

Strong Performers and Successful Reformers in Education

LESSONS FROM PISA
FOR THE UNITED STATES



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Foreword

United States President Barack Obama has launched one of the world's most ambitious education reform agendas. Entitled "Race to the Top", the agenda encourages US states to adopt internationally benchmarked standards and assessments as a framework within which they can prepare students for success in college and the workplace; recruit, develop, reward, and retain effective teachers and principals; build data systems that measure student success and inform teachers and principals how they can improve their practices; and turn around their lowest-performing schools.

But what does the "top" look like internationally? How have the countries at the top managed to achieve sustained high performance or to significantly improve their performance? The OECD Programme for International Student Assessment (PISA) provides the world's most extensive and rigorous set of international surveys of the knowledge and skills of secondary school students. It allows one to compare countries on measures such as their average learning outcomes, their share of low-performing schools, the extent to which socio-economic background shapes learning outcomes and how consistently their schools deliver high quality outcomes.

When OECD Secretary-General Angel Gurría and United States Secretary of Education Arne Duncan met in April 2010, both felt that much was to be gained from a more detailed analysis of the policies and practices of those education systems that are close to the "top" or advancing rapidly. This volume takes up the challenge, and is a first step towards a deeper understanding of education systems and policy trajectories through international comparisons.

This volume is the result of a collaborative effort between the OECD, the National Center on Education and the Economy (NCEE) in Washington, government officials of the case study countries discussed, as well as international experts with extensive expertise in analysing the performance of education systems internationally. The report was prepared under the responsibility of the Indicators and Analysis Division of the OECD Directorate for Education, principally Andreas Schleicher and Richard Hopper, as part of OECD's new programme Leveraging Knowledge for Better Education Policies. The underlying studies were carried out by the NCEE in consultation with the OECD, principally by Marc Tucker, Susan Sclafani, Betsy Brown Ruzzi and Jackie Kraemer. The principal authors of the chapters in this volume are: Introduction: Marc Tucker and Andreas Schleicher, NCEE and OECD; Current performance of the United States: Andreas Schleicher; Japan: Marc Tucker and Betsy Brown Ruzzi, NCEE; China: Kai-ming Cheng, University of Hong Kong, Hong Kong, China; Canada: Robert Schwartz and Jal Mehta, Harvard University, United States; Finland: Robert Schwartz and Jal Mehta, Harvard University, United States; Germany: Marc Tucker and Betsy Brown Ruzzi, NCEE; Singapore: Vivien Stewart, Asia Society, United States; Brazil: Susan Sclafani, NCEE; Poland: Susan Sclafani, NCEE; Sweden: Betsy Brown Ruzzi, NCEE; United Kingdom: Michael Day, Training and Development Agency for Schools, United Kingdom; Lessons for the United States: Marc Tucker and Andreas Schleicher, NCEE and OECD. Richard Hopper and Susan Sclafani established and maintained the contacts with the country experts and interview partners and co-ordinated the work. Vanessa Shadoian-Gersing, Niccolina Clements, and Pedro Lenin García de León of the OECD compiled relevant quantitative data and background information on each education system. The OECD PISA team provided information and diagrams to support PISA analysis contained in this volume. Elisabeth Villoutreix of the OECD co-ordinated the steps for publication. The officials and experts whom we interviewed for this study are listed at the end of each chapter. A group of experts oversaw the development of the conceptual framework, reviewed draft chapters, discussed preliminary findings and provided guidance to the authors. These experts were Kai-ming Cheng: University of Hong Kong, Hong Kong; Michael Day: Department for Education, England; David Hopkins: University of London, England; Richard Hopper: OECD; Jackie Kraemer: NCEE; Barry McGaw: Melbourne Graduate School of Education, Australia; Elizabeth Pang: Ministry of Education, Singapore; Betsy Brown Ruzzi: NCEE; Pasi Sahlberg: CIMO Finland; Andreas Schleicher: OECD; Robert Schwartz: Harvard University, United States; Susan Sclafani: NCEE; Vivien Stewart: Asia Society, United States; Suzie Sullivan: NCEE; Marc Tucker: NCEE; Siew Hoong Wong: Ministry of Education, Singapore. The country chapter for Germany was reviewed by Eckhard Klieme from the German Institute of International Educational Research. The other country chapters were reviewed and validated by the respective national authorities.



