

3. What makes high-performing school systems different

What we know about successful school systems

Policy makers' hunger for immediate answers is always frustrated by the snail's pace at which the development of data, evidence and research advances. And sometimes I think policy makers forget that data are not the plural of anecdote.

The data collected by PISA alone leave many questions unanswered. The results offer a snapshot of education systems at a certain moment in time; but they do not – they cannot – show how the school systems got to that point, or the institutions and organisations that might have helped or hindered progress. In addition, the data do not really say anything about cause and effect. Correlations are often deceptive: if the birds sing when the sun rises, and they do so day after day, year after year, and in many different places around the world, it doesn't mean the sun rises because the birds sing.

In a nutshell, knowing what successful systems are doing does not yet tell us how to improve less-successful systems. That is one of the main limitations of international surveys, and that is where other forms of analysis need to kick in. That is also why PISA does not presume to tell countries what they should do. PISA's strength lies in telling countries what everybody else is doing.

And yet, policy makers need to make inferences if they are going to draw lessons from international test results.

Education policy makers can benefit from international comparisons in the same way that business leaders learn to steer their companies towards success: by taking inspiration from others, and then adapting lessons learned to their own situation. For policy makers in education, this can be achieved through various forms of benchmarking: analysing observed differences in the quality, equity and efficiency of education between one country and another, and considering how they are related to certain features of those countries' education systems.

One of the key architects of this approach is Marc Tucker, who has headed the National Center on Education and the Economy in the United States since 1988.¹ In 2009, he and I convened a group of leading thinkers to analyse what the United States might learn from high-performing and rapidly improving education systems as measured by PISA. The research entailed an enquiry of historians, policy makers, economists, education experts, ordinary citizens, journalists, industrialists and educators. Tucker's initiative became the basis of a whole range of sought-after studies that complement the OECD's thematic and country policy reviews in interesting ways.

Any examination of an individual country's trajectory towards high performance must take into account that country's unique history, values, strengths and challenges. But Tucker's benchmarking studies have revealed a surprising range of features common to all high-performing education systems.

- The first thing we learned is that the leaders in high-performing education systems have convinced their citizens that it is worth investing in the future through education, rather than spending for immediate rewards, and that it is better to compete on the quality of labour rather than on the price of labour.
- Valuing education highly is just part of the equation. Another part is the belief that every student can learn. In some countries, students are segregated into different tracks at early ages, reflecting the notion that only some children can achieve world-class standards. But PISA shows that such selection is related to large social disparities. By contrast, in countries as different as Estonia, Canada, Finland and Japan, parents and teachers are committed to the belief that all students can meet high standards. These beliefs are often manifested in student

and teacher behaviour. These systems have advanced from sorting human talent to developing human talent.

- In many education systems, different students are taught in similar ways. Top school systems tend to address the diversity of student needs with differentiated pedagogical practice – without compromising on standards. They realise that ordinary students can have extraordinary talents; and they personalise the education experience so that all students can meet high standards. Moreover, teachers in these systems invest not just in their students’ academic success but also in their well-being.
- Nowhere does the quality of a school system exceed the quality of its teachers. Top school systems select and educate their teaching staff carefully. They improve the performance of teachers who are struggling and they structure teachers’ pay to reflect professional standards. They provide an environment in which teachers work together to frame good practice, and they encourage teachers to grow in their careers.
- Top-performing school systems set ambitious goals, are clear about what students should be able to do, and enable teachers to figure out what they need to teach their students. They have moved on from administrative control and accountability to professional forms of work organisation. They encourage their teachers to be innovative, to improve their own performance and that of their colleagues, and to pursue professional development that leads to better practice. In top school systems, the emphasis is not on looking upward within the administration of the school system. Instead it’s about looking outward to the next teacher or the next school, creating a culture of collaboration and strong networks of innovation.
- The best-performing school systems provide high-quality education across the entire system so that every student benefits from excellent teaching. To achieve this, these countries attract the strongest principals to the toughest schools and the most talented teachers to the most challenging classrooms.

- Last but not least, high-performing systems tend to align policies and practices across the entire system. They ensure that the policies are coherent over sustained periods of time, and they see that they are consistently implemented.

It is worth looking at each of these features in greater detail.²

Making education a priority

Many nations claim that education is a top priority. There are some simple questions one can ask to find out whether countries live by that claim. For example: What is the status of the teaching profession; and how do countries pay teachers compared to how they pay others with the same level of education? Would you want your child to be a teacher? How much do the media report on schools and schooling? When it comes down to it, which matters more: a community's standing in the sports leagues or its standing in the academic league tables?

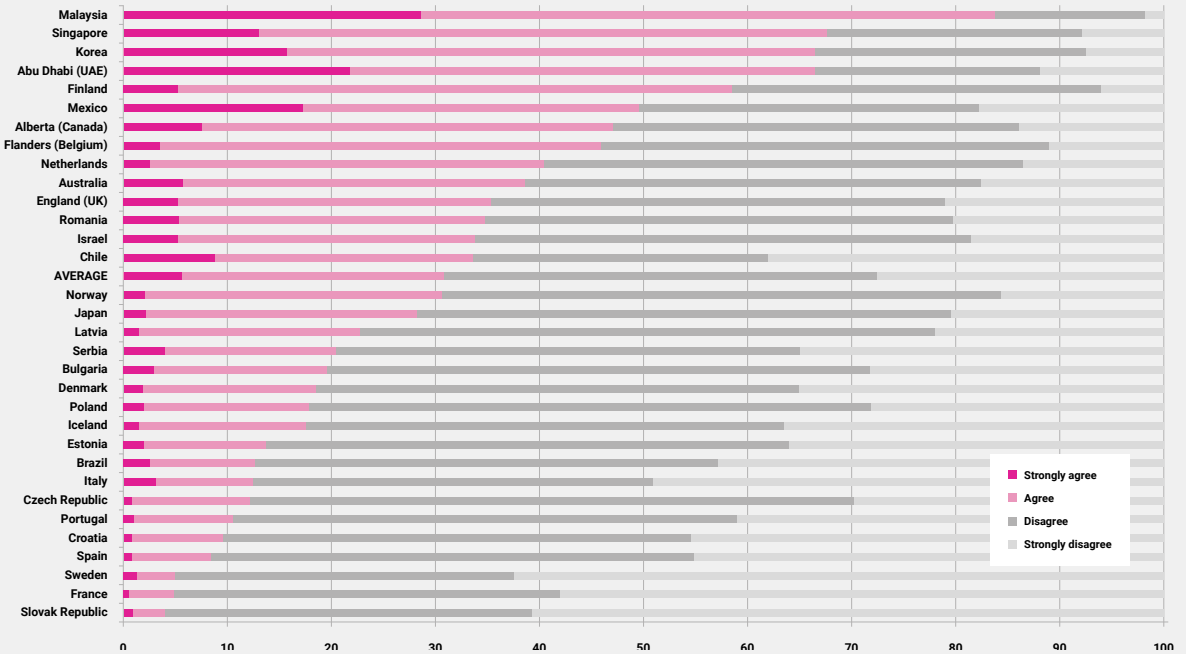
In many of the highest-performing countries in PISA, teachers are typically paid better, education credentials are valued more, and a larger share of spending on education is devoted to what happens in the classroom than is the case in many European countries and in the United States. In these latter countries, parents might not encourage their children to become school teachers if they think they have a chance of becoming attorneys, engineers or doctors.

The value placed on education is likely to influence the decisions students make about what they want to study later on; it will also influence whether the most capable students consider a career in teaching. And, of course, the status accorded to education will have an effect on whether the public values the views of professional educators or fails to take them seriously.

It is perhaps no surprise, then, that the 2013 OECD Teaching and Learning International Survey (TALIS) found wide differences across countries in whether teachers feel that their profession is valued by society. In Malaysia, Singapore, Korea, the United Arab Emirates and Finland, the majority of teachers reported that they feel their profession is valued by society; in France and the Slovak Republic, fewer than 1 in 20 reported so (**FIGURE 3.1**).

FIGURE 3.1: IN SOME COUNTRIES, MOST TEACHERS FEEL THEIR WORK IS NOT VALUED BY SOCIETY

Percentage of lower secondary teachers who “agree” or “strongly agree” with the following statement: I think that the teaching profession is valued in society.



Note: Countries are ranked in descending order, based on the percentage of teachers who "strongly agree" or "agree" that they think that the teaching profession is valued in society.

Source: OECD, TALIS 2013 Database, Tables 7.2 and 7.2.Web.

StatLink  <http://dx.doi.org/10.1787/888933042219>

Believing that all students can learn and achieve at high levels

Valuing education may be a prerequisite for building a world-class education system; but placing a high value on education will get a country only so far if the teachers, parents and other citizens of that country believe that only a minority of the nation's children can or need to meet high academic standards.

Until recently, people in Germany widely assumed that the children of working-class adults would themselves get working-class jobs and would not profit from the curriculum offered by the more academically oriented *gymnasias*. The education system in many parts of the country still divides 10-year-old students between those who go on to academic schools, geared towards entry into university and the preparation of knowledge workers, and those who go to vocational programmes that prepare them to work for the knowledge workers.

PISA results show that these attitudes are mirrored in students' perceptions of their own future education. While only one in four 15-year-olds in PISA said that they expect to go on to university or earn an advanced vocational qualification (fewer than those who actually will), in Japan and South Korea, nine out of ten students said they expected to do so.³

By contrast, in the East Asian countries that perform well in PISA, and also in other high-performing countries, including Canada, Estonia and Finland, parents, teachers and the public at large tend to share the belief that all students are capable of high achievement. The aspiration of the Ministry of Education in Singapore is that every student is an engaged learner, every teacher a caring educator, every parent a supporting partner, every principal an inspiring leader in education, and every school a good school. All of this tends to be mirrored in students' beliefs. Analyses of the Trends in Mathematics and Science Study show that students in many East Asian countries tend to believe in effort rather than inherent talent as the route to success.⁴ This is supported by other research suggesting that East Asians are more likely to attribute successes and failures to effort as compared to students in the Western world. In fact, Asian students are often explicitly taught that effort and hard work are the keys to success.⁵ Asian teachers are not only helping students succeed, but also

helping them believe that it is their own ability and effort that are the sources of their success.

In other countries, when students struggle, teachers respond by lowering standards. In doing so, they imply that low achievement is the consequence of a lack of inherent ability. Unlike effort, talent is seen as something that students have no control over, so students may be more likely to give up trying harder. According to some research, teachers give more praise, more help and coaching, and lengthier answers to questions to those students whom they perceive have greater ability.⁶

When teachers don't believe that pupils can develop and extend themselves through hard work, they may feel guilty pressing students who they perceive to be less capable of achieving at higher levels. This is concerning because research shows that when a teacher gives a student an easier task and then praises that student excessively for completing it, the student may interpret the teacher's behaviour as reflecting a belief that the student is less able.

All of this is important, because of all the judgements people make about themselves, the most influential is how capable they think they are of completing a task successfully.⁷ More generally, research shows that the belief that we are responsible for the results of our behaviour influences motivation,⁸ such that people are more likely to invest effort if they believe it will lead to the results they are trying to achieve.

All of this may explain why mastery learning is so much more common and successful in East Asia than in the West, where the concept was first defined and researched. Mastery learning builds on the understanding that learning is sequential, and that mastery of earlier tasks is the foundation on which mastery of subsequent tasks is built. According to American psychologist John Carroll,⁹ student learning outcomes reflect the amount of time and instruction a student needs to learn, and whether the opportunity to learn and quality of instruction are sufficient to meet students' needs. For teachers, that means that they do not vary the learning goals, which hold for the entire class, but that they do whatever is needed to ensure that each student has the opportunity to learn the material in ways that are appropriate to him or her. Some students will require additional instruction time, others will not; some students will require different learning environments than others. Behind this

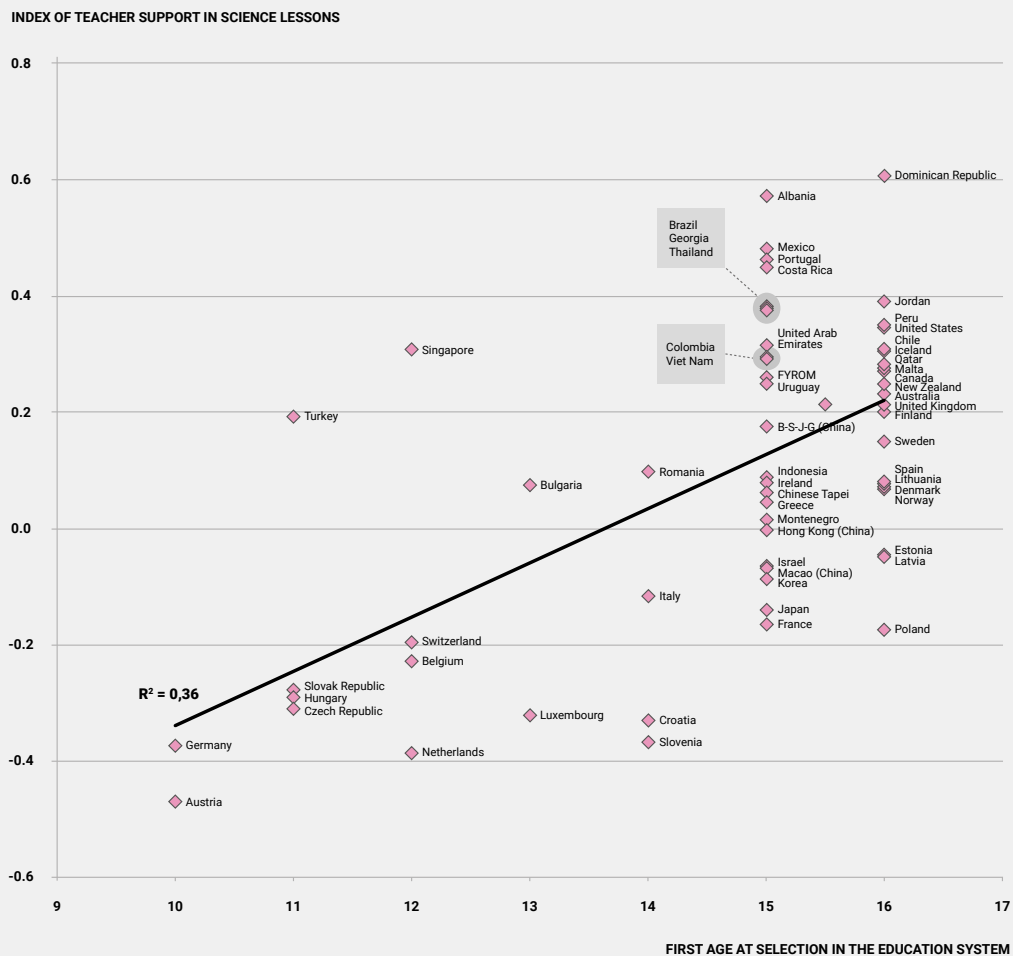
thinking is the deep belief that all students can learn and succeed, and that the task of teachers is to design the learning environments, whether inside or outside the classroom, that help students realise their potential. Because all students succeed at completing each successive task, the result is less variation and a weaker impact of socio-economic background on learning outcomes – precisely the results that set many East Asian education systems apart in PISA.

FIGURE 3.2 offers another perspective on this. PISA asked students to report on the level of support they receive from their teachers. Their responses were closely related to the age at which students were selected into different school tracks. Countries where students reported the least support from teachers were often those where students were divided by academic ability at a young age: Austria, Belgium, Croatia, the Czech Republic, Germany, Hungary, Luxembourg, the Netherlands, the Slovak Republic, Slovenia and Switzerland. Even if different response styles mean that country comparisons need to be interpreted with caution, these results are not entirely surprising. Sorting students into different types of schools creates more homogeneous classes, where teaching becomes more straightforward, and teachers may feel they do not need to pay as much attention – “show interest”, “give extra help” or “work with students” – to individual students.

Singapore, the top-ranked country in PISA 2015, had a system of streaming in its elementary schools that it later modified as the country raised its standards. Singapore now uses a wide range of strategies to make sure that struggling students are identified and diagnosed early, and are given whatever help is needed to get them back on track. Even though the results from the PISA 2015 assessment show that Singapore still has a way to go to reach the levels of equity in education achieved by Canada and Finland, the government’s economic and education policies have increased social mobility, creating a shared sense of mission and instilling a value for education that is nearly universal.

Finland’s special teachers fulfil a similar role, working closely with classroom teachers to identify students in need of extra help, and then working individually or in small groups with struggling students to help them keep up with their classmates. It is not left solely to the regular classroom teacher to identify a problem and alert the special teacher; every comprehensive school has a “pupils’ multiprofessional

FIGURE 3.2: THE LATER CHILDREN ARE TRACKED, THE MORE THEY FEEL SUPPORTED BY THEIR TEACHERS



Notes: FYROM refers to the Former Yugoslav Republic of Macedonia. B-S-J-G (China) refers to Beijing-Shanghai-Jiangsu-Guangdong (China).

