	●			Students take exams upon completion of ninth grade; and if they pass, they receive a Certificate of Basic General Education that entitles them to continue education. Students are not tested on a large scale before this point.
Singapore	●	●		●	Students sit for a national examination known as the Primary School Leaving Exam (PSLE) towards the end of sixth grade. Results help determine students' placement in secondary school.
South Korea	●	●	●	●	The National Assessment of Educational Achievement is given to students in grade 6 (as well as grades 9 and 10) to provide reference data and information on the school and student levels.

* Language Arts refers to the official language(s) of a country. When English is not one of the official languages, it is considered a foreign language.

TABLE B-4: What subject matter is tested in the secondary grades?

COUNTRY	Math	Biology	Chemistry	Physics	Language Arts*	Social Studies	Science**	Notes
Brazil	●	●	●	●	●	●		Students sit for the National Basic Education Evaluation System (SAEB) at the end of secondary education; it is administered to a sample of students every other year. There is also the National Secondary Education Examination (ENEM), which was created to assess a profile of students leaving secondary education. The test is multidiscliplinary and includes an essay; it measures students' performance at the end of secondary education.
Canada	●				●		●	Students take the national Pan-Canadian Assessment Program (PCAP) - similar to the American National Assessment of Educational Progress at ages 13 and 16. It assesses students in mathematics, reading, writing and science.
Alberta	●	●	●	●	●	●	●	Provincial tests are administered in four subjects with a four-year cycle. Diploma examinations in grade 12 are in English language arts, French language arts, math, social studies, biology, chemistry, and physics. All tests, other than those in language arts and vocational education, are available in English or French language.
British Columbia	●				●	●	●	Students take both provincial and graduation exams: language arts, science, and mathematics in grade 10, social studies in grade 11 or 12, and language arts in grade 12. Other optional grade 12 exams are also available.
Ontario	●				●	●	●	Students are tested in grade 9 in literacy, math, and science and in grade 10 in literacy, math, science, and history.
China	●				●			There are two types of tests: graduation exams, which measure proficiency and assess whether a student has met standards, and high-stakes entrance exams which control entry to secondary education and the university.
France	●				●	●		School-leaving exams cover a wide variety of subjects that correspond to the student's chosen path of study. Marked in this table are the subjects covered in the diagnostic national exam at the beginning of upper secondary school (roughly eighth grade).
Germany	●				●		●	National assessments aligned with national standards are currently being developed. Some states also use standardized assessments to compare schools and monitor students' performance. In addition, students sit for school-leaving and certificate examinations after 12 or 13 years of education. The upper track ends with a school-leaving examination *(Abitur)* necessary for entry to university. Students take the *Abitur* in at least four or five subjects, depending on their focus in the last two to three years of study, but the *Abitur* always includes the areas of language arts, mathematics, and social sciences.
India	●	●	●		●	●		The type of examinations depends on the state school board with which secondary schools are affiliated. One of the most prominent is the Central Board of Secondary Education; students take CBSE exams in subjects specified in the CBSE curriculum.

* Language Arts refers to the official language(s) of a country. When English is not one of the official languages, it is considered a foreign language.

** Some countries in this table have broad "science" standards, instead of more specific biology, chemistry, and physics standards.

TABLE B-4: What subject matter is tested in the secondary grades? ....*continued*

COUNTRY	Math	Biology	Chemistry	Physics	Language Arts*	Social Studies	Science**	Notes
Netherlands	●	●	●	●	●	●	●	Dutch and English are compulsory for all students regardless of track. The following are subjects typically covered regardless of track: culture and society, economics and society, science and health, and science and technology.
Russia	●				●			Math and writing (composition) are mandatory. Students choose three other exams as well.
Singapore	●	●	●	●	●	●		Depending on a student's high school track, he or she takes a "normal," "ordinary," or advanced test as part of the Singapore Cambridge General Certificate of Education. Tracks are determined by PSLE scores (see Table B-3) at the end of primary school. Students in Express/Special courses will take O (ordinary) level exams; students in Academic/Technical courses will take N (normal) level exams. If a student does well on the N level exam, they may continue for a fifth year and sit for the O level exam.
South Korea	●				●	●	●	Tests are part of the National Assessment of Educational Achievement.