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This book has...



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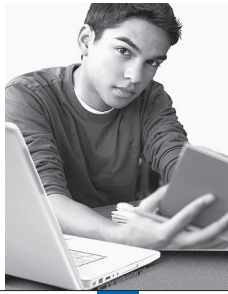
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1

Introduction



A CHANGING YARDSTICK FOR EDUCATIONAL SUCCESS

Globalisation and modernisation are rapidly posing new and demanding challenges to individuals and societies alike. Increasingly diverse and interconnected populations, rapid technological change in the workplace and in everyday life, and the instantaneous availability of vast amounts of information are just a few of the factors contributing to these new demands. In this globalised world, people compete for jobs not just locally but internationally. The integrated worldwide labour market means that highly-paid workers in wealthier countries are competing directly with people with much the same skills but who demand less compensation in lower-wage countries. The same is true for people with low skills. The competition among countries now revolves around human capital and the comparative advantage in knowledge.

The effect of these developments is to raise wages in less developed countries and depress wages in the most industrialised countries. But these developments do not affect all workers equally. Job automation is proceeding even faster than the integration of the job market. If the work is routine, it is increasingly likely to be automated, although some jobs will always be done by human beings. The effect of automation, and more generally of the progress of technological change, is to reduce the demand for people who are only capable of doing routine work, and to increase the demand for people who are capable of doing knowledge work. This means that a greater proportion of people will need to be educated as professionals to do such knowledge-based work. High-wage countries will find that they can only maintain their relative wage levels if they can develop a high proportion of such knowledge workers and keep them in their work force. Increasingly, such work will require very high skill levels and will demand increasing levels of creativity and innovation.

This is not a description of one possible future, but of the economic dynamics that are currently in play. In the high-wage countries of the OECD, demand for highly-skilled people is increasing faster than supply (which the OECD indicators mirror in rising wage premiums for highly-skilled individuals) and demand for low-skilled workers is decreasing faster than supply (which the OECD indicators mirror in growing unemployment or declining wages for low-skilled individuals). Jobs are moving rapidly to countries that can provide the skills needed for any particular operation at the best rates. And the rate of automation of jobs is steadily increasing in both high-wage and low-wage countries.

These dynamics are increasing the pressure on governments to educate their citizens to earn a decent living in this environment and to offer their children an education that will ensure their life is at least as rewarding as their own. Governments need to create education systems that are accessible to everyone, not just a favoured few; that are globally competitive on quality; that provide people from all classes a fair chance to get the right kind of education to succeed; and to achieve all this at a price that the nation can afford. The aim is no longer just to provide a basic education for all, but to provide an education that will make it possible for everyone to become “knowledge workers”. Such education will need to build the very high skill levels required to solve complex problems never seen before, to be creative, to synthesise material from a wide variety of sources and to see the patterns in the information that computers cannot see, to work with others in productive ways, to lead when necessary and to be a good team member when necessary. This is what is required in today’s “flat” world where all work that cannot be digitised, automated and outsourced can be done by the most effective and competitive individuals, enterprises or countries, regardless of where they may be. The implication is that the yardstick for educational success is no longer simply improvement by national standards, but the best performing education systems internationally (Box 1.1).