Source: OECD, PISA 2015 Database, Tables II.3.23 and II.4.27.

StatLink <http://dx.doi.org/10.1787/888933435743>

care group” that meets at least twice a month for two hours. The group consists of the principal, the special teacher, the school nurse, the school psychologist, a social worker, and the teachers whose students are being discussed. The parents of any child being discussed are contacted prior to the meeting and are sometimes asked to attend.

To prevent dropout, the education ministry in Ontario, Canada, created the “Student Success Initiative” in high schools.¹⁰ The ministry gave the districts money to hire a Student Success leader to co-ordinate local efforts, and funded meetings among the district leaders during which they could share strategies. Each high school was given the resources to hire a province-funded Student Success teacher and was required to create a Student Success team to identify struggling students and design appropriate interventions. The outcomes of this and other initiatives have changed Ontario’s system profoundly: within a few years, the province’s high school graduation rate increased from 68% to 79%.

In many countries, it has taken time to move from a belief that only a few students can succeed to embracing the idea that all students can achieve at high levels. It takes a concerted, multifaceted programme of policy making and capacity building to attain that goal. But one of the patterns observed among the highest-performing countries is the gradual move from a system in which students were streamed into different types of secondary schools, with curricula demanding various levels of cognitive skills, to a system in which all students go to secondary schools with similarly demanding curricula.

Among OECD countries, Finland was the first to take this route in the 1970s; Poland is the most recent, with its school reform in the 2000s. These countries “levelled-up”, requiring all students to meet the standards that they previously expected only their elite students to meet. Students who start to fall behind are identified quickly, their problem is promptly and accurately diagnosed, and the appropriate course of action is quickly taken. Inevitably, this means that some students are targeted for more resources than others; but it is the students with the greatest needs who benefit from the most resources.

It takes strong leadership, and thoughtful and sustained communication to bring parents along in this effort, particularly those benefiting from the more selective

tracks. I learned that lesson in my home city, Hamburg, in 2010. In October 2009, policy makers from across the political spectrum agreed on a school reform that would reduce the degree of stratification in the school system and moderate its impact.¹¹ The politicians had understood that this would be the most effective way to provide better and more equitable learning opportunities. But proponents of the initiative had not worked hard enough to convince parents of its merits, and a citizens' group lobbying against the reform, mainly involving families whose children were in the elite track, soon emerged. These families were worried about losing out in a more comprehensive school system. The reform was eventually overturned in a referendum in July 2010.

But the bottom line remains: no education system has managed to achieve sustained high performance and equitable opportunities to learn without developing a system built on the premise that it is possible for all students to achieve at high levels – and that it is necessary for them to do so. I cannot overstate the importance of clearly articulating the expectation that all students should be taught and held to the same standards. PISA shows that this is possible in all types of cultural settings, and that progress towards that end can be made rapidly.

Setting and defining high expectations

Establishing standards can shape high-performing education systems by creating rigorous, focused and coherent content; reducing overlap in the curriculum across grades; reducing variation in how curricula are delivered in different schools; and perhaps most important, reducing inequity between socio-economic groups.

Most countries have incorporated standards into their curricula and often also into their external examinations, which, in secondary school, are commonly used as gateways for students to enter the workforce or the next stage of education, or both. Across OECD countries, students in school systems that require standards-based external examinations score more than 16 points higher, on average, than those in school systems that do not use such examinations.¹² But getting the design of exams wrong can hold education systems back, narrowing the scope of what is valued and what is taught, or encouraging shortcuts, cramming or cheating.

It is noteworthy that most of the high-performing education systems in PISA focus on the acquisition of complex, higher-order thinking skills and, in many of those, on the application of those skills to real-world problems. In these countries, we find teachers continually probing for understanding and prompting for further thinking, by asking students questions such as: Who is correct? How do you know? Can you explain why he or she is correct?

The re-organisation of traditional subjects into “learning domains” in Shanghai provides an example of such efforts. Finland has gone furthest in this respect, with an instructional system that is now largely cross-curricular, requiring both students and teachers to think and work across the boundaries of school subjects.¹³

For that reason, examinations in some high-performing countries do not rely mainly on multiple-choice, computer-scored tests. Instead, they also use essay-type responses, oral examinations, and sometimes factor into the final grade pieces of work that could not be produced in a timed examination.

At the same time, some countries are making greater efforts to improve rigour and comparability. I served on the advisory board that created a common school-leavers’ exam in Nordrhein Westfalen, Germany’s largest state, and could see how policy makers and experts struggled to move from entirely school-based written exams to more standardised forms of assessment, without sacrificing relevance and authenticity.

The goals of validity and comparability, and relevance and reliability, may seem difficult to reconcile at first, but there has been considerable progress in many countries towards building high-quality exam systems that capitalise on the merits while mitigating the risks of high-stakes exams.

One of the countries that have surprised me most in how they were able to change their examination culture is the Russian Federation. For a long time Russians had lost trust in exam scores and degrees because of fraud and misconduct in examinations. But for well over a decade, Russia has worked persistently on addressing these issues. Its unified state exam now offers an advanced and transparent way of assessing student learning outcomes.

For a start, Russia has not fallen into the trap of sacrificing validity for efficiency or relevance for reliability that is so common to many exam systems. There are no bubble sheets and few multiple-choice questions. Instead, tasks are open-ended and

often involve essays, focusing on the acquisition of advanced knowledge, complex higher-order thinking skills and, increasingly, the application of those skills to real-world problems.

But the biggest accomplishment of Russia's unified state exam has been in re-establishing trust in education and examinations. Trust cannot be legislated; nor does it just happen. Trust is at least as much a consequence of the design of an exam system as it is a pre-condition for conducting an exam.

So how did Russia do it? For a start, it invested in state-of-the-art test security that is now available across the country. The exam papers are packaged and printed at the point of delivery, in the classroom, under the eyes of the students and the examiners – and in the lens of a 360-degree camera that monitors and records the entire exam process.

At the end, the exam papers are scanned, digitised and anonymised, once again as students watch. Where more complex responses to essays cannot be scored by machines, they are marked centrally by independent and specially trained experts, with extensive checks for raters' reliability. Of course, there is always some judgement involved in scoring essays. So how can students trust that they were graded fairly? They can see for themselves. The fully marked exam papers are posted online and all students can review their results. Students can contest the marks if they are not happy, something which a small percentage of them do each year. Schools, too, can see and track their exam scores. So if Russian students, teachers, school leaders and employers are now much more confident in schooling and examinations, this has not happened by chance.

■ Exams as a step towards qualifications

After exams, newspapers in some countries publish exam questions and the ministry releases examples of answers that earned top grades. In this way, students, parents and teachers all learn what is considered to be high-quality work, and students can compare their own work against a clear example of work that meets the standard.

Often these examinations are linked to national qualifications systems. In countries with systems of this sort, one cannot go on to the next phase of education

or begin a career in a particular field without showing that one is qualified to do so. In these systems, everyone knows what is required to get a given qualification, in terms of both the content studied and the level of performance that has to be demonstrated to earn it.

In Sweden, and a number of other northern European countries, the qualifications systems are modular and are established such that it is never too late to earn a given qualification. In such systems, it cannot be said that one has failed the exams, but only that one has not yet succeeded on them. Perhaps it is not a coincidence that Sweden is also the OECD country where adult learners have the most discretion over what they learn, how they learn, where they learn and when they learn – and that is reflected in the highest participation rates in both formal and non-formal adult learning programmes among OECD countries.¹⁴ Sweden's adults are also among the world's most proficient in literacy and numeracy.¹⁵

In such systems, where it is never too late to earn a qualification, examinations are always available and standards are never lowered or waived. Students know that they have to take tough courses and study hard in order to earn the qualification. A student does not get to go on to the next stage simply because he or she has put in the requisite time. This is a system with high stakes for students, but usually low or no stakes for the teachers in these systems.

Because the examinations are typically externally graded, the teacher, student and parents feel that they are all on the same side, working towards the same end. Rarely do parents go to the school administration to try to change the student's grade, pitting the teacher, who wants to preserve some standard, against parents, who want the best possible future for their child. Parents and students know that neither the teacher nor the administration can change the grade, and therefore the only way to improve the outcome is for the student to learn.

It is true that high-stakes examinations can lead to a focus on test preparation at the expense of real learning, the development of large private-tutoring industries that tend to favour the wealthy, and incentives for cheating. These dangers are real, but they can be mitigated.

Parents and educators sometimes also argue that testing can make students anxious without improving their learning. In particular, standardised tests that

could determine a student's future – entry into a certain education programme or into university, for example – may trigger anxiety and undermine self-confidence. However, analyses of PISA data show that the frequency of tests, as reported by school principals, is not related to the level of test anxiety reported by students.¹⁶ In fact, on average across OECD countries, students who attend schools where they have to sit standardised or teacher-developed tests at least once a month reported similar levels of test anxiety as students who attend schools where assessments are conducted less frequently.¹⁷ The relationship between student performance and the frequency with which schools or countries assess students is also weak.

By contrast, the data show that students' experience in school has a stronger relationship with their likelihood of feeling anxious than the frequency with which they are assessed. For example, PISA shows that students reported less anxiety when their teachers provide more support or adapt the lessons to their needs. Students reported greater anxiety when they feel that their teachers treat them unfairly, such as by grading them harder than other students, or when they have the impression that their teachers think they are less smart than they are.

■ Exams as a factor in designing curricula

Education standards and examinations are where the system of instruction begins, not where it ends. The key is how those standards and examinations translate into the curriculum, instructional material and ultimately instructional practice. I have often been surprised at how little attention and resources countries devote to developing their curriculum and instructional material and aligning them with education goals, standards, teacher development and examinations.

It is not uncommon to find a few academics and government officials in a country who determine what millions of students will learn. They will often defend the scope and integrity of their discipline rather than consider what students need to know and be able to do to be successful in tomorrow's world. When studying national mathematics curricula for the development of the PISA 2003 assessment, I often asked myself why curricula devoted as much attention to teaching things like trigonometry and calculus. The answer cannot be found in the internal structure of the mathematics discipline, in the most meaningful learning progressions for

students, or in the way mathematics is used in the world today. The answer lies in how mathematics was used generations ago by people measuring the size of their fields or performing advanced calculations that have long since been digitised.

Since student learning time is limited and we seem unable to give up teaching things that may no longer be relevant, young people are held prisoners of the past, and schools lose the opportunity to develop valuable knowledge, skills and character qualities that are important for students' success in the world.

In the late 1990s, Japan responded to this situation by removing almost a third of the material in the national curriculum with the aim of creating space for greater depth and interdisciplinary learning. Teachers tended to agree with the goals of this *yutori kyoiku* reform¹⁸ but were insufficiently supported by the government and local school authorities to work towards those objectives in their classrooms.

Moreover, secondary teachers, in particular, were reluctant to diverge from practices that had proven effective in the past and that were valued by the Japanese examination system. When results from PISA showed a decline in mathematics performance in 2003, parents lost confidence that the reformed curriculum would prepare their children for the challenges that lay ahead. They looked increasingly to private tutoring to fill what they perceived as a gap in their children's education. Much of the public was unaware that between 2006 and 2009 Japan had improved faster than any other country in students' abilities to solve the kinds of unstructured, open-ended tasks found in PISA. These were tasks that tapped the kind of creative and critical thinking skills that the *yutori* reform had sought to strengthen. But pressure mounted to reverse the reform, and over the past few years curriculum content became more dominant again.

Other countries have responded to new demands on what students should learn by layering more and more content on top of their curriculum, with the result that teachers are ploughing through a large amount of subject-matter content but with little depth. Adding new material provides an easy way to show that education systems are responding to emerging demands, while it is tough to remove material from instructional systems.

Parents often expect their children to learn what they had learned, and they may equate a reduction in content with lowered standards. The work of teachers will

become more demanding when the curriculum is less detailed and less prescriptive, and therefore requires greater investment in deepening student understanding.

I learned this first-hand through PISA. In the wake of the financial crisis of 2008, policy makers sought to strengthen financial education in school and requested that these skills be tested in PISA too. The assumption was that more financial education would translate into better student performance in financial literacy. But when the first results were published in 2014,¹⁹ they showed no relationship between students' financial literacy and the amount of financial education they were exposed to. The top performer in the PISA assessment of financial literacy was Shanghai, whose schools did not provide much financial education. Shanghai's secret to success on the PISA assessment of financial literacy was that its schools cultivate deep conceptual understanding and complex reasoning in mathematics. Because students in Shanghai could think like mathematicians, and understand the meaning of concepts such as probability, change and risk, they had no difficulties transferring and applying their knowledge to unfamiliar financial contexts.

This all highlights how important it is to assemble the best minds in the country – leading experts in the field, but also those who understand how students learn, and those who have a good understanding of the demand for and use of knowledge and skills in the real world – in order to determine and regularly re-examine what topics should be taught in what sequence through the grades.

So it really matters how standards feed into well-thought-out curriculum frameworks that can guide the work of teachers and textbook publishers. Rigorous examinations should focus on complex thinking skills that assess the extent to which students have met the standards across the core curriculum; and a system of gateways, based on those examinations, should be constructed as part of a well-developed qualifications system.

It is also crucially important that education systems are built around what learning science tells us about how students learn and progress, rather than simply around academic disciplines. For example, in establishing its curriculum, Singapore was explicit about learning progressions. As students advance from primary, through secondary and on to post-secondary education, they are expected to advance from distinguishing right from wrong, through understanding moral integrity,

towards having the moral courage to stand up for what is right. Similarly, teachers are expected to help their students progress from knowing their strengths and weaknesses, through believing in their abilities and being able to adapt to change, to becoming resilient in the face of adversity. Students are expected to advance from co-operating and sharing with others, through being able to work in teams and show empathy to others, to being able to collaborate across cultures and be socially responsible. They are expected to progress from having a lively curiosity in primary school, through being creative and having an enquiring mind in secondary school, to being innovative and enterprising in tertiary education. Teachers are expected to guide students from being able to think for themselves and express themselves confidently, through being able to appreciate diverse views and communicate effectively, towards being able to think critically and communicate persuasively. Not least, students are expected to progress from taking pride in their work, through taking responsibility for their own learning, towards pursuing excellence.

It is surprising that it has taken until this decade for countries to advance towards taking a more intentional and systematic approach to curriculum design. This move has largely been inspired by the work of people like Charles Fadel and his Center for Curriculum Redesign at Harvard University.²⁰ That shift was also mirrored in the OECD Education 2030 project on curriculum design, which we launched in 2016. After years of countries refusing to discuss curricula from an international perspective (countries tend to perceive curricula as the domain of domestic policy only), they put the OECD at the helm of developing an innovative global framework for curriculum design. They recognised that the gap between what society expects from education and what our current educational institutions deliver has been getting wider, and that it required a concerted international effort to narrow that gap.

Recruiting and retaining high-quality teachers

We demand a lot from our teachers. We expect them to have a deep and broad understanding of what they teach and whom they teach, because what teachers know and care about makes such a difference to student learning. That entails

professional knowledge (e.g. knowledge about a discipline, knowledge about the curriculum of that discipline, and knowledge about how students learn in that discipline), and knowledge about professional practice so they can create the kind of learning environment that leads to good learning outcomes. It also involves enquiry and research skills that allow them to be lifelong learners and grow in their profession. Students are unlikely to become lifelong learners if they don't see their teachers as such.

But we expect much more from our teachers than what appears in their job description. We also expect them to be passionate, compassionate and thoughtful; to encourage students' engagement and responsibility; to respond to students from different backgrounds with different needs, and promote tolerance and social cohesion; to provide continual assessments of students and feedback; to ensure that students feel valued and included; and to encourage collaborative learning. And we expect teachers themselves to collaborate and work in teams, and with other schools and parents, to set common goals, and plan and monitor the attainment of those goals.

There are aspects that make the job of teachers much more challenging and different from that of other professionals. As the head of Singapore's prestigious National Institute of Education, Oon Seng Tan, describes,²¹ teachers need to be experts at multitasking as they respond to many different learner needs all at the same time. They also do their job in a classroom dynamic that is always unpredictable and that leaves teachers no second to think about how to react. Whatever a teacher does, even with just a single student, will be witnessed by all classmates and can frame the way in which the teacher is perceived in the school from that day forward.

Most people remember at least one of their teachers who took a real interest in their life and aspirations, who helped them understand who they are and discover their passions; and who taught them how to love learning.

For me, it is a given that the quality of an education system can never exceed the quality of its teachers. So attracting, developing and retaining the best teachers is the greatest challenge education systems have to face. To meet that challenge, governments can look to corporations to see how they build their teams. Companies know that they have to pay attention to how the pool from which they recruit and select their staff is established; the kind of initial education their recruits get before

they present themselves for employment; how to mentor new recruits and induct them into their service; what kind of continuing education their employees get; how their compensation is structured; how they reward their best performers and how they improve the performance of those who are struggling; and how they provide opportunities for the best performers to acquire more status and responsibility.

■ **Attracting high-quality teachers**

One of the first things I learned when studying how high-performing education systems recruit teachers is that they make the teaching profession exclusive and teaching inclusive.