* Language Arts refers to the official language(s) of a country. When English is not one of the official languages, it is considered a foreign language.

** Some countries in this table have broad "science" standards, instead of more specific biology, chemistry, and physics standards.

TABLE B-5: What types of accountability are practiced? At what level(s) do consequences occur?

COUNTRY	Regional	School	Class	Students	Notes
Brazil	●		●		Brazil's national system for evaluation (SAEB) develops tests to evaluate students' abilities at each level of education. The tests are used as an instrument for implementation of curricular reforms. Results are used for diagnostic purposes, meaning they serve as an indicator of how students are grasping the goals outlined in the national curricular frameworks. At the end of the secondary level, many students sit for the National Secondary Education Examination (ENEM). The test is voluntary, and like SAEB, it is used as a diagnostic tool to evaluate implementation of curricular reforms. Every year, more students take it because universities increasingly take the results into account when deciding on student admissions.
Canada					
Alberta		●	●	●	Assessments have primarily diagnostic purposes: They provide information on students' progress, help teachers assess students, and inform school performance data for the public. Schools are not reprimanded for subpar performance.
British Columbia		●		●	Students participate in three types of assessments: Foundation Skills Assessments (or FSAs in reading, writing, and math in grades 4 and 7), national and international assessments (e.g., PISA, TIMSS, Pan-Canadian Assessment Program), and graduation-required provincial examinations (in grades 10, 11, and 12). The assessments provide information that helps the Ministry to gauge how students are living up to provincial curricula and how they compare to other students nationally and internationally, but schools do not suffer consequences for poor performance. Graduation exams, on the other hand, have individual consequences, since, as their name implies, they are a requirement of graduation and measure individual achievement against provincial-level benchmarks.
Ontario		●	●	●	Large scale assessments tied to the provincial curriculum are administered in grades 3, 6, 9, and 10. Results are used not only for accountability purposes, but also as a mechanism to improve teaching and learning. The Ministry issues reports with a profile of students' performance; districts and schools prepare their own reports that include action plans for improving instruction. The results of the assessments are also reported in local newspapers with schools ranked from highest to lowest. The national Education Quality and Accountability Office, which is responsible for the assessments, opposes such use of the results because it finds the practice misleading. The Minister, however, requires the release of data in the name of transparency. More recently, Ontario developed the Education Quality Indicators Framework to provide more complete information on factors affecting student achievement to complement reports on test results. Assessment results in grade 10 are part of graduation requirements and, therefore, represent high stakes for individual students.
China		●		●	There is no national evaluation system yet, but student assessments are used to monitor school effectiveness. School-level assessment results are published in league ranking tables for the public, for the purpose of increasing competition and school performance. School enrollment quotas are based partially on students' exam scores, so better student achievement means more students and more funding. China ties money to school success in this way to motivate schools to improve. Despite China's recent efforts to reorient its test-driven education system to one focused on quality and well-roundedness, the stakes of these tests are highest for individual students, whose access to higher education and prestigious schools is determined by exam scores.

TABLE B-5: What types of accountability are practiced? At what level(s) do consequences occur ...*continued*