OVERVIEW

This volume draws lessons from the education systems of a selection of top-scoring and rapidly improving countries as measured by the OECD Programme for International Student Assessment (PISA – described below). While this volume relates these lessons to the education reform agenda in the United States, they may have resonance for a wide range of countries and different types of education systems aspiring for excellence in educating their young people. This volume defines countries as high-performing if: almost all of their students are in high school at the appropriate age, average performance is high and the top quarter of performers place among the countries whose top quarter are among the best performers in the world (with respect to their mastery of the kinds of complex knowledge and skills needed in advanced economies as well their ability to apply that knowledge and those skills to problems with which they are not familiar); student performance is only weakly related to their socio-economic background; and spending per pupil is not at the top of the league tables. Put another way, this volume defines superior performance as high participation, high quality, high equity and high efficiency.



Box 1.1 The pace of change in educational improvement

Few countries have been able to capitalise more on the opportunities the ‘flat’ world provides than the United States, a country which can draw on one of the most highly educated labour forces of the industrialised nations (when measured in terms of formal qualifications).¹ However, this advantage is largely a result of the “first-mover advantage” which the United States gained after World War II by massively increasing enrolments. This advantage is eroding quickly as more and more countries have reached and surpassed the US’s qualification levels among its younger age cohorts. The OECD baseline qualification for reasonable earnings and employment prospects is a high school diploma. Among OECD countries, the average proportion of young adults with at least a high school diploma has now risen to 80%; in Germany and Japan, two of the benchmark countries chosen for this volume, this figure exceeds 95%. Over time, this will translate into better workforce qualifications in OECD countries. In contrast, changes in the graduation rates have been modest in the United States and, as a result, only 8 of the 34 OECD countries now have a lower high school graduation rate than the United States. Two generations ago, South Korea had the economic output equivalent to that of Afghanistan today and was 23rd in terms of educational output among current OECD countries. Today South Korea is one of the top performers in terms of the proportion of successful school leavers, with 94% obtaining a high school diploma. Similarly, Chile moved up by 9 rank order positions, Ireland by 8 and Belgium and Finland by 4 rank order positions.

Similar trends are visible in college education. Here the United States slipped from rank 2 to rank 13 between 1995 and 2008, not because its college graduation rates declined, but because they rose so much faster in many other OECD countries. These developments will be amplified over the coming decades as countries such as China and India raise their educational output at an ever-increasing pace.

Changes are not just observed in the quantitative output of education systems, but many countries have also shown impressive improvements in the quality of learning outcomes. Korea’s average performance was already high in 2000, but Korean policy makers were concerned that only a narrow elite achieved levels of excellence in PISA. Within less than a decade, Korea was able to virtually double the share of students demonstrating excellence in reading literacy. A major overhaul of Poland’s school system helped to dramatically reduce performance variability among schools, reduce the share of poorly performing students and raise overall performance by the equivalent of more than half a school year. Germany was jolted into action when PISA 2000 revealed below-average performance and large social disparities in results, and has been able to make progress on both fronts. Last but not least, countries such as Brazil, Chile, Indonesia and Peru have seen impressive gains catching up from very low levels of performance.

The remainder of Chapter 1 describes the framework of analysis for this volume, the PISA measures used in this volume, and the methodology for developing the country chapters and lessons.

Chapter 2 sets the stage by analysing in-depth the performance of the United States on PISA, contrasting its relative strengths and weaknesses with those of other countries.

The subsequent chapters of this volume present detailed analyses of education systems which are either high-performing or have seen rapid improvements in their performance. For each country, desk reviews and interviews with a range of experts in the field of education were conducted. Each chapter first reviews the country’s history and culture as context for understanding its education system. The chapters then go on to outline the main elements of the country’s education system and how these relate to the observed outcomes. These elements vary across the education systems described, but generally include standards, examination systems, instructional systems, school finance, teacher quality, accountability, student motivation, and so on. Recent policy developments are highlighted in the context of past reforms. Each chapter concludes by drawing wider lessons.

The last chapter draws together the threads of the preceding chapters to present some of the policy lessons that can be drawn.