When any industry or organisation recruits professionals, they will do whatever is possible to create a pool of potential employees that comes from the highest-performing segment of the population. Most firms and industries rely heavily on schools and universities and the exam system to do that sorting for them. That is what the top Japanese ministries are doing when they decide to recruit from Tokyo University and what the top Wall Street firms are doing when they recruit mainly from among Harvard, Yale and Stanford graduates. They target these institutions because they believe they are good at recognising the most talented young people, not because of any specific knowledge or skills their graduates can offer. Because no industry can afford to source all of its professionals from the highest-performing segment of graduates, they also structure their operations so that they can put the best of the best in key positions and use others who might not be quite as good in supporting positions. More often than not, they use career structures that permit them to make the most of their most advanced professionals.

So what shapes the pool from which industry selects its professionals? Generally it is a combination of the social status associated with the job, the contributions a candidate feels he or she can make while in the job, and the extent to which the work is financially and intellectually rewarding.

The status of the teaching profession in a country has a profound impact on who aspires to enter the profession. Teaching is a highly selective occupation in Finland, with highly skilled, well-educated teachers spread throughout the country. Few occupations in the country have a higher reputation. In the traditionally Confucian

cultures, teachers have long had higher social status than most of their counterparts in the West. In some East Asian countries, teachers' pay is fixed by law to make sure that teachers are among the highest paid of all civil servants.

In England, Tony Blair's Labour administration faced one of the worst shortages of teachers in British history when it took office. Five years later, there were eight applicants for every opening. To some extent this had to do with raising initial pay, and with significant changes in teachers' work environment. But a sophisticated and powerful recruitment and advertising programme also played an important part in the turnaround.²²

Singapore is notable for its sophisticated approach to improving the quality of the pool from which it selects candidates for teacher education. The government carefully selects its teacher candidates and offers them a monthly stipend, during initial teacher education, that is competitive with the monthly salary for fresh graduates in other fields. In exchange, these teachers-in-training must commit to teaching for at least three years. Singapore also keeps a close watch on starting salaries and adjusts the salaries for new teachers. In effect, the country wants its most qualified candidates to regard teaching as just as financially attractive as other professions. PISA data show that schools in Singapore have comparatively limited leeway in making hiring decisions. But the principal of the school to which student-teachers are attached will sit on the recruitment panel and weigh in on those decisions, well aware that wrong hiring decisions can result in 40 years of poor teaching. So it's not all just about your school, but about the success of the system.

While it is relatively easy to make teaching more financially attractive, it tends to be much harder to make teaching more intellectually attractive. But it is the latter that is key to drawing highly talented individuals into the profession, particularly as many people who go into teaching do so to make a difference to their society. It is hard because it depends on how the work of teachers is organised, the opportunities teachers have for professional growth, and how their work is regarded in the profession and by society at large (**FIGURE 3.1**). Given this, it is remarkable that the teaching profession does not have more ways of recognising and rewarding excellence internationally. In 2016, the film industry presented its 88th Academy Awards, but it was the first year that a Global Teacher Prize²³ was awarded.

But as discussed in Chapter 2, the Survey of Adult Skills shows that there is no country where teachers are drawn from the top third of the highest-achieving college graduates (see **FIGURE 2.5A**). In fact, teachers tend to come out remarkably similarly to the average employee with a college or university degree. Even more interesting is that some of the countries where the skills of teachers do not compare favourably either internationally or with regard to the average college graduate (Poland is one such country) have seen the most rapid progress. That shows that recruiting top-performing graduates is only one component of improving education; the investments countries make in teachers' continued professional development are at least as important.

■ Educating high-quality teachers

What makes an effective teacher? Education researchers Thomas L. Good and Alyson Lavigne²⁴ summarise some of the telling characteristics: these teachers believe their students are capable of learning and they themselves are capable of teaching; they spend the bulk of their classroom time on instruction; they organise their classrooms and maximise student learning time; they use rapid curriculum pacing based on taking small steps; they use active teaching methods; and they teach students until the students achieve mastery.

But how do we educate such teachers? I'll use an analogy from nature: frogs release a very large number of eggs in the hope that some of their tadpoles will survive and ultimately metamorphose into the next generation of frogs; ducks lay a few eggs, protect and warm them until they hatch, then defend their ducklings with their life. In a way, these different philosophies of reproduction are mirrored in the approaches towards teacher education in different countries. In some countries, teacher education is open to everyone, but it often becomes an option of last resort, and one with a high dropout rate. In other countries, teacher education is highly selective. In these countries, resources are focused on helping those who are admitted become successful teachers.

Many top-performing education systems have moved from recruiting teachers into a large number of specialised, low-status colleges of teacher education, with relatively low entrance standards, towards a relatively smaller number of university-

based teacher-education colleges with relatively high entrance standards and relatively high status in the university. By raising the bar to enter the teaching profession, these countries discourage young people with poor qualifications from becoming teachers. They understand that capable young people who could go into other high-status occupations are not likely to enter a profession that society perceives as easy to get into and therefore attractive to people who could not get into more demanding professions.

Finland has made teacher education one of the most prestigious academic programmes. Each year there are typically more than nine applicants for every place in Finnish teacher education; those who aren't selected can still become attorneys or doctors. Applicants are assessed on the basis of their high school record and their score on the matriculation exam. But the more rigorous selection comes afterwards. Once applicants make it beyond the initial screening of their academic credentials, they are observed in teaching-like activity and interviewed. Only candidates with a clear aptitude for teaching in addition to strong academic performance are admitted.

A combination of raising the bar for entry and granting teachers greater autonomy and control over their classrooms and working conditions has helped lift the status of the profession. Teaching is now one of the most desirable careers among young Finns. Finnish teachers have earned the trust of parents and the wider society, not least by showing that they can help virtually all students become successful learners.

Top-performing education systems also work to move their initial teacher-education programmes towards a model based less on preparing academics and more on preparing professionals in classroom settings, in which teachers get into schools earlier, spend more time there, and get more and better support in the process. These programmes put more emphasis on helping teachers develop skills in diagnosing struggling students early and accurately, and adapting instruction correspondingly. They want prospective teachers to be confident in drawing from a wide repertoire of innovative pedagogies that are experiential, participatory, image-rich and enquiry-based.

In some countries the initial preparation of teachers includes instruction in research skills. Teachers are expected to use those skills as lifelong learners to question the established wisdom of their times and contribute to improved professional practice.

Research is an integral part of what it means to be a professional teacher. In Finland every teacher finishes his or her initial education with a research master's-degree thesis. Because Finland is at the frontier of curriculum design to support creativity and innovation, teachers' work has many of the attractions of the professions that involve research, development and design.

One of the biggest challenges for the future is that we become better at recognising teachers for what they know and can do, rather than how they became a teacher. I have been following the Teach For All movement for some time with great interest. The aspiration of the organisations within the Teach For All network is to enlist promising future leaders from across academic disciplines and careers to teach at least two years in high-needs schools and become lifelong promoters of quality and equity in education.

Soon after becoming a member of its governing board, I went to the Teach First annual conference in London in 2012 to give a talk on "How to transform 10 000 classrooms". I heard many stories of people who had left successful careers to join the teaching force in order to make a significant impact on the lives of disadvantaged children. Still more impressive were the stories told by the young participants who had designed and were delivering intensive teacher-education courses for 400 teachers per year in Nigeria – a country with an essentially non-existent teacher-education infrastructure. A participant from China shared how she was collaborating with local governments to build urgently needed teaching capacity in remote rural areas.

Wendy Kopp, who founded Teach For America more than two decades ago, recounted the evolution of Teach For All, which she co-founded in 2007. What began as a small group of social entrepreneurs from a handful of countries with a shared commitment to equity in education is now a global network of 47 independent partner organisations that are working to develop collective leadership for educating the most vulnerable children. Teach For All's most mature partner, Teach For America, today has an alumni community of more than 50 000 current and former teachers, over 80% of whom continue to work in education or with under-resourced communities. Its more than 6 500 current participants reach nearly 400 000 students across the United States, while its alumni are working to effect lasting change as teachers, school principals, school district leaders, policy makers and social entrepreneurs.

Teach For All's second longest-standing partner, Teach First, currently fields more than 2 500 teachers in the United Kingdom, reaching over 165 000 students. Nearly 70% of Teach First's 7 000 alumni remain working in education, and the organisation has been credited as one of the key players in transforming London's public schools. Across the Teach For All network, organisations are being born and growing in every region of the world. More than 5 000 teachers and 6 000 alumni work outside of the United States and the United Kingdom.

Critics of these organisations maintain that there is just no alternative to the traditional route of undergraduate studies, teacher education and then a career in the classroom, and there is some truth to that. But those critics may simply underestimate the potential for creativity in the field of education that this combination of talent, passion and experience represents.

The fact that these programmes are now so attractive that they can recruit the most promising candidates, even where the general status of the teaching profession is in decline, speaks for itself. These organisations combine good academic outcomes and a support system in which teachers work together to create good practice. They also offer intelligent pathways for teachers to grow in their careers, whether as teachers, or leaders at the school or system level, or even in other areas, such as policy making and social enterprise. What strikes me most is the vision of social transformation behind all this work – from teacher leadership to community organisation. Clearly, Teach for All does not provide an alternative for traditional teacher education; but many of its teachers have become much-needed game-changers and innovators in the teaching profession.

■ **Updating teachers' skills**

If we want schools to support more effective learning for students we need to think harder about how to offer more powerful learning opportunities for teachers. But how do good teachers become excellent teachers in a way that is consistent and can be repeated across schools?

Teacher development tends to focus on initial teacher education: the knowledge and skills that teachers acquire before starting work as a teacher. Similarly, most of the resources for teachers' development tend to be allocated to pre-service

education. But given the rapid changes in education and the long careers of many teachers, teachers' development must be viewed in terms of lifelong learning, with initial teacher education the foundation for ongoing learning, not the summit of professional development. Think about the challenges teachers face as a result of technological innovations and new media, or those European teachers face as a result of the recent influx of migrants. No initial teacher-education programme could have predicted these challenges decades ago when today's teachers were educated.

Ontario's former premier, Dalton McGuinty, explained to me in 2010 how, rather than wait for a new generation of teachers, he invested in the existing schools and teachers, enlisting their commitment to reform and supporting their improvement. This involved extensive capacity-building in schools, and quarterly meetings between system leaders and teachers' unions, superintendents' organisations, and school leaders' associations to discuss how the reform strategies were developing.

Other countries have also made significant investments in teacher professional development. Teachers in Singapore are entitled to 100 hours of professional development per year to stay up-to-date in their field and to improve their practice. Teacher networks and professional learning communities encourage peer-to-peer learning. The Academy of Singapore Teachers was opened in September 2010 to further encourage teachers to continuously share best practices. The usual complaint that teacher education does not provide sufficient opportunity for recruits to experience real students in real classrooms in their initial education isn't unknown in Singapore. It is difficult, disruptive and expensive to get an annual cohort of 2 000 teacher recruits into classrooms.

So what can be done? Do you follow the example of the United States and some parts of Europe where teacher education is shaped by myriad decisions made by local authorities who have no idea how their choices are affecting the overall national quality of the teaching profession? Or do you follow the elite universities that offer teacher-education places to a small, select group, while national standards are sinking all around them? Singapore has been experimenting with very different approaches. On top of school teaching-practice attachments of between 10 to 22 weeks, its National Institute for Education uses digital technology to bring classrooms into pre-service education, with real-time access to a selection of the country's

classrooms. The Institute also carries out an impressive range of classroom-based research to help teachers personalise learning experiences, deal with increasing diversity in their classrooms and differences in learning styles, and keep up with innovations in curricula, pedagogy and digital resources.

In Shanghai, each teacher is expected to engage in 240 hours of professional development within five years. Shanghai is no exception in China. I hold a guest professorship at Beijing Normal University, China's premier teacher education institution. Every time I give a lecture there, I am deeply impressed by teachers' professionalism and dedication to continued improvement, and how keenly they are interested in the teaching practices used in other countries.

Effective professional development needs to be continuous and include education, practice and feedback, and provide adequate time for follow-up. Successful programmes involve teachers in learning activities that are similar to those they will use with their students.

But the key is often not just a large amount of class-taking by serving teachers; it is the underlying career structures and how they inter-relate with the time teachers work together in a form of social organisation that both requires and provides new knowledge and skills that make the difference. Successful programmes encourage the development of teachers' learning communities through which teachers can share their expertise and experiences. There is growing interest in ways to build cumulative knowledge across the profession, for example by strengthening connections between research and practice, and encouraging schools to develop as learning organisations.

David Hung, at Singapore's National Institute for Education, found changing teachers' beliefs to be the most important point of leverage for change in education.²⁵ He describes the challenge as a shift in instruction from knowledge transmission to knowledge co-creation, from receiving abstractions in textbooks to learning by experimenting, from summative evaluation to formative monitoring. This often requires transforming a fear of failure into a willingness to try. Teachers with a very high or very low sense of self-efficacy may be less likely to use the new skills they have learned, while those with moderate confidence in their own ability might be the most likely to do so. Self-efficacy, in turn, is related to the ways in which work is organised: the more teachers observe other classrooms, engage in collaborative

professional development, and teach jointly, the more they perceive themselves as being effective teachers (**FIGURE 3.3**).²⁶

And yet, surprisingly little is known about the ways in which teachers continue to learn throughout their careers. That was motivation for me to give teachers a voice through the first OECD Teaching and Learning International Survey (TALIS). When first results from this survey came out in 2009,²⁷ they showed how teachers reported far less participation in the kinds of professional development activities that are usually considered to be the most effective. The subsequent TALIS survey in 2013²⁸ also showed that, across countries, teachers frequently co-ordinate and engage in informal exchanges, while the kinds of professional development activities that are most closely related to teachers' efficacy, such as classroom observations and lesson study, or team teaching, still occurs much more rarely (**FIGURES 3.3** and **3.4**).

The evidence from TALIS suggests that professional development activities that have an impact on teachers' instructional practices are those that take place in schools and allow teachers to work in collaborative groups. Teachers who work with a high degree of professional autonomy and in a collaborative culture – characterised by high levels of both co-operation and instructional leadership – reported both that they participate more in in-school professional development activities and that those activities have a greater impact on their teaching.²⁹

Turning this into practice is not easy. There is often a tension between bottom-up, teacher-led collaboration and guided, systemic improvement processes. In many schools teachers appreciate opportunities to work together, but they don't maximise this time. On the other hand, attempting to overly steer the direction of professional collaboration is poorly received by teachers.

Indeed, building a collaborative culture in schools is easier said than done. Andy Hargreaves, Thomas More Brennan Chair in the Lynch School of Education at Boston College, has often drawn attention to the difficulties of building collaborative cultures in schools, and of extending these beyond a few enthusiastic well-led schools and school districts.³⁰ He argues that the approach adopted by some school systems amounts to “contrived collegiality”, that is, collaboration imposed from above that, by crowding the collegial agenda with requirements about what is to be done and with whom, inhibits bottom-up professional initiative and true collaboration.

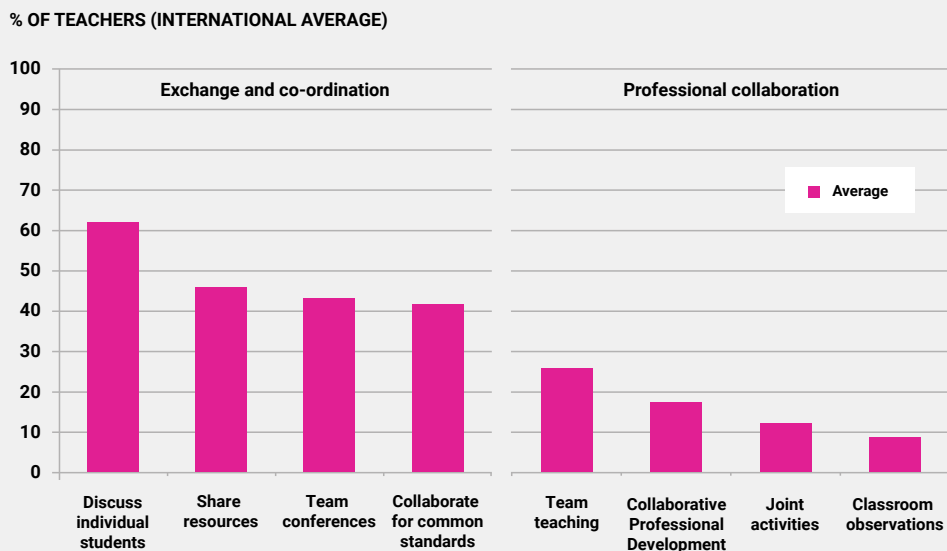
But policy can do a lot to encourage genuine collaboration by establishing leadership-development strategies that create and sustain learning communities; building indicators of professional collaboration into school-inspection and accreditation processes; linking evidence of commitment to professional learning communities to performance-related pay and measures of teacher competence; and by providing seed money for self-learning in and among schools. Structures and processes that encourage teachers to co-operate, including providing time and opportunities for collective apprenticeships, are needed to foster collective teacher efficacy. Such activities can include teacher-initiated research projects, teacher networks, observation of colleagues, and mentoring or coaching. By supporting the conditions and activities most associated with effective teacher professional development, policy makers can increase the likelihood that students are positively affected too.