COUNTRY	Regional	School	Class	Students	Notes
France		●	●		National diagnostic exams are administered to students age 8, 11, and 15 (not compulsory for the latter) in both public and private schools. The purpose is to give teachers diagnostic information to gauge their students' progress and help them design appropriate instructional strategies. The assessments are designed by teams of teachers and test students in French, language arts and mathematics. Teachers normally administer and mark their own students' tests according to a scheme that is made available to them. The tests are set to match the competencies required by the curriculum. They change each year so the results cannot be compared from year to year.
Germany	●				A nation-wide assessment will be used starting in 2009 to monitor school performance in relation to the new national standards and will generate data that will inform policy. The assessments are not intended to carry consequences for individual students. One year after the assessment cycle, reports will be released and made available to the public.
India	●			●	There is no national assessment at the primary level but external examinations are given at the end of grades 10 and 12. The entity in charge of these assessments is the Central Board of Secondary Education. The examinations measure students' performance in two languages, math, science, and social science. Regional reports are issued based on test results; test scores also determine students' future educational paths.
Netherlands		●		●	School-leaving examinations determine whether a student receives a certificate of school completion. There is a national examination (CITO) that most students take at the end of primary education. The test predicts their future scholastic success and helps them decide what type of secondary school they should attend. This examination also provides data for reports that compare schools' average scores with national averages and with those of other schools. The Ministry publishes the results in a national education guide that provides parents with information about individual schools to help them decide where to send their child.
Russia				●	A national standardized assessment, the Unified State Exam, is used both as a secondary school-leaving exam and a college entrance examination. Additionally, students' scores help to determine the amount of merit-based financial help they receive in college.
Singapore		●		●	The national examinations at the end of primary education (Primary School Leaving Exam or PSLE) help determine students' placement in secondary education. Likewise, national examinations at the end of secondary education determine admission to institutions of higher education. In addition to these student-level purposes, the Ministry of Education uses the results to evaluate school performance. School rankings are published as a way to foster inter-school competition. Schools also use the results to assess themselves as part of their School Excellence Model, a byproduct of a quality assurance system introduced in 2000.
South Korea				●	Students are pressured to do well on the exams because individuals' social and economic success is closely related to the university they attend. The Korean SAT (C-SAT) determines university admission. Examinations in lower years are used for promotion of students from one level of education to the next and to place them within different tracks (and different curricula). Nationwide testing (which comprises a sampling of the student population in years 6, 9, and 10) is also used to inform policy decisions.

TABLE B-6: Which grade levels are tested?

COUNTRY	Curriculum standards	Tested grade levels												Notes on assessments
		1	2	3	4	5	6	7	8	9	10	11	12	
Brazil	The curriculum guidelines and framework are defined in the National Curricular Parameters.				●				●			●		The national assessment is tied to the National Curricular Parameters and works as an instrument of curricular reform. It is administered to a representative sample of students for the purpose of diagnosing and informing policy. The national exam at the end of secondary education is not mandatory; it is simply for developing a "profile" of students leaving secondary education.
Canada	Canada has no national standards but provinces have province-wide standards and curricula.								●		●			The national Pan-Canadian Assessment Program (PCAP), similar to the American National Assessment of Educational Progress (NAEP), is given to a sample of 13 and 16 year-olds.
Alberta	Alberta has a K-12 curriculum outlining what students are expected to learn and be able to do in all subjects and grades.			●			●			●			●	Standardized achievement tests are administered in grades 3, 6, and 9 and are aligned with the provincial curriculum. Grade 12 diploma examinations, also based on provincial curriculum, are required for high school graduation.
British Columbia	British Columbia has a K-12 curriculum outlining what students are expected to know and do at the end of each grade or course.				●			●			●	●	●	Students complete provincial exams to show they have met standards and fulfilled graduation requirements.
Ontario	Ontario has a K-12 curriculum explaining what students are expected to know and be able to do at the end of each grade.			●			●			●	●			Tests in grades 3,6, and 9 linked to the provincial curriculum. Tests in grade 10 are part of graduation requirements. Third and sixth graders are tested in literacy and math. Ninth graders are tested in math; tenth graders are tested in literacy.