[Part 1/1]

Table 1.1 Basic data on the countries studied in this volume

	Quality										Equity	Coherence	Efficiency	Income	Equality
	PISA 2009 Results, ¹ Table V.2.1		PISA 2009 Results, ¹ Table V.2.1		PISA 2009 Results, ¹ Table V.2.1		PISA 2009 Results, ¹ Table V.3.1		PISA 2009 Results, ¹ Table V.3.3		PISA 2009 Results, ¹ Figure II.1.4b	PISA 2009 Results, ¹ Table II.5.1	EAG, ² Table B1.2	EAG, ² Table X2.1	PISA 2009 Results, ¹ Table II.1.2
	Mean PISA score on the reading scale 2009	S.E.	Mean PISA score on the reading scale 2000	S.E.	PISA score difference in reading between 2000 and 2009	S.E.	Mean PISA score on the mathematics scale 2009	S.E.	Mean PISA score on the science scale 2009	S.E.	Percentage of the variance in student performance explained by student socio-economic background	Total variance between schools expressed as a percentage of the total variance within the country	Annual expenditure per student on educational core services (below tertiary) 2007	GDP per capita	Gini Index
	Score	S.E.	Score	S.E.	Score	S.E.	Score	S.E.	Score	S.E.	%	%	USD PPP	Value	Value
Brazil	412	2.7	396	3.1	16 ³	4.9	386	2.4	405	2.4	13.0	48	1 796 ⁴	10 770	0.57
Canada	524	1.5	534	1.6	-10	3.4	527	1.6	529	1.6	8.6	22	7 609	36 397	0.30
Shanghai-China	556	2.4	m	m	m	m	600	2.8	575	2.3	12.3	38	42 064 ⁵	5 340	0.42
Hong Kong-China	533	2.1	m	m	m	m	555	2.7	549	2.8	4.5	42	32 896 ⁶	42 178	0.43
Finland	536	2.3	546	2.6	-11	4.3	541	2.2	554	2.3	7.8	9	6 430	35 322	0.26
Germany	497	2.7	484	2.5	13 ³	4.5	513	2.9	520	2.8	17.9	60	7 072	34 683	0.27
Japan	520	3.5	522	5.2	-2	6.8	529	3.4	539	3.4	8.6	49	8 012 ⁴	33 635	0.34
Singapore	526	1.1	m	m	m	m	562	1.4	542	1.4	15.3	35	23 699 ⁷	51 462	0.42
Poland	500	2.6	479	4.5	21 ³	5.8	495	2.8	508	2.4	14.8	19	3 784	16 312	0.32
United States	500	3.7	504	7.0	-5	8.3	487	3.6	502	3.6	16.8	36	9 932	46 434	0.36
Sweden	497	2.9	516	2.2	-19 ³	6.1	494	2.9	495	2.7	13.4	19	7 878	36 785	0.23
United Kingdom	494	2.3	m	m	m	m	492	2.4	514	2.5	13.7	29	7 032	34 957	0.34
OECD average	494	0.5	497	0.6	-2	2.7	497	0.5	501	0.5	14	39	6 675	32 962	0.31


1. OECD (2010a), *PISA 2009 Results, Volumes I-V*, OECD Publishing.2. OECD (2010b), *Education at a Glance 2010: OECD Indicators*, OECD Publishing.

3. Statistically significant.

4. Value for core and ancillary services.

5. Cumulative expenditure per student over the theoretical duration of primary studies (*PISA 2009 Results*).

6. Recurrent government expenditure on education, including primary, secondary and special education and departmental support (Hong Kong Annual Digest of Statistics 2010).