In Finland, teachers are encouraged to contribute to research on effective teaching practices throughout their career. The Chinese teacher-education system also emphasises the importance of research, and improvement to the system relies on research conducted by teachers. I have always been impressed by the amount of teacher-led research conducted in China, and by how easy it is for teachers to obtain government grants for such work. The criterion for success is that teachers can show that they can replicate their findings in other schools with other teachers. Zhang Mingxuan, former director of an experimental school in Shanghai and later president of Shanghai's premier teacher-education university, explained to me how schools are given research grants to pilot new programmes or policies and to test their scalability in other schools. The most experienced teachers in those schools are then enlisted as co-researchers to evaluate the effectiveness of the new practices.

But elsewhere in Asia too, countries make the most of their top-performing teachers. The education authorities often identify the best teachers and relieve them of some of their teaching duties so that they can give lectures to their peers, provide demonstrations, and coach other teachers in their district, their province, or even across the country. At the school level, the best teachers typically lead the process of lesson development. Experienced teachers are also called upon to coach novice teachers and to play a key role in analysing why certain students are having difficulties learning.

FIGURE 3.3: INFORMAL EXCHANGE IS MORE COMMON AMONG TEACHERS THAN DEEP PROFESSIONAL COLLABORATION

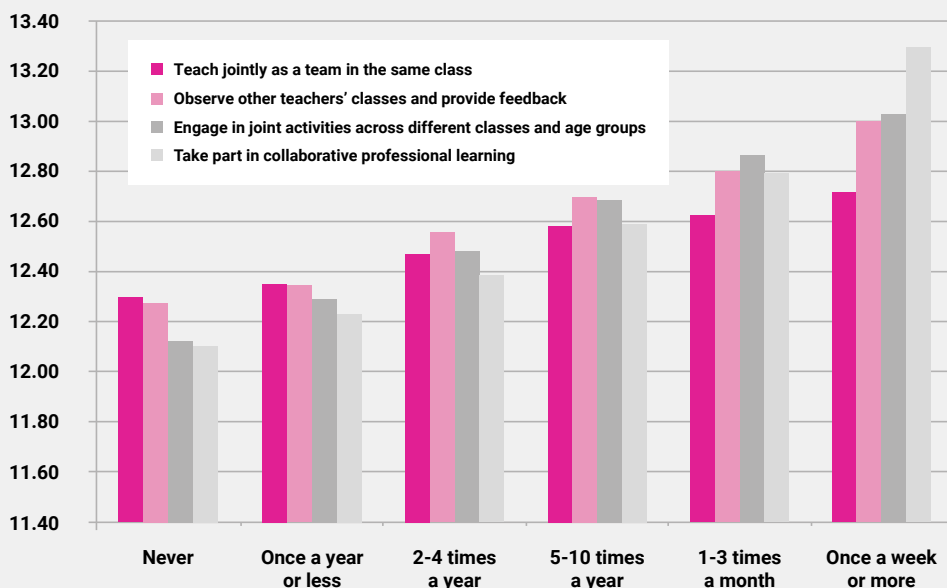
Percentage of lower secondary teachers who reported doing the following activities at least once per month



Source: OECD, TALIS 2013 Database, Table 6.15.

FIGURE 3.4: FEELING EFFECTIVE AS A TEACHER IS LINKED TO COLLABORATING WITH COLLEAGUES

INDEX OF TEACHER SELF-EFFICACY (INTERNATIONAL AVERAGE)



Notes: Teacher self-efficacy by intensity of type of teacher professional collaboration. The more frequently teachers engage in the different types of collaboration, the higher their self-perceived effectiveness.

Source: OECD, TALIS 2013 Database, Table 7.10.

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These policies and practices influence the quality of the teaching force itself. For example, the Japanese tradition of lesson study means that Japanese teachers work together to improve the quality of the lessons they teach. Teachers whose practice is inferior to that of teacher leaders can see what good practice is. Because the structure of the profession provides opportunities for teachers to move up a ladder of increasing prestige and responsibility, it also pays for a good teacher to become even better.

Singapore encourages teacher development through its Enhanced Performance Management System. The system, which was first fully implemented in 2005, is part of the career and recognition system under the “Education Service Professional Development and Career Plan”. This structure has three components: a career path, recognition through monetary rewards, and an evaluation system. The plan recognises that teachers have different aspirations and provides for three career tracks for teachers: the Teaching Track, which allows teachers to remain in the classroom and advance to the level of Master Teacher; the Leadership Track, which provides opportunities for teachers to assume leadership positions in schools and in the ministry’s headquarters; and the Senior Specialist Track, where teachers join the ministry’s headquarters to become part of a “strong core of specialists with deep knowledge and skills in specific areas in education that will break new ground and keep Singapore at the leading edge”, according to the government of Singapore.

The Enhanced Performance Management System is competency-based, and defines the knowledge, skills and professional characteristics appropriate for each track. The process involves performance planning, coaching and evaluation. In performance planning, the teacher starts the year with a self-assessment and develops goals for teaching, instructional innovations and improvements at the school, and for professional and personal development. The teacher meets with his or her reporting officer, who is usually the head of a department, for a discussion about setting targets and performance benchmarks. Performance coaching takes place throughout the year, particularly during the formal mid-year review, when the reporting officer meets with the teacher to discuss progress and needs.

In the performance evaluation held at the end of the year, the reporting officer conducts the appraisal interview and reviews actual performance against planned performance. The grade given for performance influences the annual performance

bonus received for the year's work. During the performance-evaluation phase, decisions regarding promotions to the next level are made based on "current estimated potential". The decision about a teacher's potential is made in consultation with senior staff who have worked with the teacher. It is based on observations, discussions with the teacher, portfolio evidence and the teacher's contribution to the school and community.

This, too, is an area where international exchanges can greatly enrich policy and practice. In 2014, England's then Under Secretary of State for Education and Childcare, Liz Truss, a former mathematics teacher, was inspired by Shanghai's high performance in the PISA mathematics assessment. She went to visit Shanghai and was impressed by the mathematics teaching that she observed and the teacher-to-teacher and school-to-school programmes in the province. She worked with the Chinese to create an exchange programme for teachers between China and England.³¹ As part of the government's "maths hubs", a national network of mathematics centres of excellence, the initiative was designed to spread best teaching practice and raise standards in mathematics.

The initiative was met with some scepticism at first. I saw that first-hand when the BBC interviewed me and a leader of the National Union of Teachers when the programme was launched. The union representative raised the usual question of whether what works in one country and culture could be transposed to another context. I countered that the Chinese had spent a thousand years refining methods for teaching mathematics, and asked whether there was nothing that England could learn from their experience. He seemed unconvinced.

Shortly afterwards, the programme took off. Some 50 English-speaking mathematics teachers from China were deployed to more than 30 maths hubs in England. They showed the teaching methods they use, including teaching to the top and helping struggling students one-on-one. They gave daily mathematics lessons, homework and feedback. The Chinese teachers were also running masterclasses for local schools and provided subject-specific, on-the-job teacher education. In turn, leading English mathematics teachers from each of the maths hubs went to work in schools in China. The programme attracted considerable attention in both countries, showing how much teachers can and want to learn from other cultures if they are given the opportunities to do so, and if we dare to pull down ideological walls.³²

Seeing teachers as independent and responsible professionals

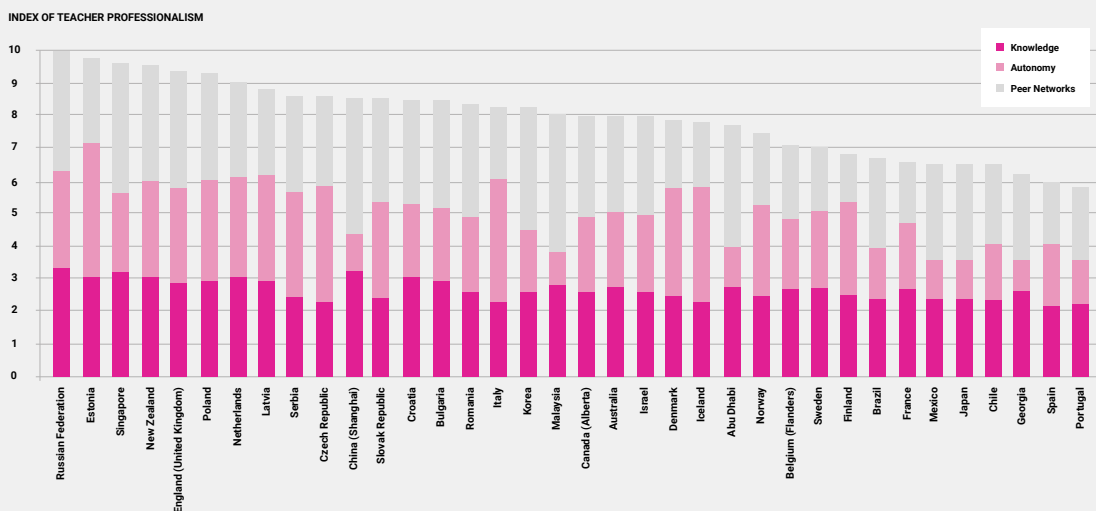
The concept of “professionalism” historically referred to the level of autonomy and internal regulation exercised by members of an occupation. In 18th- and 19th-century Europe, the distinction between occupations and professions lay in the level to which a profession required special knowledge, a formal code of conduct and a state-issued mandate to carry out particular services. Over time, the classic definition of the professions was expanded, and university professors and upper secondary teachers were recognised as experts in education.

In the 20th century, the professionalism of teaching was countered by the growing standardisation of curricula and, with it, the emergence of an industrial work organisation. The expansion of education opportunities around the world during the past 100 years led not only to an increase in the number of teachers but also to more structured and scripted curricula and lesson plans.

At the turn of the 21st century, however, there was renewed focus on teacher professionalism as key to education reform. As improving teacher quality became viewed as the key to student achievement, teacher professionalism gained prominence. Indeed, a strong and coherent body of professional knowledge that is owned by the teaching profession, and to which teachers feel responsible and accountable, together with teachers’ continuous professional development, are now widely seen as essential for improving teachers’ performance and effectiveness. Teacher professionalism varies significantly across countries (**FIGURE 3.5**), and this variation often reflects cultural and historical differences, as well as disparities in national and local policy priorities.

In some countries, educators consider teaching to be entirely in the purview of the individual teacher in the sanctuary of his or her classroom; but that often leads to a profession without an accepted practice. The challenge is moving from a system where every teacher chooses his or her own approach towards one where teachers choose from practices agreed by the profession as effective. We should not take freedom as an argument to be idiosyncratic. What seems most important in this context is that professionalism and professional autonomy do not mean that

FIGURE 3.5: TEACHER PROFESSIONALISM, AND ITS COMPONENTS, VARY CONSIDERABLY AROUND THE WORLD



Notes: Knowledge is defined as expertise that is necessary for teaching; the index includes: formal teacher education, and whether the teacher has incentives for professional development (e.g. can participate in activities during professional hours) and participates in professional development. Autonomy is defined as teachers' decision-making power over aspects related to their work; the index includes decision making over: teaching content, course offerings, discipline practices, assessment and materials. Peer networks are defined as opportunities for the exchange of information and support needed to maintain high standards of teaching; the index includes: participation in induction, mentoring programmes and/or network of teachers, receiving feedback from direct observations.

Source: OECD (2016), *Supporting Teacher Professionalism: Insights from TALIS 2013*.

teachers do what they think or feel is right in a given situation, but rather that they do what they know is right based on their deep understanding of professional practice.

As data from TALIS show, when rated on their professional knowledge base, their decision-making power over their work, and their opportunities for exchange and support, teachers still have significant challenges ahead of them. Rarely do teachers own their professional standards to the extent other professionals do, and rarely do they work with the level of autonomy and in the collaborative work culture that people in other knowledge-based professions take for granted. But the data also show that when teachers teach a class jointly, when they regularly observe other teachers' classes, and when they take part in collaborative professional learning, they are more satisfied with their careers and feel more effective in their teaching (**FIGURE 3.4**).

It is instructive to turn to the high-performing education systems to see what teacher professionalism looks like on the ground. Interestingly, there is almost just as much variation in approaches to teacher professionalism among the high performers as in the rest of the world. Hong Kong, for example, has introduced greater teacher autonomy than its neighbours in East Asia. School administrators and teachers in Hong Kong are given the freedom to customise the curriculum, materials and teaching methods. This breadth and depth of autonomy has fostered high professional self-esteem among teachers and internal motivation for continuous professional development. The government does not intervene in school management even for low-performing schools; it relies instead on the decision-making power of the school administration and teachers.

By contrast, in Shanghai the municipal government designs the policies, manages the schools and works to improve instruction. Teachers in Shanghai are comprehensively and rigorously educated in pre-service programmes and subsequent regular professional-development activities. They are expected to adhere to the standards and curricular approaches defined by the government, and generally have a narrower space for interpreting curricular objectives.

High-quality teachers and school leaders form the cornerstone of Singapore's education system and are considered a major reason for its high performance. Singapore has developed a comprehensive system for selecting, educating,

compensating and developing teachers and principals, thereby creating strong capacity on the frontlines of education. Much professional development is school-based, led by staff developers who identify teaching-based problems or introduce new practices. This gives teachers greater autonomy over professional development and facilitates a teacher-led culture of professional excellence. Australia, Canada, Finland and the Netherlands pursue similar strategies and are also known for the latitude they give to their teachers to customise their teaching.

These differences in the degree of autonomy that teachers are granted suggest that the impact of that autonomy depends on the context. In countries in which teacher education and selection procedures produce a well-prepared and independent teaching workforce, autonomy will allow creativity and innovation to flourish; in other cases, autonomy may simply amplify poor judgement and wrong decisions.

The cases of Finland and Ontario provide examples of how formerly centralised systems have shifted emphasis towards improving the act of teaching; towards giving careful attention to implementation, along with opportunities for teachers to practice new ideas and learn from their colleagues; towards developing an integrated strategy and set of expectations for both teachers and students; and towards securing support from teachers for reform.

Other countries, too, have rebalanced their systems to provide more discretion to school heads and school faculties – a factor that, when combined with a culture of collaboration and accountability, seems to be closely related to school performance.³³

In some countries, great discretion is given to the faculty, as a whole, and its individual members; in others, more discretion is given to schools that are doing well and less to those that might be struggling. In some countries, the school head is little more than the lead teacher; in others, the authorities continue to look to the school head to set the direction and manage the faculty. But common to all is the degree to which these countries are moving away from bureaucratic management of schools to forms of work organisation that are more likely to be found in professional partnerships.

In many cases, these countries concluded that top-down initiatives were insufficient to achieve deep and lasting changes in practice, because reforms were focused on things that were too distant from the instructional core of teaching and learning; because reforms assumed that teachers would know how to do things

they actually didn't know how to do; because too many conflicting reforms asked teachers to do too many things simultaneously; or because teachers and schools did not buy into the reform strategy. Therefore, public policy was focused on creating strong social institutions that connect deeply with society, as opposed to assuming that government can directly interact with schools, teachers and other stakeholders.

At one end of the spectrum, the Estonian and Finnish systems of accountability are entirely built from the bottom up. Teacher candidates are selected, in part, based on their capacity to convey their belief in the core mission of public education. The preparation they receive is designed to build a sense of individual responsibility for the learning and well-being of all the students in their care. The next level of accountability rests with the school. Again, the level of trust that the larger community extends to its schools seems to engender a strong sense of collective responsibility for the success of every student. While every comprehensive school in Finland reports to a municipal authority, authorities vary widely in the quality and degree of oversight that they provide. They are responsible for hiring the principal, typically on a six- or seven-year contract, but the day-to-day responsibility for managing the schools is left to the teachers and other education professionals, as is the responsibility for assuring students' progress.