TABLE B-6: Which grade levels are tested? ....*continued*

COUNTRY	Curriculum standards	Tested grade levels												Notes on assessments
		1	2	3	4	5	6	7	8	9	10	11	12	
China	China has centrally established standards for nine years of compulsory education plus three years of secondary education. Provinces and local governments have a small degree of flexibility to adjust a portion of the prescribed curriculum to their needs.	●	●	●	●	●	●	●	●	●			●	China's education system has traditionally been test-oriented. Curricular reforms over the past decade have attempted to change that focus. But though new curricula have been developed over the years, high-stakes tests that determine an individual's access to secondary and higher education prevail and continue to drive the curriculum—often contrary to the principles of the curricular reforms. China also tests students every year of compulsory education (grades 1-9); those tests, however, are given at the individual school level.
France	The national government sets standards for all subjects for all grades.			●			●			●			●	There are national assessments at ages 8 (grade 3), 11 (grade 6), and 15 (grade 9), which are purely diagnostic. There are also national "school leaving" examinations at the end of lower secondary education and the Baccalaureat test at the end of upper secondary education.
Germany	National standards are set for what students should achieve at the end of primary, lower secondary, and intermediate tracks. Germany moved towards national standards only relatively recently; prior to 2003, each state had its own standards.			●					●	●			●	Standardized assessments are typically conducted one year before students complete a respective educational level (i.e., before graduating from elementary, junior high, and high school). Results are used for diagnostic purposes to monitor school performance in relation to national standards. At the completion of upper secondary education, students in the higher tracked schools (*Gymnasium*) sit for final examinations (*Abitur*). Though these examinations vary between states, they are centralized within each state and their results are important for entry to university.

TABLE B-6: Which grade levels are tested? ...*continued*

COUNTRY	Curriculum standards	Tested grade levels												Notes on assessments
		1	2	3	4	5	6	7	8	9	10	11	12	
India	The National Council of Educational Research and Training (NCERT) develops model syllabi and textbooks for all stages of education (grades 1-12). Curricula selection in schools depends upon which state board a school is affiliated. The most prominent are the Central Board of Secondary Education (CBSE) and the Council for the Indian School Certificate Examination (CISCE). CBSE's curriculum is based on the national frameworks and NCERT textbooks. Other boards may or may not benchmark their curricula against the CBSE curriculum.										●		●	Examinations in grade 12 are school-leaving examinations but their results matter for students' future educational paths (entrance to higher education). They are tied to the curriculum studied in a given school. For example, students studying in schools affiliated with the Central Board of Secondary Education take CBSE exams.
Netherlands	The national government broadly defines core objectives ("attainment targets") for individual levels of education. These objectives describe desirable knowledge, skills, and insights that students should reach when they complete primary, lower secondary, and upper secondary education. Schools determine which courses to offer and what specific content to cover in order to meet the core objectives.						●		●			●	●	There is a school-leavers attainment test at the end of primary education and secondary education. Most schools use tests devised by the Central Institute for Test Development in the Netherlands (CITO) but other tests may be used as well. The CITO tests are less like exams and more like aptitude tests that assess an individual's scholastic potential. Secondary school leaving exams depend on the type of secondary program students have selected (prevocational, general secondary, preuniversity)—the tracks vary in duration so some some students complete their studies after grade 11 and some after grade 12.

TABLE B-6: Which grade levels are tested? ...*continued*

COUNTRY	Curriculum standards	Tested grade levels												Notes on assessments
		1	2	3	4	5	6	7	8	9	10	11	12	
Russia	Curriculum is set for grades 1-11.									●		●		Exams at the end of grade 9 determine a student's secondary track (e.g., upper secondary, vocational education, etc.). Starting in May 2009, school-leaving examinations at the end of grade 11 have been replaced with a compulsory national Unified State Examination.
Singapore	Singapore has highly centralized standards and curriculum for all grades.						●				●	●		Exams are administered at the end of the primary level (PSLE) and secondary level (the Singapore-Cambridge General Certificate of Education, or CGCE). The CGCE is offered at normal (CGCE-N), ordinary (CGCE-O), and advanced levels (CGCE-A).
South Korea	Korea's national curriculum covers compulsory subjects taught in the first 10 years of education ("Common Basic Curriculum") and elective subjects offered in years 11 and 12 ("Selected Curriculum"), when students select courses based on their interests (the content of the electives is still defined at the national level).						●			●	●		●	The National Assessment of Educational Achievement (NAEA) is administered in grades 6, 9, and 10. Only a sample of students are tested and the purpose is to obtain diagnostic data. The assessment system is tied to the national curriculum. The Korean College Scholastic Ability Test at the end of secondary education is important for individual access to higher education.

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