7. Cumulative expenditure per student for 6 to 15-year-olds (*PISA 2009 Results*).Source: OECD, *PISA 2009 Database*.StatLink  <http://dx.doi.org/10.1787/888932366617>

The high-performing education systems included in this volume are: Canada (Ontario), China (Hong Kong and Shanghai), Finland, Japan, and Singapore. The examples of rapidly improving systems that were chosen are Brazil and Germany. Table 1.1 compares these countries on relevant measures relating to learning outcomes, equity in the distribution of learning opportunities, spending on education and the economic context of the country. These countries were chosen to provide a variety of relevant policies and practices as well as a range of education structures and models:

- Canada has been among the top performers in PISA over the last decade. Given that Canada has a decentralised education system and shares a border with the United States, Canada's experiences raise questions about why the United States has so far not equalled the performance of its northern neighbour. Ontario, the most populous province, provides a window onto some key reforms.
- China is a country newly covered in PISA. This country report focuses on the performance of Hong Kong and Shanghai, two cities each with a population as large or larger as some OECD countries. Hong Kong has long been a top performer on the PISA league tables; Shanghai was only assessed for the first time for PISA 2009, yet its first assessment already places it among the star performers. These two cities, despite being in the same country, have markedly different histories and school systems with very different governance arrangements. Contrasted they provide valuable insights on the impressive education accomplishments of a country now taking a prominent position on the world stage.
- Finland was the highest performing country on the first PISA assessment in 2000 and has performed consistently well on subsequent assessments.
- Japan, like Finland, is another country that ranked high on the initial PISA assessment and has maintained its standing on subsequent assessments.
- Singapore in its first PISA assessment in 2009 already scored near the top, having improved its education system in dramatic ways since its independence in 1965.
- Brazil is an example of a country that has managed to make considerable progress in recent years against substantial economic and social odds.
- Germany's early performance in PISA was far lower than Germans had expected. After recent reforms, Germany's performance on PISA 2009 shows how it has been able to recover a lot of the ground between its aspirations and its actual performance.



- Brief vignettes illustrate particular developments within three other countries. Poland shows how modification in its school structure appears to have made possible a significant change both in the level and distribution of student performance. Sweden shows the apparent success of a programme that provides language assistance to the children of immigrants. England describes how a concerted effort to change teacher recruitment may have played a role in improving student learning.