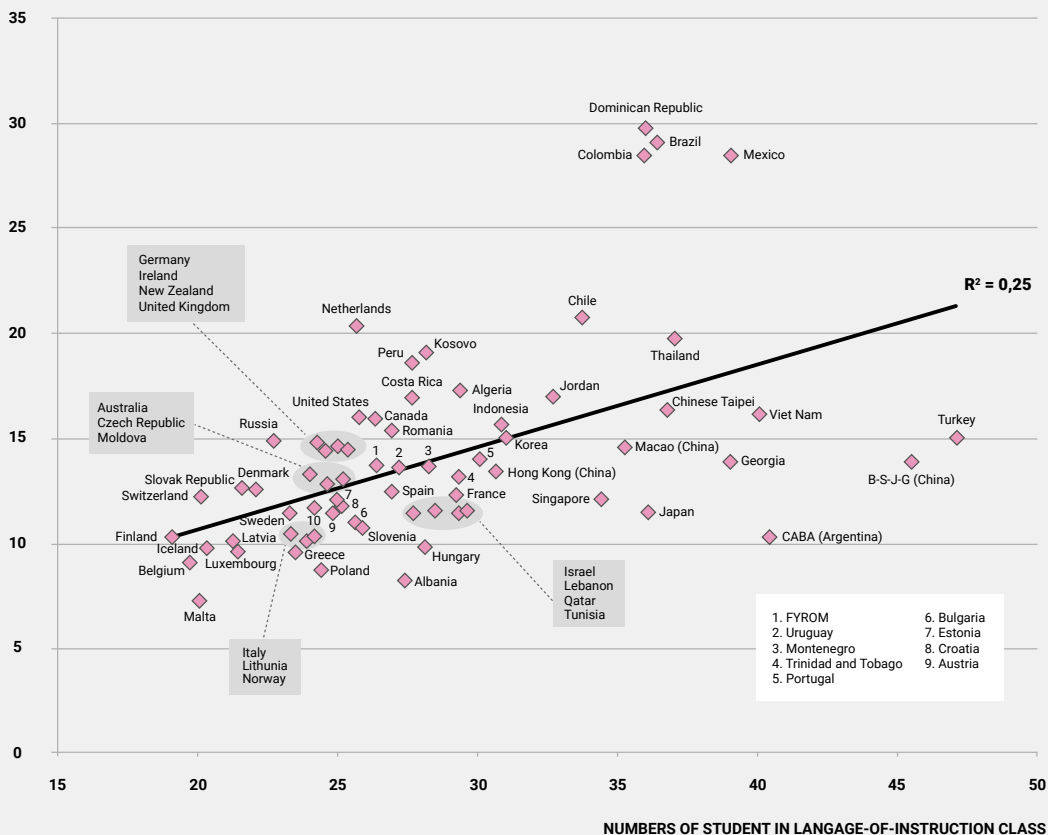
Making the most of teachers' time

One of the most striking findings in the PISA 2015 assessment is the weak link between the ratio of students to staff in the education system and the size of classes in schools (**FIGURE 3.6**). It seems intuitive that having more teachers per student will translate into smaller classes, but that is far from evident in the data. For 15-year-old students, Brazil and Japan both have an average class size of around 37 students, but Brazil has one teacher for every 29 students while Japan has one teacher for every 11 students. Conversely, in the United States and Viet Nam, there are around 15 students per teacher, but classes in Viet Nam are almost twice as large as those in the United States.

What might look like a statistical fluke has a lot to do with education policy. While teachers in Brazil and the United States have little time for things other than

FIGURE 3.6: SIMILAR STUDENT-TEACHER RATIOS CAN BE FOUND IN CLASSES OF VERY DIFFERENT SIZES

STUDENT-TEACHER RATIO IN THE SCHOOL
(NUMBER OF STUDENTS PER TEACHER)



Notes: FYROM refers to the Former Yugoslav Republic of Macedonia. CABA (Argentina) refers to Ciudad Autónoma de Buenos Aires (Argentina). B-S-J-G (China) refers to Beijing-Shanghai-Jiangsu-Guangdong (China). Source: OECD, PISA 2015 Database, Table II.6.26.

StatLink <http://dx.doi.org/10.1787/888933436320>

teaching, their peers in Japan and Viet Nam have a fraction of their teaching load and can devote plenty of time to other things besides teaching, such as working with individual students, with parents and, most important, with other teachers.

One might still think that large classes leave teachers little room for dedicating sufficient time to the needs of individual students; but the level of teacher support that students reported in PISA does not seem to correlate with class size.³⁴ Indeed, I have observed many classes in Japan where there was little lecturing by teachers, but where teachers developed a class discussion that focused on conceptual understanding and the underlying concepts involved in problem solving, in a way that reached both the quickest and the slowest students in the class. In this way, Japanese teachers maximise their contact time with each student in the class. Students are not whiling away their time when the teacher is dealing with a small group in the classroom. In fact, a Japanese teacher in Fukushima once complained to me that classes were becoming too small to show a wide enough range of student solutions to a given problem – the basis for conducting a good lesson.

The Finnish education system pursues similar goals but with different strategies. Finnish schools devote about a third of instruction time to learning outside the classroom, thus giving teachers ample opportunity to tackle underperformance and nurture talent. In Finland, special-needs education is not synonymous with teaching students with learning difficulties. Rather, virtually every student will become a special-needs student at some point in his or her education, simply because the school has recognised that it can do more for him or her outside classroom instruction.

Inside the classroom, there is a considerable emphasis on self-regulated learning and self-assessment by students. By the time students enrol in upper secondary school, they are expected to be able to design their own programme in which, without a grade structure, each student proceeds at his or her own pace.

In Shanghai, the enquiry-based curriculum component asks students to identify research topics based on their experiences, with support and guidance from teachers. The aim is to develop students' capacity to learn to learn, think creatively and critically, participate in society and promote social welfare. In fact, one significant change implemented in Shanghai through the slogan "return class time to students"

was the increase in student activities in class relative to teachers' lecturing.³⁵ This has resulted in a fundamental change in the perception of what makes a good class, which was once typified by well-designed presentations by teachers. Training videos showing examples of good teaching used to concentrate on teachers' activities; now, model classes are filmed with multiple cameras, one recording student activities. Teachers are evaluated according to the time given to student participation and how well student activities are organised.

In places as different as Finland, Japan and Shanghai, teachers' work is reviewed by the other teachers in the school. No teacher's classroom is a private domain.

■ A lesson in creative learning time from Hiroshima

As school principal Kadoshima drove by an office tower on our way to his school in Hiroshima, he explained to me that this had been the place where his grandmother and two uncles had been burned alive like most other residents 69 years earlier. All that had been left, he said, was a shadow on the floor.

But on this day in 2014, a group of students was out on Hiroshima Nagisa High School's playing field. What looked like casual play was actually part of a carefully planned and sequenced curriculum designed to help students develop their five senses, their own identity, and their ability to work with others.

In classroom after classroom I observed lots of lively interaction both among students and between students and their teachers. I found Rudyard Brettargh from Australia and Olen Peterson from the United States co-teaching an English class, showing students that there is not just one, but many ways to speak a language.

Many of the school's pedagogical approaches involved experiences in addition to intellectual engagement. In one classroom I met a group of students cooking *okonomiyaki*, Hiroshima's most popular local dish. Each student was preparing the dish his or her own way – and learning from the mistakes they made as they went along.

Principal Kadoshima showed me pictures from the many field trips his students had taken to other countries, or to businesses and other places in Japan. During these trips, students learned about the global economic, social and political forces that were shaping their lives. One picture showed a group of exhausted students lying on a bridge at dawn. They had walked 44 kilometres through the night, Kadoshima explained. The

aim of that exercise was to strengthen their resilience, with the understanding that living in the world means trying, failing, adapting, learning and evolving.

Aligning incentives for teachers, students and parents

To understand why people do the things they do, ask yourself what sort of incentives they have to act that way. Examining whether the incentives that operate on students, parents and teachers in some countries are more likely to result in higher performance than the incentives that operate in other countries can provide important insights into why some countries rank higher on the education league tables than others.

In countries with high-stakes examination systems, systems in which students cannot progress to the next stage of their life – be it work or further education – unless they show that they are qualified to do so, students know what they have to do to realise their dreams, and they put in the required work. In other words, examination systems provide strong incentives for students to study hard. And as the PISA outcomes from countries like Estonia, Finland, the Netherlands and Switzerland show, studying hard and doing well in school does not automatically detract from a strong sense of belonging at school and a high degree of student well-being.

What kinds of incentives do teachers have to work hard? In repetitive, inflexible, industrial work environments, management rewards those whose output exceeds expectations. In those environments, workers compete against one another. Those who resent the co-worker who outperforms them are eventually likely to treat that co-worker as an outcast. But in professional work environments, the success of the whole group depends on maximising the output of each worker, so workers tend to collaborate.

In schools, the environment is also shaped by the influence of parents. In many countries in both Europe and Asia, certain teachers are designated as classroom teachers. These teachers follow students through a number of grades. They assume a certain responsibility for the students in their class and form a close relationship not only with students but also with parents. In both Asia and Europe, it is typical that information between teachers and parents is shared through social networks. Not

only is this a good way to get parents involved but, perhaps even more important, it is a way to provide accountability to parents in a form that seems appropriate to teachers.

Parents in these systems tend to feel a strong bond with their children's classroom teachers. In a series of focus groups conducted in Denmark by the National Center on Education and the Economy, parents were asked what happens when their child is assigned a less-competent classroom teacher. Is that a problem? Parents said that the advantages of the classroom-teacher system far outweigh any disadvantages.

There is another, more subtle, advantage of this system. A teacher who teaches a given student for only one year might feel that, while they will do the best they can with the students to whom they have been assigned, there is little they can do in one year to correct the problems students have inherited from teachers in earlier grades, and little they can do to protect students from teachers in succeeding grades who might be less competent.

But in the classroom-teacher system, the teacher in the earlier grade is the teacher in question, as is the teacher who comes later. In this system, there is no way for the classroom teacher to evade personal responsibility for what happens to the student. As a matter of professional pride, and as a result of being close to the student for years and developing a sense of personal responsibility for the student, it is natural for the teacher to reach out to the student's parents. It is also common for these teachers to co-ordinate the education of their students with those students' specialist teachers, and counsel and guide their students as they grow up.

■ **Focusing on students' well-being**

PISA is best known for its data on learning outcomes, but in 2015 we also studied students' satisfaction with life, their relationships with peers, teachers and parents, and how they spend their time outside of school.³⁶ The results show that students differ greatly, both between and within countries, in how satisfied they are with their lives, their motivation to achieve, how anxious they feel about their schoolwork, their expectations for the future, and their perceptions of being bullied at school or treated unfairly by their teachers. Students in some of the countries that top the PISA league tables in science and mathematics reported comparatively low satisfaction with life; but Estonia, Finland, the Netherlands and Switzerland seem

able to combine good learning outcomes with high student satisfaction with life. It is tempting to regard low levels of life satisfaction among students in East Asia or elsewhere as the consequence of long study hours, but the data show no relationship between the time students spend studying, whether in or outside of school, and their satisfaction with life. And while educators often argue that anxiety is the natural response to testing overload, the frequency of tests is also unrelated to students' level of schoolwork-related anxiety.

But there are other factors that affect students' well-being, and many of them are related to teachers, parents and schools.

For a start, PISA finds that one major threat to students' sense of belonging at school is their perception of having negative relationships with their teachers. Happier students tended to report positive relations with their teachers, and students in "happy" schools (schools where students' life satisfaction is above the average in the country) reported receiving much more support from their teachers than students in "unhappy" schools reported.

On average across countries, students who reported that their teacher is willing to provide help and is interested in their learning were also about 1.3 times more likely than students who reported the contrary to feel that they belong at school. Conversely, students who reported some unfair treatment by their teachers were 1.7 times more likely to report feeling isolated at school. This is important. Teenagers forge strong social ties; they value acceptance, care and support from others. Adolescents who feel that they are part of a school community are more likely to perform better academically and be more motivated in school.

There are also big differences between countries on these measures. On average, three out of four students reported that they feel they belong at school; in some of the highest-performing education systems, including Estonia, Finland, Japan, the Netherlands, Singapore, South Korea, Chinese Taipei and Viet Nam, the proportion is even larger. But in France, only around two in five students so reported.

Of course, most teachers care about having positive relationships with their students; but some teachers might be insufficiently prepared to deal with difficult students and classroom environments. Effective classroom management consists of far more than establishing and imposing rules, rewards and incentives to control

behaviour; it requires the ability to create a learning environment that facilitates and supports students' active engagement in learning, encourages co-operation, and promotes behaviour that benefits other people. A stronger focus on classroom and relationship management in professional-development programmes may give teachers the tools they need to connect better with their students. Teachers should also be given the time to share information about students' strengths and weaknesses with their colleagues, so that, together, they can find the best approach to make students feel part of the school community.

While it is not the frequency of testing that affects students' well-being, students' perception of tests as threatening has a clear influence on how anxious students feel about tests. On average across OECD countries, 59% of students reported that they often worry that taking a test will be difficult, and 66% reported that they worry about poor grades. Some 55% of students reported that they are very anxious when they are tested, even if they are well prepared.

Again, results from PISA suggest that there is a lot teachers can do about this. Even after accounting for students' performance, gender and socio-economic status, students who reported that their teacher adapts the lesson to the class's needs and knowledge were less likely to report feeling anxious when they are well prepared for a test, or to report that they get very tense when they study. Students were also less likely to report anxiety if their teacher (in this case, their science teacher) provides individual help when they are struggling.

By contrast, negative teacher-student relations seem to undermine students' confidence and lead to greater anxiety. On average across countries, students were about 62% more likely to report that they get very tense when they study, and about 31% more likely to report that they feel anxious before a test if they perceive that their teacher thinks they are less smart than they really are. Such anxiety might be students' reaction to, and interpretation of, the mistakes they make – or are afraid to make. Students might internalise mistakes as evidence that they are not smart enough.

So teachers need to know how to help students develop a good understanding of their strengths and weaknesses, and an awareness of what they can do to overcome or mitigate their weaknesses. For example, more frequent assessments that start with easier goals and gradually increase in difficulty can help build students' sense

of control, as can opportunities for students to demonstrate their skills in low-stakes tests before taking an assessment that counts. Interestingly, in all countries, girls reported greater schoolwork-related anxiety than boys, and anxiety about schoolwork, homework and tests is negatively related to performance. The fear of making mistakes on a test often undermines the performance of top-performing girls who “choke under pressure”.

Parents have a vital role to play too. Students whose parents reported “spending time just talking to my child”, “eating the main meal with my child around a table” or “discussing how well my child is doing at school” daily or nearly every day were between 22% and 39% more likely to report high levels of life satisfaction. “Spending time just talking” is the parental activity most frequently and most strongly associated with students’ satisfaction with life. And it seems to matter for performance too. Students whose parents reported “spending time just talking” were the equivalent of two-thirds of a school-year ahead in science performance. Even after accounting for socio-economic status, these students were still one-third of a school year ahead. The results are similar when considering parents who reported that they eat meals with their children. This relationship is far stronger than the impact on students’ performance of most of the school resources and school factors measured by PISA.

Parents can also help children manage test anxiety by encouraging them to trust in their ability to accomplish various academic tasks. PISA results show that, even after accounting for differences in performance and socio-economic status, girls who perceive that their parents encourage them to be confident in their abilities were 21% less likely to report that they feel tense when they study, on average across OECD countries.

Most parents also want their children to be motivated at school, and motivated students tend to do better. PISA finds that students who are among the most motivated score the equivalent of more than one school year ahead of the least-motivated students, on average. Achievement motivation is also related to life satisfaction in a mutually reinforcing way. Students who are highly satisfied with their life tend to have greater resiliency and are more tenacious in the face of academic challenges. A greater motivation to achieve, paired with realised goals, might give students a sense of purpose in life. That might be why students with greater motivation to achieve reported higher satisfaction with life.

But there can also be downsides to achievement motivation, particularly when this motivation is a response to external pressure. PISA results show that countries where students are highly motivated to achieve also tend to be those where many students feel anxious about tests, even if they are well prepared for them. Both teachers and parents need to find ways to encourage students' motivation to learn and achieve without generating an excessive fear of failure.

All in all, a clear way to promote students' well-being is to encourage all parents to be more aware of their children's interests and concerns, and show interest in their school life, including in the challenges children face at school. Schools can create an environment of co-operation with parents and communities. Teachers can be given better tools to enlist parents' support, and schools can address some critical deficiencies among disadvantaged children, such as the lack of a quiet space for studying. If parents and teachers establish relationships based on trust, schools can rely on parents as valuable partners in the education of their students.

Developing capable education leaders

In September 2003, I had a visit from Johan van Bruggen, who was leading the Standing International Conference of Inspectorates.³⁷ I was impressed with the importance he attached to effective school and system leadership and the elaborate techniques school inspectorates had developed to observe and characterise effective leadership. He made the point that poor leadership can undercut even the best teacher. Put a great teacher in a poorly managed school and the school will “win” every time. Too often teachers – and their students – are the victims of dysfunctional schools, not their creators.

OECD's comparative review of school leadership identifies four groups of inter-related leadership responsibilities as central to improving learning outcomes:³⁸

- Supporting, evaluating and developing teacher quality. This includes recruiting high-quality teachers; providing a strong induction programme for new teachers; making sure teachers have the skills and knowledge needed to teach

the curriculum; organising and supporting teachers to work together to improve the quality of teaching and instruction; monitoring and evaluating teacher practice; promoting teacher professional development; and supporting truly collaborative work cultures. If you want to effect real and lasting change, don't ask yourself how many teachers support your ideas, but how many teachers are capable of and engage in co-operation with their colleagues.