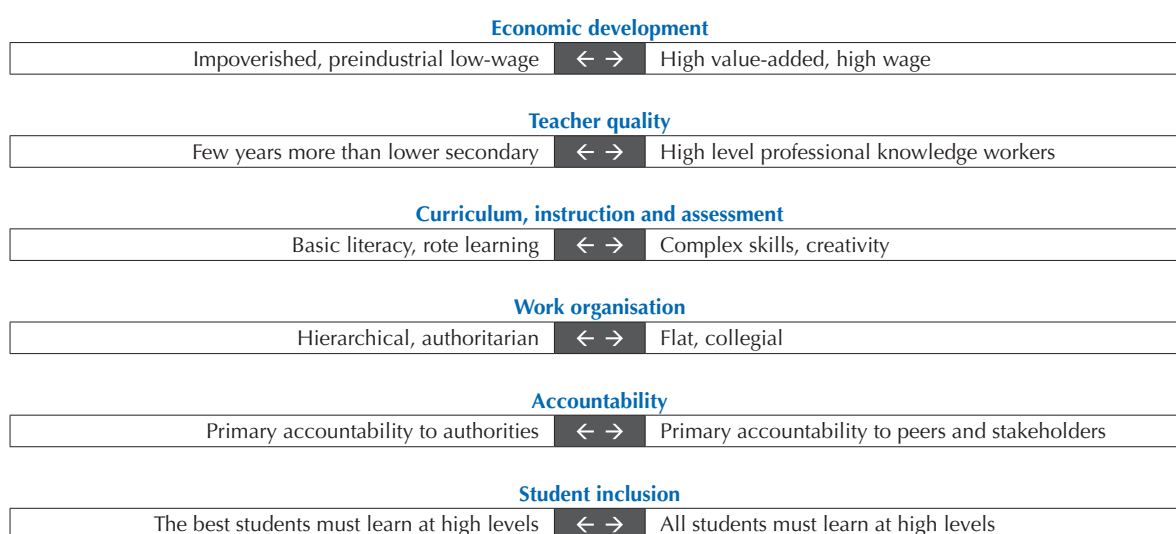
FRAMEWORK FOR ANALYSIS

The analysis in this volume follows a framework of analysis which suggests a continuum of approaches to education reform linked, in part, to a country's economic advancement. Developing countries with few resources to invest in education are likely to have lower levels of literacy among both students and teachers. Governments of countries with such characteristics may therefore invest more heavily into educating well a small elite to lead the country's industries and government operations while allocating remaining resources for teachers with little training. When teacher quality is so low, governments may also prescribe to teachers very precise job requirements, instructing teachers what to do and how to do it. Such systems tend to rely on "Tayloristic" methods² of administrative control and accountability in an effort to achieve desired results.

As developing and transition economies become more industrialised, citizens and policy makers tend to converge on different philosophy: the best way to compete in the global economy is to provide all citizens with the type and quality of education formerly provided only to the elite. To provide high-quality education to the broader population, education systems must recruit their teachers from the top of the higher education pool. But top graduates tend to find Tayloristic workplaces such as school systems using bureaucratic command-and-control systems to be unappealing options. To attract the best graduates to the teaching profession, these systems need to transform the work organisation in their schools to an environment in which professional norms of control replace bureaucratic and administrative forms of control. Equally important, more professional discretion accorded to teachers allows them greater latitude in developing student creativity and critical thinking skills that are important to knowledge-based economies; such skills are harder to develop in highly prescriptive learning environments.

All countries lie somewhere along this economic continuum. As a country's goals move from the delivery of basic skills and rote learning to the delivery of advanced, complex skills, they increasingly need: more educated teachers, more professional forms of work organisation and accountability, and more developed forms of professional practice (Figure 1.1). These fundamental differences in education system design have important ramifications for every aspect of the education system.

■ Figure 1.1 ■
Framework of analysis





Progress along each of these dimensions can be made, at least to some degree, independently of the others – but not without some penalties. For example, nations attempting to promote complex learning and creativity without improving teacher quality will likely run into difficulties. Nations that try to improve teacher quality without professionalizing their work organisation are also likely face challenges. In this framework, there is nothing inevitable about the movement from left to right, nor is it necessarily the case that policy makers will see the need for coherence in the policies in play at any one time, but there is a price to be paid for lack of coherence. Adjusting only one or two dimensions at a time without concern for a more co-ordinated adaptation of the system as a whole risks tampering with the equilibrium that pervades successful systems.