- Establishing learning objectives and assessments to help students reach high standards. This involves aligning instruction with central standards, setting school goals for student performance, measuring progress against those goals, and making adjustments in the school programme to improve individual and overall performance. School leaders also need to be able to use data to ensure that the progress of every student is charted. They need to be confident when engaging with those who have different approaches to learning.
- Using resources strategically and aligning them with pedagogy.
- Building partnerships beyond the school to foster greater cohesion among all those concerned with the achievement and well-being of every child. This requires finding innovative ways to enhance partnerships with families and communities, higher education, businesses, and especially with other schools and learning environments.

As our analysis of TALIS results show, there also seems to be a link between teachers' ability to improve their own working practice and their development as leaders.³⁹ When teachers can take the lead in initiating improvement and innovation in their schools, they feel more competent and confident – and both their professional status and their morale get a boost.

Good leadership is, of course, required at every level of the education system (see Chapter 6). This is becoming increasingly important for many reasons. In many countries, greater devolution is being coupled with more school autonomy, more accountability for school and student results, better use of the knowledge base of

education and pedagogical processes, and broader responsibility for supporting the local communities in which schools are located, other schools and other public services.⁴⁰

Michael Fullan, the architect of Ontario's widely known education-reform strategy, describes how the best leaders of education systems engage others and distribute leadership throughout the system.⁴¹ As he notes, these leaders can identify emerging trends and issues that may be important to their teachers and schools. They have an inclusive style that encourages collaboration and provides the space for staff to take risks. They are strategic planners and entrepreneurial, in the sense that they can mobilise the people and money needed for innovation, and they attract talented staff. They build strong linkages across sectors and countries, engaging government leaders, social entrepreneurs, business executives, researchers and civil society leaders as partners in innovation for education and training.

Finding the right level of school autonomy

Many countries have shifted their focus on education towards results. At the same time, they have devolved more responsibility to schools, encouraging them to be more responsive to local needs (**FIGURE 3.7**). Many schools have been granted greater autonomy so that principals, school boards and teachers can assume more responsibility for policies related to resources, the curriculum, assessments, school admissions and discipline.

The data from PISA suggest that, once the state has set clear expectations for students, school autonomy in defining the details of the curriculum and assessments is positively related to the system's overall performance. For example, school systems that provide their schools with greater discretion in student assessments, the courses offered, the course content and the textbooks used, tend to be the school systems that perform at higher levels on PISA, whatever the causal nature of that relationship.⁴²

Another argument in favour of autonomy in an education system is that it can create stronger incentives for innovation. Successful schools will be places where people want to work, and where they find that they can realise good ideas. By

FIGURE 3.7: AUTONOMY IN DECISION MAKING IS ASSOCIATED WITH SCHOOL CHARACTERISTICS AND STUDENT PERFORMANCE

Results based on school principals' reports

Notes: The index of school autonomy is calculated as the percentage of tasks for which the principal, teachers or the school governing board has considerable responsibility. Socio-economic status is measured by the PISA index of economic, social and cultural status. FYROM refers to the Former Yugoslav Republic of Macedonia. CABA (Argentina) refers to Ciudad Autónoma de Buenos Aires (Argentina). B-S-J-G (China) refers to Beijing-Shanghai-Jiangsu-Guangdong (China).

Countries and economies are ranked in descending order of the index of school autonomy.

Source: OECD, PISA 2015 Database, Table II.4.5.

StatLink  <http://dx.doi.org/10.1787/888933435854>



WORLD CLASS | WHAT MAKES HIGH-PERFORMING SCHOOL SYSTEMS DIFFERENT

- Positive difference/association
- Negative difference/association
- Difference/association is not significant
- Missing values

| | SCHOOL CHARACTERISTICS | | | SCIENCE PERFORMANCE | |
|----------------------|----------------------------|---------------|------------------|---|--|
| | Advantaged / disadvantaged | Urban / rural | Private / public | Before accounting for socio-economic status | After accounting for socio-economic status |
| Macao (China) | ■ | ■ | ■ | ■ | ■ |
| Czech Republic | ■ | ■ | ■ | ■ | ■ |
| United Kingdom | ■ | ■ | ■ | ■ | ■ |
| Lithuania | ■ | ■ | ■ | ■ | ■ |
| Netherlands | ■ | ■ | ■ | ■ | ■ |
| Thailand | ■ | ■ | ■ | ■ | ■ |
| Slovak Republic | ■ | ■ | ■ | ■ | ■ |
| Estonia | ■ | ■ | ■ | ■ | ■ |
| Sweden | ■ | ■ | ■ | ■ | ■ |
| New Zealand | ■ | ■ | ■ | ■ | ■ |
| Latvia | ■ | ■ | ■ | ■ | ■ |
| Hong Kong (China) | ■ | ■ | ■ | ■ | ■ |
| Denmark | ■ | ■ | ■ | ■ | ■ |
| Indonesia | ■ | ■ | ■ | ■ | ■ |
| Iceland | ■ | ■ | ■ | ■ | ■ |
| Russia | ■ | ■ | ■ | ■ | ■ |
| Bulgaria | ■ | ■ | ■ | ■ | ■ |
| United States | ■ | ■ | ■ | ■ | ■ |
| Chile | ■ | ■ | ■ | ■ | ■ |
| Poland | ■ | ■ | ■ | ■ | ■ |
| Slovenia | ■ | ■ | ■ | ■ | ■ |
| Georgia | ■ | ■ | ■ | ■ | ■ |
| Australia | ■ | ■ | ■ | ■ | ■ |
| Israel | ■ | ■ | ■ | ■ | ■ |
| Ireland | ■ | ■ | ■ | ■ | ■ |
| Finland | ■ | ■ | ■ | ■ | ■ |
| Chinese Taipei | ■ | ■ | ■ | ■ | ■ |
| Singapore | ■ | ■ | ■ | ■ | ■ |
| Japan | ■ | ■ | ■ | ■ | ■ |
| Lebanon | ■ | ■ | ■ | ■ | ■ |
| Norway | ■ | ■ | ■ | ■ | ■ |
| FYROM | ■ | ■ | ■ | ■ | ■ |
| OECD average | ■ | ■ | ■ | ■ | ■ |
| Moldova | ■ | ■ | ■ | ■ | ■ |
| Switzerland | ■ | ■ | ■ | ■ | ■ |
| Belgium | ■ | ■ | ■ | ■ | ■ |
| Romania | ■ | ■ | ■ | ■ | ■ |
| Luxembourg | ■ | ■ | ■ | ■ | ■ |
| Colombia | ■ | ■ | ■ | ■ | ■ |
| Korea | ■ | ■ | ■ | ■ | ■ |
| Canada | ■ | ■ | ■ | ■ | ■ |
| Peru | ■ | ■ | ■ | ■ | ■ |
| Croatia | ■ | ■ | ■ | ■ | ■ |
| Qatar | ■ | ■ | ■ | ■ | ■ |
| Hungary | ■ | ■ | ■ | ■ | ■ |
| CABA (Argentina) | ■ | ■ | ■ | ■ | ■ |
| Germany | ■ | ■ | ■ | ■ | ■ |
| Portugal | ■ | ■ | ■ | ■ | ■ |
| Trinidad and Tobago | ■ | ■ | ■ | ■ | ■ |
| United Arab Emirates | ■ | ■ | ■ | ■ | ■ |
| France | ■ | ■ | ■ | ■ | ■ |
| Austria | ■ | ■ | ■ | ■ | ■ |
| Montenegro | ■ | ■ | ■ | ■ | ■ |
| Spain | ■ | ■ | ■ | ■ | ■ |
| Italy | ■ | ■ | ■ | ■ | ■ |
| Malta | ■ | ■ | ■ | ■ | ■ |
| Costa Rica | ■ | ■ | ■ | ■ | ■ |
| B-S-J-G (China) | ■ | ■ | ■ | ■ | ■ |
| Brazil | ■ | ■ | ■ | ■ | ■ |
| Dominican Republic | ■ | ■ | ■ | ■ | ■ |
| Viet Nam | ■ | ■ | ■ | ■ | ■ |
| Mexico | ■ | ■ | ■ | ■ | ■ |
| Kosovo | ■ | ■ | ■ | ■ | ■ |
| Algeria | ■ | ■ | ■ | ■ | ■ |
| Uruguay | ■ | ■ | ■ | ■ | ■ |
| Jordan | ■ | ■ | ■ | ■ | ■ |
| Tunisia | ■ | ■ | ■ | ■ | ■ |
| Turkey | ■ | ■ | ■ | ■ | ■ |
| Greece | ■ | ■ | ■ | ■ | ■ |

| | | | | | |
|--|----|----|----|----|----|
| Education systems with a positive difference/association | 32 | 15 | 50 | 29 | 12 |
| Education systems with no difference/association | 33 | 36 | 8 | 35 | 47 |
| Education systems with a negative difference/association | 3 | 4 | 0 | 4 | 9 |

contrast, innovative change can be more difficult in hierarchical and bureaucratic structures that are geared towards rewarding compliance with rules and regulations.

An attempt to measure the innovation in education systems between 2000 and 2011 found that countries with a high degree of school autonomy and decentralisation, such as Denmark and the Netherlands, were at the top of the “composite innovation index”, which summarises various measures of innovative change in schools and classroom practices.⁴³

A recent OECD study on “Innovative Learning Environments” examined several innovative schools and school networks across OECD countries.⁴⁴ While the sample cannot be regarded as representative, the case studies came from a broad range of schools in various education systems. Some were mainstream public schools, others belonged to networks of charter schools of similar environments, still others were private schools, working within or outside public systems. But all flourished because governance and oversight arrangements gave them the freedom to create spaces for experimentation.

The study also underscored the risk of autonomy leading to the “atomisation” of schools. Working with others can spur innovation and sustain the drive to innovate. However, school autonomy will be self-defeating if it is interpreted as functioning in isolation. Instead, autonomy should take the form of freedom and flexibility to work with many partners.

An important yet often underestimated barrier to achieving coherence within a school system is the lack of shared understanding about the problems the system faces. When teachers or parents do not know what problems the government is trying to solve, it is hard to understand the policies that have been designed in response. The tireless efforts of the Ontario government to build a sense of shared understanding and common purpose among stakeholder groups provides an example of how this can be achieved. Ontario’s strategy for improving literacy and numeracy skills, for example, was not just about raising reading, writing and mathematics achievement, although it clearly accomplished that goal. It was at least as much about building broad support for the improvement of key skills through an impressive range of initiatives that resulted in a shift in the culture of Ontario schools. Increased awareness of the importance of literacy and numeracy skills led to changes in attitudes and behaviours at the classroom, school, board and ministry levels.⁴⁵

Singapore's "thinking schools – learning nation" reform organised schools into geographic clusters that were given more autonomy, with successful principals appointed as cluster superintendents, to mentor others and promote innovation.⁴⁶ Along with greater autonomy came new forms of accountability. The old inspection system was abolished and replaced by a school-excellence model, under which each school sets its own goals and annually assesses its progress towards those goals, including academic performance. Greater autonomy also led to a laser-like focus on identifying and developing highly effective school leaders who can lead school transformation. Schools undergo an external review every six years.

I had always assumed that teachers and schools in the United States, with its tradition of local control, and as the country where I have seen many of the most innovative and inspiring schools, would have more autonomy than teachers and schools in other countries. When I met with American school leaders in July 2009 at the annual conference of the National Association of Secondary School Principals, I was surprised by their reports on how constrained their decision-making ability actually was, at least according to them.

When I studied the PISA results on this, I found that, indeed, American schools tend to get much more direction from the local district office than is the case in many other countries. In that sense, the United States may have traded one form of centralised bureaucracy for another. It is also true that the relatively recent rise of unions in American education, given the American style of union-management relations and the pressure to have contracts mirror those in neighbouring localities, may have produced a more rule-bound environment than is found in systems embracing more professional forms of work organisation. So there, as elsewhere, the devil is in the details.

In fact, some countries provide most of their public schools with a scope for decision making that is similar to that among charter schools in the United States. The academies in England are an example. These are state schools that have been granted autonomy but are still expected to conduct state tests, produce the same public data on their performance, have the same budget resources, be accountable to the public, and admit students as other state schools are expected to do. England's education ministers have viewed academies and their greater independence as the way to tackle underperformance.

But how much is known about the dynamics involved? How would granting greater school autonomy actually lead to better student performance? And if the reform is a one-way street, and academy status means lifetime independence for schools, then some years down the road new policy interventions might not be effective. As schools become more autonomous, how can they avoid becoming more isolated?

The academies show how important it is to combine professional autonomy with a collaborative culture, both among teachers and among schools. The challenge for an academy-style system is to find a way to share knowledge among schools. Knowledge in the field of education is very sticky; it doesn't spread easily. It tends to remain where it is unless there are powerful incentives to share it. That means the leaders of the academies programme and similar initiatives need to think hard about how to shift knowledge around pockets of innovation, and how to attract the most talented teachers to the most challenging classrooms, and get the strongest principals into the toughest academies.

It is certainly not impossible. Schools in Denmark, Finland, Japan, Norway, Shanghai and Sweden have a good history of autonomy, teamwork and co-operation. They build networks and share resources and ideas to create new and innovative practice. But this collaborative culture does not happen by accident; it needs to be carefully crafted by policy and practice. In some Finnish municipalities, for example, school leaders also work as district leaders, with one-third of their time devoted to the district and two-thirds to their own schools. In this way they promote a common vision of schooling between schools and municipalities.

For school leaders to take on this larger system-level role, leadership is shared, with leadership teams assuming some of the school leaders' tasks. The result is that school leaders regularly meet with their peers. They no longer work under a local school administration, they *are* the local school administration. The district office is not filled with administrators, but with people who know what is involved in running a school. Or take Shanghai. If you are a vice principal of a great school in Shanghai and you want to become a principal, you can be – but only after showing that you can turn around one of the system's lowest-performing schools.

A characteristic of the English school system is that all schools are subjected to a stringent inspection regime. It is, in my view, one of the most effective in the world.

To be judged as outstanding in leadership, schools have to show they are helping improve education beyond their own walls.

But more than that might be needed. PISA data show that in school systems where knowledge is shared among teachers, autonomy is a positive advantage; but in school systems without a culture of peer learning and accountability, autonomy might actually adversely affect student performance. There needs to be enough knowledge mobilisation and sharing, and checks and balances to make sure that academies are using their independence effectively – and wisely.

Nonetheless, the reform holds significant promise for improving school systems. If autonomy can be combined with a culture of collaboration, not only will schools benefit, but individual teachers will too.

Moving from administrative to professional accountability

To reconcile school autonomy with overall coherence in the school system, there must be ways to see clearly how schools are providing education and the learning outcomes they are producing. Assessment and accountability allow educators and policy makers to keep their finger on the pulse of progress in education. Most high-performing education systems have an accountability system of some sort. Some systems publish data on the performance of schools, although that is far from common among high-performing education systems. In systems that allow parents to choose the school their child attends, comparative data can influence their decisions. In some systems these data are also used by school administrators to allocate resources, often to provide additional resources to struggling schools.

But approaches to accountability evolve as school systems themselves evolve – as rules become guidelines and good practice, and ultimately, as good practice becomes culture. Often this progression involves a shift in the balance between “administrative accountability” and “professional accountability”.

“Administrative accountability” typically uses data to identify good teachers and good schools, and to intervene in underperforming schools. Among the features of

administrative accountability are often test-based accountability systems that use data on student performance to make decisions about which teachers and school principals to hire, promote and retain, and to decide on compensation for individual teachers.

By contrast, “professional accountability” refers to systems in which teachers are accountable not so much to administrative authorities but primarily to their fellow teachers and school principals. Professionals in most fields feel themselves accountable to other members of their profession. In the case of education, professional accountability also includes the kind of personal responsibility that teachers feel towards their peers, their students and their students’ parents.

Jurisdictions such as Ontario in Canada, Finland, Japan and New Zealand that place greater emphasis on the more professional forms of work organisation tend to pursue more collegial forms of teacher and school-leader accountability. The aim is to ensure that reform is a collaborative endeavour, not something imposed from above. They would argue that people who expect to be treated as professionals and think of themselves that way are more likely to respond to professional and informal modes of accountability, and would resent the use of more administrative forms of accountability that they associate with industrial work environments.

The experience of Ontario shows how partnerships among the government, schools and teachers can be created to identify good practices, consolidate them, and use them more widely. Rather than mandating reform, in Ontario seed money was put into schools to encourage local experimentation and innovation, sending a strong signal that teacher-generated solutions to students’ problems with reading and mathematics were likely to be more successful than solutions imposed from above. The dramatic reduction in the number of low-performing schools in the province was not achieved by threatening to close those schools, but by flooding them with technical assistance and support. The underlying assumption was that teachers are professionals who are trying to do the right thing, and that any inadequacies in teachers’ performance are much more likely to stem from a lack of knowledge than from a lack of motivation.

At the same time, the Ontario government made no attempt to dismantle or weaken the assessment regime put in place by the previous government. The

government consistently communicated the message to schools and to the public that results, as defined by performance on provincial assessments, matter.

In Singapore, administrative and professional accountability are combined. Teachers, principals, ministry staff and students all have strong incentives to work hard. The government sets annual goals, provides support to achieve them, and then assesses whether or not they have been achieved. Data on student performance are included, but so, too, are a range of other measures, such as teachers' contributions to the school and community, and judgements by a number of senior practitioners. Reward and recognition systems include honours and salary bonuses. Individual appraisals are conducted within the context of school-excellence plans.

■ The importance of trust

Some argue that it is not possible to derive any real lessons from Finland because of the trust-based culture of the Finnish school system. That kind of culture does not travel easily, they would argue. But in the relationship between teachers and the wider society, one could also argue that trust is at least as much a consequence of policy decisions as it is a precondition.

Given the respect that teachers have historically enjoyed in Finland, there was a solid base on which to build reforms. Finnish leaders empower their teachers by trusting them, and in doing so they create a virtuous circle of productivity and innovative learning environments. In turn, the high level of policy coherence, meaning that decisions will be followed through across electoral cycles and political administrations, leads to Finnish teachers' trust in their education leaders: they trust their leaders' integrity and count on their capacity to do what they say.

This is not blind trust. In fact, the pressure of professional accountability in Finland is high. The fact that just 5% of the variation in student performance in Finland lies between schools⁴⁷ shows that the system is capable of intervening when additional support is needed. While some portray Finland as a paradise with no standardised testing, reports from students in the PISA 2015 assessment prove that image wrong. The frequency with which standardised tests are conducted in Finnish schools is close to the OECD average.⁴⁸ The difference is that tests are not used to find faults

in the system or document underperformance, but to help students learn better, teachers teach better and schools to work more effectively.

Indeed, trust and accountability might be more closely linked than one might think. Clear accountability might be a necessary feature of a high-trust culture: if people don't have a clear understanding of where the goal posts are and what is being measured, then trust is difficult to build. Trust is also a function of specific competence: you trust your mother; but would you trust her to fly a 747? The significant investment Finnish leaders make in the professional development of their teachers is a critical part of the equation. It is the combination of much more rigorous preparation and the devolution of much greater decision-making authority over things like curriculum and assessment that enables teachers in Finland to exercise the kind of autonomy enjoyed by other professionals in other fields – and to command the trust to do so. The granting of trust from the government, coupled with their status as university graduates from highly selective programmes, empower teachers to pursue their profession in ways that deepen the trust accorded them by parents and others in the community.

■ Who says she's a great teacher?

It is important to be sure that emphasising professional accountability at the frontline does not conflict with establishing a culture of evaluation throughout the system. There are some countries where mentioning the phrase “teacher evaluation” around educators, teachers' union leaders and policy makers prompts heated arguments.⁴⁹ Teachers in the United States and France have gone on strike over the issue; England's teachers' unions and those that represent head teachers have found themselves on opposite sides of debates about whether to link teachers' pay to their performance.

Nearly everyone agrees that school systems need to find a way to encourage promising teachers, reward those who have demonstrated their effectiveness, and remove consistently underperforming teachers from the profession. But what makes a teacher great? And who gets to decide? Students? Parents? Fellow teachers? Principals?

In the 23 countries that participated in TALIS in 2013, 83% of teachers who had been appraised and received feedback considered them to be fair assessments of their work; of those, 79% found that the appraisals were helpful in developing their

work as teachers.⁵⁰ But agreement on how to measure teachers' skills is harder to come by.

Teacher-appraisal systems in most countries are still a work-in-progress – where they exist at all. Some 13% of teachers in countries that participated in TALIS had never received any feedback or appraisal of their work from any source. This is partly because such systems can be costly to design and maintain – not just in terms of money and time, but also in the political capital and courage it takes to establish them. More often, though, it is because there is no consensus on what criteria should be used to measure teacher performance. Should it be students' test scores? A teacher's ability to engage a classroom full of students? The opinions of students and parents? Who should do the measuring: an inspector from a central education authority, the school principal or fellow teachers? And how should the results of an evaluation or appraisal be used? Should it determine salary? Should it shape the trajectory of a career? Should it be a way of signalling professional-development needs? Should it be used to weed out ineffective practitioners?

However, consensus is beginning to take shape around some of these questions. Student test scores offer important information, but they cannot provide a complete picture of teaching quality. A reliance only on test scores will unduly narrow perspectives. Teacher-appraisal systems need to be part of a holistic approach to the profession, including teacher education and professional development, nurturing school leaders, and engaging teachers in reform and in creating attractive working environments.

Like all government employees and many other professionals in Singapore, teachers are appraised annually, by a board, against 13 different competencies. These are not just about academic performance, but include teachers' contributions to the academic and character development of the students in their charge, their collaboration with parents and community groups, and their impact on their colleagues and the school as a whole. It was intriguing for me to see how teachers did not seem to view this as a top-down accountability system, but rather as an instrument for improvement and career development. Teachers who do outstanding work receive a bonus from the school's bonus pool. After three years of teaching, teachers are assessed annually to see which of three career paths would best suit

them – master teacher, specialist in curriculum or research, or school leader. Significantly, the individual appraisal system sits within the school’s overall plan for excellence in education.

■ **The buck stops...where?**

In most high-performing education systems there is a certain level of authority at which the buck stops – some agency or group of agencies that is responsible for the effectiveness and efficiency of the whole system. Usually this is the national or state ministry of education. Because they are held accountable for the quality and efficiency of education in their country, these over-arching authorities assume responsibility for long-range planning. They commission research and make deliberate use of that research in their decision making. Working in these agencies is widely thought to be a worthy goal for leading educators in these countries. Their wishes are taken seriously because of the respect in which their staff are held.

The various parts of an education system need to be designed to work harmoniously with each other. Systems need to make effective plans and make sure those plans are carried out. They need to have the capacity to do the necessary analyses, deliver support to the field, monitor the degree to which their plans are being implemented, judge the results and change course if needed. If a country or a state or group of states in a federal system lacks this capacity, it might not be able to make comprehensive, coherent plans; and even if it has the capacity to plan, it might not matter very much what its policies are if the country or state lacks the capacity needed to implement them.

The experience of countries with federal oversight for education provides useful insights into how states can collaborate. Canada’s Council of Ministers of Education⁵¹ and the German Standing Conference of Education Ministers⁵² provide fora through which provincial ministers of education meet frequently to co-ordinate. While their formal powers are limited, these bodies fulfil an important function by enabling good ideas and practices to spread across provincial borders. The power of ideas and the possibilities for dissemination have generated good practice and encouraged jurisdictions to learn from each other.

In Germany, the constitution prohibits the federal government from doing much more than supporting education research; but the government has provided the

stimuli and ideas for many of the most significant reforms over the past decade. For example, it was the federal government that developed the original concept of competency-based national school standards, even if it was the states, operating through the council of state ministers, that established and oversaw the national standards and reporting system.

Articulating a consistent message

Trends across education systems today are nothing if not paradoxical. On the one hand, people are concerned about a growing gap between what societies expect from schools and actual learning outcomes. On the other hand, there are mounting complaints among educators about a too-rapid pace of education reform that leaves little time or space for thoughtful implementation. Behind the perceptions that reform is happening both too slowly and too fast is a lack of direction and alignment between policies and the components of reform. School leaders and teachers are rarely involved in designing policies; sometimes they only hear about them when they are announced in the media. Since they do not see the bigger picture, they are less likely to be able to help craft the delivery chain linking intention and implementation of policies that is central to success.

Policy makers, in turn, have few incentives to promote and see to fruition their predecessors' ideas, or they don't see that they won't have to do everything differently in order to do some things better. They are generally more inclined to put their own proposals at the top of an already crowded policy agenda. That, in turn, reinforces short-term-ism and misalignment, as well as distrust among teachers on the frontline who have to change course with every new political administration.

There is a great need for consistency and continuity when a school system is trying to improve. Whether changes to the curriculum or funding, or a different way of supporting teachers, these various parts of the process need to be moving in the same direction – towards a coherent vision.

That is not to say that the process of reform is smooth; it is often fraught with political controversy and sometimes difficult to follow. Quite apart from political

and economic challenges, moving from centralised, administrative control towards professional autonomy can be counterproductive if a nation does not yet have teachers and schools with the capacity to implement these policies. Devolving authority to lower levels can be problematic if there is no agreement on what students need to know and be able to do, and if standards are not high enough. Recruiting high-quality teachers will not be sufficient if those who are recruited are so frustrated by an inadequate system of initial teacher education, or so turned off by a top-heavy bureaucracy that they leave the profession entirely.

■ **Speaking with one voice in Singapore**

As a visiting professor at Singapore's National Institute of Education, I have had the chance to learn a lot about the country's approach to education reform. The Ministry of Education, the National Institute and individual schools share responsibility and accountability for aligning policies with implementation. Professors from the National Institute are regularly involved in ministry discussions and decisions, so it is easy for the Institute's work to be aligned with ministry policies; school principals learn about major reform proposals directly from the minister rather than through the media. No policy is announced without a plan for building the capacity to implement it. The ministry functions in a culture of continuous improvement, constantly assessing what is and isn't working, using both data and practitioner experience from around the world to inform its policy design and implementation. Teacher-education programmes are designed with the teacher in mind, rather than to suit the interests of academic departments. Teachers typically go into the classroom with a first degree, then a master's programme puts this practical experience into a coherent theoretical setting later on, in mid-career.

One of the most striking things I find in Singapore is that I hear the same clear focus on the same bold outcomes wherever I go – whether in the ministries of education, national development or community development, or in the universities, technical institutes or schools. The system in itself is very porous, in the sense that professionals can and do move between research, policy making, administration and teaching practice, often multiple times in their careers. The close connection among policy, research and practice keeps the vision forward-

looking and dynamic. Education is expected to change as conditions change; it is not stuck in the past.

“Milestone” courses, as they’re called, bring together top officials from all the ministries to create a shared understanding of national goals. A focus on effective implementation runs throughout the government. “Dream, Design and Deliver” is Singapore’s apt characterisation of its approach to public administration.

The government of Singapore understands the critical relationship between people’s skills and economic development, so it provides a clear vision of what is needed in education. While the ministry of education designs the policies that will realise this vision, teachers, in turn, are entitled to spend 100 hours per year developing their skills, often in the National Institute of Education; and that institution, in turn, helps design education reform, including related policy.

Spending more vs spending wisely

The first lesson I learned when researching the countries that came out on top of the PISA comparisons is that their leaders seem to have convinced their citizens to make choices that value education more than other things. In these countries, a well-equipped school turns more heads than a shiny new shopping mall. Parents in China will often invest their last *renminbi* in the education of their children, their future and the future of their country. In much of the Western world, governments have started to borrow money from the next generation to finance consumption today. Economic and social progress is running straight into the pile of debt they are amassing.

In 2013, I had an interesting lunch with vice mayor Fu Yonglin of Chengdu, China, one of the key influencers behind the rapid transformation in education that his municipality has seen over the past decade. What struck me most was his take on how China’s power and role in the world would ultimately not be determined primarily by what and how many goods China produces, but by what China will be able to contribute to the global knowledge pool and to global culture, through education. In a country where the average graduate takes home a salary that is little more than a maid could earn in one of China’s big cities, money is clearly not the only incentive

for learning. China's political and social leaders still seem to be able to persuade their citizens to value education, their future, more than consumption today.

It was also interesting how the vice mayor of Chengdu reconciled the need to preserve and build on the past – in his words, “nothing comes from nothing; everything has a history and evolves from there” – with the need to embrace change. He was well aware of the learning curve the Chinese have in front of them, the need for China to play an active role in globalisation, and the importance of education as the gateway to understanding different cultures and fields of knowledge. He was also aware of the need to change the nature of education itself. I asked him why he and other city officials were so interested in our work on the future of education, which, in those days, some OECD countries still viewed with some scepticism. He looked at me and said that today, Chengdu is the world's factory for digital equipment, providing a population of 14 million with jobs and wealth. Within a decade, he said, every single one of those jobs will have been taken over by a robot. The challenge for us, he continued, is not just to create new jobs, but to create new jobs that humans can do better than robots, and to educate humans who can think and work differently than robots.

But, as I discussed in Chapter 2, education systems do not improve simply by throwing money at them. Two countries with similarly high spending levels can produce very different results. In other words, once a minimum threshold of spending is met, it is not how much countries spend on education, but how they spend those resources. If average-performing OECD countries are to move from the middle ranks in performance to the top ranks, either they will have to radically improve the efficiency of their education systems, or they will have to increase the amount spent on them enormously.

Most governments face severe financial constraints, and that situation is not likely to change any time soon. So a great expansion in education spending is unlikely in the foreseeable future. The challenge is thus to wring much more from every dollar spent. The question is how to do that. The experiences of high-performing education systems offer several possible approaches.

For example, Japan puts a large share of its resources into core instructional services by spending much less than most OECD countries on extravagant school buildings, school services, glossy textbooks and expensive sports programmes.⁵³

Some of the savings are used to pay teachers relatively well. The rest is returned to taxpayers (in 2014, public and private spending on schools in Japan amounted to 3% of GDP, the fourth lowest percentage among OECD countries after the Czech Republic, the Slovak Republic and Hungary).

Another way to get better results without spending more money is to make basic changes in the way the education system is organised. Up until the decline in the population of school-age children in Japan, student-teacher ratios in the United States and Japan were almost identical. But the Japanese chose to keep classes large – sometimes as much as twice as large as classes in the United States. That choice gave Japanese teachers much more time to prepare their lessons, confer with other teachers about struggling students, and tutor students who were falling behind. The two countries spent the same (in terms of student-teacher ratios), but Japanese policy makers traded larger classes for giving teachers more time to plan and work with small groups of students, while American policy makers opted for smaller classes and less time for teachers to plan and work with small groups of students.

Japan is not alone in this. As already noted, whenever high-performing education systems have to choose between smaller classes and better teachers, they seem to go for the latter. Many Western countries have opted for the former.

Between 2006 and 2015, expenditure per primary, secondary and post-secondary non-tertiary student increased by almost 20% across OECD countries.⁵⁴ But over the same period, most OECD countries prioritised smaller classes over better teachers, over more instruction time and individualised support for students, and over more equitable access to education. Popular pressure and changing demographics have pushed governments to reduce class size in lower secondary education by an average of 6% across OECD countries. In other words, spending has been driven by choices that are popular with parents and teachers but not necessarily by what helps students succeed in the long run.

Countries that opt for large classes can afford to pay their teachers better. If classroom teachers are paid well, recruitment into the profession is more competitive and candidates can be educated in higher-status teacher-education institutions. Those teachers stay in teaching longer, need to be replaced less frequently and require much less specialised assistance in the classroom. That means that fewer

teacher-education institutions are needed and more money can be spent on those who remain. An apparently low-cost solution (hiring lower-quality teachers and educating them in lower-cost institutions) can turn into a higher-cost solution in the long run, after all costs are taken into account.

Employing lower-cost teachers means that more specialist staff are needed in schools and more managers are needed to supervise and co-ordinate those specialists. In the top-performing countries, although teachers may earn relatively higher pay, fewer administrators are needed and fewer additional specialists are required, making it possible to employ higher-quality teachers and still enjoy lower net costs. This is why it is important to think about the design of the system, as a whole, and the net costs of that system, rather than thinking about individual costs in isolation.

The bottom line is that there is a striking asymmetry in the relationship between skills and money. While improved skills consistently generate more benefit for individuals and nations, more money does not automatically generate improved education.

The evidence of PISA has shown how some countries have re-invented themselves through a systematic process of reform and investment in the education of their populations such that the relative standing of education systems has changed fundamentally. That also means the world is no longer divided between countries that are rich and well-educated and those that are poor and badly educated. Countries can choose to develop a superior education system, and if they succeed it will yield huge rewards. This is a path that leads to better lives and better jobs, which drive societies forward.

But there is a lot more than money required to raise education outcomes. This includes the belief in the success of every child. The fact that students in most East Asian countries consistently believe that achievement is mainly a product of hard work, rather than inherited intelligence as Western children would often say, suggests that education and its social context can make a difference in instilling values that foster success in education.

And nowhere does the quality of a school system exceed the quality of its teachers. High-performing school systems all pay great attention to how they select and train their teachers and education leaders. When deciding where to invest, they prioritise

the quality of teachers over the size of classes. They provide intelligent pathways for teachers to grow in their careers.

High-performing countries have also moved on from bureaucratic control and accountability to professional forms of work organisation. They encourage their teachers to make innovations in pedagogy, to improve their own performance and that of their colleagues, and to pursue professional development that leads to stronger education practice.

Snapshots of five top education systems

As should be obvious by now, what makes high-performing countries different is not where they are located or how wealthy they are or what culture they are endowed with. What makes them different is their acute awareness of underperformance and inequities in their education systems and their ability to mobilise the resources, innovation and will to tackle them. Here are a few brief profiles.

■ Singapore

Singapore scored higher than any other country or economy in PISA 2015. Such a triumph raised interest about how this Asian city-state, with a population of about five million, had developed such a successful education system. Other countries wanted to know what lessons they could learn from Singapore's rapid progress.

One of the most remarkable features of Singapore's achievement is that success was built from an extremely low starting point. Singapore, which gained independence in 1965, was an impoverished country with few natural resources and a population with poor proficiency in literacy. There were few schools and colleges, and the country had an underdeveloped and low-skilled economy. The population was composed of different ethnic groups, speaking different languages and observing different religions.

But in five decades, Singapore went from nowhere to the top of the international rankings, overtaking the major economies in Europe and North America and high-

achieving rivals in East Asia. It has made the leap from “third world” to “first” in little more than one lifetime.

So what are the ingredients of this success?

Perhaps the first is intention. Singapore’s improvement in education was not an accident, or some kind of natural phenomenon; it was a deliberate decision to use education as a foundation for building an advanced economy. Education was to be the engine of economic growth.

Without natural resources, and with much bigger and more powerful neighbours, Singapore saw an educated population as its most valuable asset. Education was also integral to the nation-building of a young country. It helped construct a shared sense of identity and bring together different ethnic groups and religions.

This emphasis on education went through a series of re-inventions, reflecting and reinforcing the country’s economic progress. In the years after independence, Singapore was in a survival phase; the education system was expanded to provide a basic education for workers in an economy that was trying to attract overseas manufacturers.

A unified education system was established, teachers were hired in large numbers, schools were built, textbooks were printed. Within a decade, all children had a primary education. By the 1970s, Singapore offered universal access to lower secondary education.

This was not a particularly high standard of education, and that was addressed by the next phase of industrial development, where Singapore, in the late 1970s, moved from survival to efficiency. This was an attempt to move upwards from a low-pay, low-skills economy towards one with a higher-skilled workforce that would attract international high-tech companies. This economic upgrade was accomplished by overhauling the education system – introducing a new curriculum and different pathways for academic and vocational studies. In the early 1990s, campuses of the Institute for Technical Education were established to raise the status and quality of vocational education, and to provide technical training comparable to that offered in universities.

At the end of the 1990s, the system was further refined to prepare for the knowledge economy, in which Singapore would have to depend on a highly skilled workforce to be able to compete in a globalised economy. This idea of deeper and

more effective learning was captured in the “Teach Less, Learn More” campaign, which was promoted by Prime Minister Lee Hsien Loong, along with the continuing campaign for “Thinking Schools, Learning Nation”.

Underpinning these developments was a sustained belief in the importance of improving education. It was a systematic approach, maintained over decades and supported by public policy and spending. In 2010, education represented 20% of government expenditure, the biggest item apart from defence. Seen through the prism of this national ambition, education spending has been a key plank of economic investment, feeding into the country’s earning capacity.

This alignment of education with the economy and the needs of employers is part of a highly integrated system. There are clear goals for what schools and individuals are expected to achieve, a rigorous exam system and high academic standards. Progress through education is intended to be a meritocratic process in support of social mobility, allowing students to achieve the highest results that their potential will allow.

But even such smoothly running structures need a human face to bring them alive. What has often been highlighted in the success of Singapore’s schools is its teachers. Singapore has become a model of the principle of hiring teachers from among the best graduates, and keeping them well-trained and motivated.

Singapore introduced a process for recruiting and educating high-quality staff, with the aim of attracting the brightest and the best into the classroom. In addition, there is a strong emphasis on professional development, so that teachers keep up to date with their skills. With the expectation that these bright, ambitious teachers will want to keep advancing through their careers, teachers are entitled to 100 hours of professional development per year.

This tightly controlled, centralised system, makes a virtue of consistency. All teachers are trained at the same institution, so that every teacher will have emerged from the same “production line”, meeting the same standards. Teachers are appointed with the aim of ensuring that all schools have a fair share of the best teachers. They will go into schools with a clear notion of what is expected of them; in return, they can expect high status and public approval.

Singapore’s story is that of a small, hungry country looking for a better future. The education system has had to improve and adapt at each stage to make this possible.

Singapore shows how much in education can change in a relatively short period of time. By raising its education standards it has been able to become a beneficiary of globalisation, rather than a victim. Singapore is recognised as one of the world's top-performing school systems; its next challenge will be to stay there.

■ Estonia

Estonia was one of the top 10 highest performers in mathematics, science and reading in the 2015 PISA assessments.

The small Baltic state has been dubbed the “new Finland” for its success, particularly since it overtook Finland in mathematics and science in PISA 2015. Experts from Finland advised Estonia on education reforms in the 1990s. Indeed, there is one key similarity in the success of both countries' education systems: they both, whether through strategy or cultural inclination, have a strong sense of equity in their education system. This is made manifest in the small differences between the results of affluent students and those of disadvantaged students.

In Estonia, the impact of such socio-economic status is conspicuously weaker than in most other countries. In this respect, Estonia is similar to Canada, Hong Kong and Norway, rather than countries such as Austria, France and Germany, where there was a much stronger link between socio-economic status and students' performance.

What is particularly striking about Estonia's high-ranking performance in PISA 2015 is not the proportion of high achievers, but that so few of the country's students were among the low performers in any of the three core subjects.

Equity is also apparent in access to early childhood education, which feeds into the school system. Compulsory schooling does not begin until children are seven years old, but large proportions of three- and four-year-olds are in state-provided early education. Teacher-pupil ratios in these early education settings are half the OECD average.

At the other end of the age range, a high percentage – one of the highest in the industrialised world – of students in Estonia successfully complete secondary school. This suggests that all students are expected to attain a good level of education, regardless of their family background.

After independence, Estonia decentralised the school system, giving schools greater autonomy, with the freedom to make decisions about the curriculum, budgets, and hiring and dismissing teachers. Families have the right to choose a school for their children and, as a result, schools have to compete to attract students.

The decline in the population of school-age children means that Estonia's school system must make sure that there are schools close enough to where children are living, while at the same time making sure that schools have enough students for them to be viable and to offer a wide enough range of subjects. This is particularly important for secondary schools, when students will want to specialise.

This situation prompts a question of funding: Is it better value to invest in big schools that serve a wide area, or should local schools be protected? As of this writing, Estonia has some of the smallest secondary school classes in the developed world.

The demographic decline has become a big issue for Estonia's university sector too, with the country's universities having to fight to recruit from a shrinking pool of potential applicants; it also faces competition from universities in other countries. Estonia's businesses are worried about having an adequate supply of young graduates.

In addition, Estonia's teaching force is ageing – more so than almost any other OECD country. The need to attract more young graduates into the profession has prompted a significant rise in teachers' salaries, but teaching is still not a competitive career choice.

Education in Estonia, as in other Nordic and Baltic countries, is publicly funded; there is relatively little private funding for education. That said, Estonia does not spend as much on education as Norway, for example; and even though pre-school education is well-staffed, the teachers earn relatively low pay. Estonia's GDP is far below the OECD average, so whatever is driving its success in education, it is not high spending.

To understand Estonia's high achievement in the PISA rankings, the place to look is the share of low achievers. When it comes to top achievers across all three core PISA subjects (science, reading and mathematics), Estonia is a good, but not spectacular, performer. There are several countries ranked below Estonia that are as good or better on this measure. In top-scoring Singapore, for example, 39.1% of students attained this level, compared with 20.4% in Estonia.

Where Estonia really excels as a world leader is in its relatively small proportion of low achievers. Only 4.7% of 15-year-olds in Estonia score below the baseline level of proficiency across all three subjects – a better outcome than observed in high-flyers such as Finland, Hong Kong, Singapore and South Korea, and about half the share of low achievers in Germany and the United States.

■ Canada

Canada was one of the highest-achieving countries in the 2015 round of PISA tests, ranked third for reading and in the top 10 for mathematics and science. This puts Canada ahead of Finland for reading and mathematics.

The stand-out characteristic of Canada's education system is its emphasis on equity and its ability to elicit excellent results from students of different social backgrounds, including students with an immigrant background. The difference in performance between rich and poor students in Canada is small by international standards. It reflects a state ethos that supports the health and well-being of families.

Canada's schools have a high proportion of children from immigrant families – and their performance is often not any different from that of non-immigrant children. Indeed, Canada's school system is something of a model for integration – especially considering that immigrants enter a country that already hosts French- and English-speaking populations and First Nation indigenous people. What makes the approach in Canada unique is that it integrates content from different cultures into the curriculum, so that students learn early on how to see the world from different perspectives. Teachers also help students develop positive attitudes towards diversity and modify their teaching so that students from different social and ethnic groups can succeed.

Canada's result in the PISA tests is a national score, but the education system is run at the level of provinces and territories, with local ministers running regional school systems. This has raised questions about how Canada's success in PISA can be explained when there isn't any single federal system to analyse. While some successful education systems are highly centralised and controlled, Canada has a system of dispersed responsibility, which still seems to deliver.

Apart from the success of Canada's schools in PISA rankings, the country has an unusually large proportion of tertiary-educated adults. As another indicator of a

well-educated society, young people in Canada are more likely than students almost anywhere else in the world to read for pleasure.

So what could be the factors behind Canada's strong academic performance?

As in most high-performing countries in PISA, entry into the teaching profession in Canada is selective – and better-quality (and better-paid) teachers tend to get better student results.

But the feature that might be of greatest interest is Canada's capacity to integrate large numbers of immigrant children into its schools. Canada's results in PISA show that there is nothing inevitable about immigrant children performing worse than the rest of their classmates. It shows that one of the highest-achieving school systems can welcome many immigrant families without suffering any reduction in standards.

Immigration into Canada is now mostly from Asia – from China, India, the Philippines and Pakistan. A large proportion of these immigrants head for the big cities of Montreal, Toronto or Vancouver. But PISA results suggest that within three years of arrival, the children of new immigrants are scoring as high as their non-immigrant schoolmates.

There are a number of reasons why this might be the case.

First, Canada is a large country with a relatively small population, and it has had a long history of wanting to attract immigrants who might contribute to its economy. Many new arrivals are well-educated families seeking professional careers. Their children are soon able to catch up with their classmates, even if they have to learn a second language. In other words, these are immigrants who are already receptive to what schools can offer.

Immigrant children, whether from families with high or low levels of education, also benefit from Canada's support for new arrivals and efforts to make sure that they are able to integrate. There is extra help for language learning and support for children with special needs. The education system is able to find the balance between respecting different cultures and helping establish a common Canadian identity.

The combination of these factors seems to have a beneficial impact. Large numbers of immigrants are welcomed and carefully integrated into a high-achieving system. Immigrant students quickly meet the system's high standards. There is no negative impact from what are, by international standards, high levels of immigration.

But Canada is, admittedly, a curious example: it shows, to a certain extent, that success can be achieved without a single national strategy. Rather, the local approaches, which can be distinctive, move broadly in the same direction.

If that suggests that there is no one-size-fits-all approach to raising standards, it also shows that it is entirely possible to have a much larger proportion of immigrant children in school than found in most developed countries and, at the same time, have student results that would be the envy of most countries.

■ Finland

Finland has been one of the most consistently successful countries in global education rankings. Its name has become almost synonymous with excellence in education; indeed, many other countries have sent experts to Finland to get a first-hand look at the successful policies and practices that they could apply to their own schools.

In PISA 2015, Finland was ranked 4th in reading, 5th in science and 13th in mathematics. This might be a little down on its top-ranking performances of previous years (the proportion of low achievers in mathematics, science and reading in Finland was larger than that in other top-performing countries and economies, such as Canada, Estonia, Hong Kong, Singapore and Viet Nam, which dragged down mean scores in all three subjects), but Finland remains one of the most reliable of high achievers.

Finland shows that there are many different paths to success. This is a system where students spend less time in school than is observed in many of the highly competitive Asian systems, where there is little homework and where school inspections have been abolished.

But like many other high achievers, the Finnish system is based on the assumption that disadvantaged students can also succeed in school, and that all schools, no matter where they are located, should be of high quality. As in other Nordic and Baltic countries, the impact of socio-economic status on results is much weaker than average.

There is another strong link with the highest achievers, and that is the emphasis on the quality of teaching. Finland has made teaching a sought-after career, with

high social status and great demand for places in initial teacher education: only about one in ten applicants is accepted. This is not only a profession for graduates, it is a job for people with master's degrees, appealing to the brightest graduates. Once teachers are deployed to schools, they are expected to keep learning, with professional development compulsory. While not particularly highly paid (per-pupil budgets and teachers' salaries are mid-range, by European standards), teaching is seen as an important and well-respected profession, and teachers are trusted and given great independence.

Anyone looking to Finland for inspiration may find that it reinforces the argument that no education system can be better than the quality of its teachers. But Finland also shows that success in education can take many decades to achieve. Finland's status as an education superpower was built slowly and deliberately through a series of education reforms and in response to changing economic needs. In the late 1960s, there was a decision to move to a comprehensive system, making high-quality education available to all students, not just to the minority selected for grammar schools. Implementation was not complete until the late 1970s. To make the transition successful, and to allay concerns about the changes, there was an accompanying drive to significantly improve the quality of teaching. The education of teachers was moved into the universities and was made much more rigorous.

The economic context in which Finland's education system evolved wasn't always benign. In the early 1990s, unemployment in Finland approached 20%, GDP was falling and public debt was rising. Education offered a means of re-shaping Finland's economy, with a shift towards investing in technology and the growing market in telecommunications. The number of Finns working in research and development grew rapidly, in tandem with the rise of companies such as Nokia, which went from a 19th-century pulp-mill business to becoming one of the biggest names in mobile phones in the early 21st century.

This combination of factors meant that Finland had an economic need for a better-educated workforce – and an education system with open access and high-quality teaching that was able to produce it.

There is also a distinctive flavour to Finland's concept of excellence. The schools are comprehensive in more than the range of their students' abilities. They are places

where everyone can have a free hot meal, where there are health and dental services, and where psychological and counselling services are available. Support for children with special needs is seen as an integral part of the school system. Children also often receive individual attention in school.

■ Shanghai

When students in the Chinese city of Shanghai first sat the PISA test in 2009, they went straight to the top of the rankings in all three subjects – reading, mathematics and science. They repeated this remarkable performance three years later, sparking even more interest in how this regional education system could be so successful.

Shanghai is not representative of China; but with a population of over 24 million, Shanghai is larger than many other countries that participate in PISA.

In 2015, Beijing, Jiangsu and Guangdong also agreed to participate in PISA along with Shanghai – with a combined population of 232 million. Together, this entity ranked among the top 10 performers in mathematics and science.

It was only in the mid-1990s that Shanghai's school system was able to deliver the basics of six years of primary education and three years of secondary education for all students. Before then, the city's education system focused on rebuilding itself after being destroyed, between 1966 and 1976, during China's Cultural Revolution.

Indeed, Shanghai, an international, outward-looking city, was at the forefront of China's education reform, taking advantage of opportunities to develop its own approaches. Under the banner "First-rate city, first-rate education" Shanghai made a priority of raising education standards to realise its economic ambitions.

Looking at the results from 2009, what is striking is how few students scored poorly. There were plenty of students in Shanghai who did very well, but it was the absence of underachievers that propelled Shanghai to the top of international rankings. Of course, there are still many 15-year-olds in Shanghai, including internal migrants, who still do not have full access to upper secondary education. But for those who do, including students from disadvantaged families, the system produces strong results.

This is a system based on the assumption that every student can succeed, or at least can reach an adequate level of academic performance. It is not a "sorting mechanism"

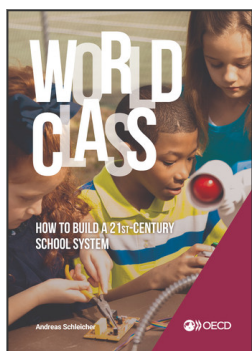
system, in which only a minority of winners crosses the finishing line. The system is designed to make sure that almost everyone completes the academic course.

This applies to children of all backgrounds who enrol in school. While the system does not – nor can it – completely eradicate the gap in results between advantaged and disadvantaged students, it assumes that such social factors will not be an excuse for failure. As a consequence, in the 2012 PISA results, children from poor families in Shanghai outperformed middle-class children in the United States.

The school system has been structured to achieve this. The best teachers are directed towards the schools needing the greatest support. Strong schools are expected to support weaker schools, with the aim of raising the overall standard. It is a systemic approach, built on meritocratic principles with the aim of getting the most from students.

Education is also intensely competitive. Students in Shanghai often supplement their learning in school with long hours of homework and private tuition. The expectations for these students are high: about 80% of students continue into tertiary education. But Shanghai's students believe that they are in control of their ability to achieve. They do not think that being good at mathematics is a natural gift; they have been taught that it depends on their own hard work and getting the right support from their teachers. Parents are also ready to support their children and to show that education is a priority for their family.

Another key feature in the Shanghai school system, consistent with other top performers, is the high quality of its teachers. The selection, education and deployment of excellent teachers is how the system can put its policies into practice. Professional development continues throughout a teacher's career, with an emphasis on education research.



From:
World Class
How to Build a 21st-Century School System

Access the complete publication at:
<https://doi.org/10.1787/9789264300002-en>

Please cite this chapter as:

Schleicher, Andreas (2018), "What makes high-performing school systems different", in *World Class: How to Build a 21st-Century School System*, OECD Publishing, Paris.

DOI: <https://doi.org/10.1787/9789264300002-3-en>

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