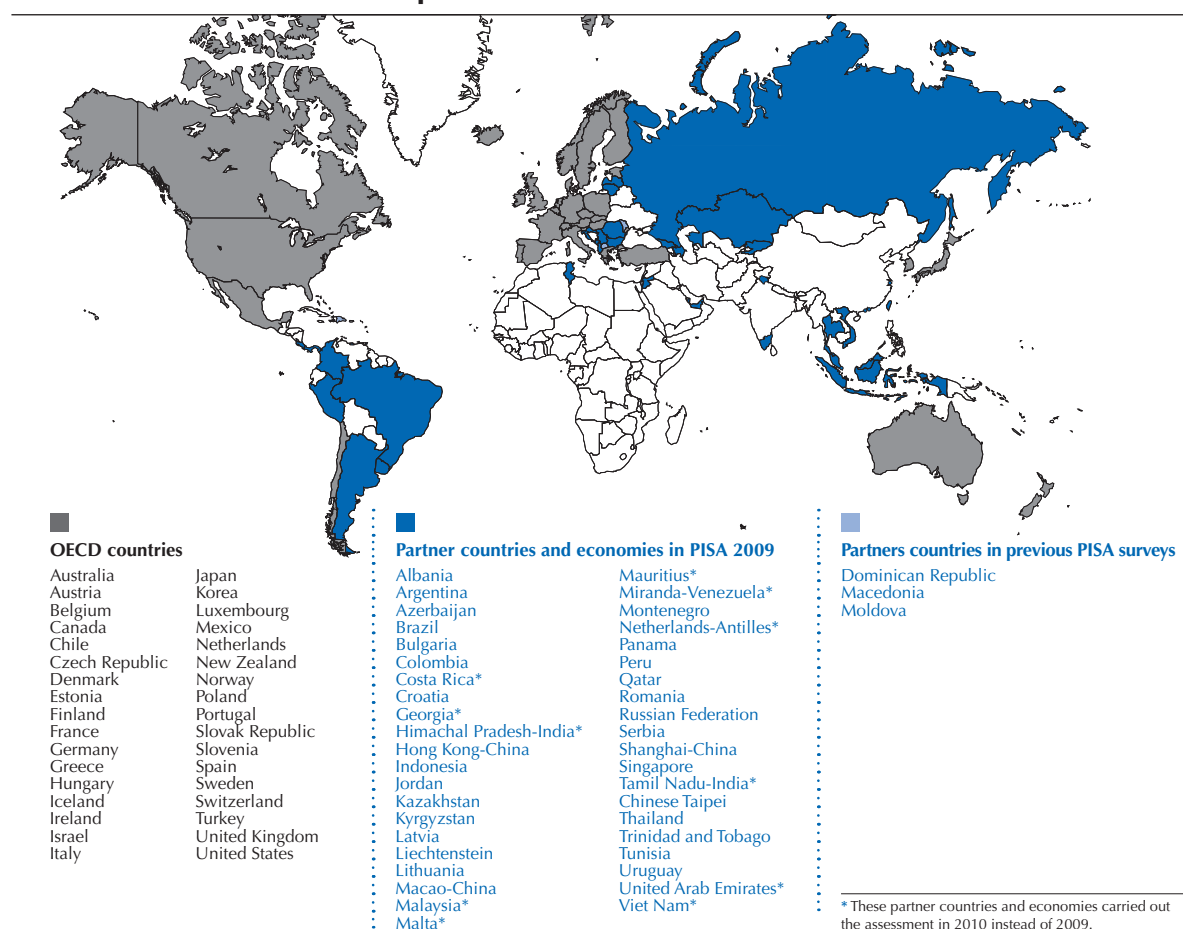
The description of successful education systems offered in this volume attempts to situate each system and its reform trajectory within this framework.

WHAT IS PISA AND WHAT CAN WE LEARN FROM IT?

Parents, students, teachers and those who run education systems are looking for sound information on how well their education systems prepare students for life. Most countries monitor their own students' learning outcomes in order to provide answers to this question. Comparative international assessments can extend and enrich the national picture by providing a larger context within which to interpret national performance. Countries inevitably want to know how they are doing relative to others, and, if other countries are outperforming them they want to know how they do it. Such assessments have gained prominence in recent years partly due to pressures from an increasingly competitive global economy that is evermore driven by human capital. As a result, the yardstick for judging public policy in education is no longer improvement against national educational standards, but also improvement against the most successful education systems worldwide.

■ Figure 1.2 ■

A map of PISA countries and economies





PISA involves extensive and rigorous international surveys to assess the knowledge and skills of 15-year-old students. PISA is the result of collaboration of more than 70 countries interested in comparing their own student achievement with the student achievement in other countries (Figure 1.2). Every three years, PISA compares outcomes for 15-year-old students on measures of reading literacy, mathematics and science (Box 1.2 for a summary of PISA 2009). PISA's assessments are designed not only to find out whether students have mastered a particular curriculum, but also whether they can apply the knowledge they have gained and the skills they have acquired to the new challenges of an increasingly modern and industrialised world. Thus, the purpose of the assessments is to inform countries on the degree to which their students are prepared for life. Decisions about the scope and nature of the PISA assessments and the background information to be collected are made by leading experts in participating countries. Governments guide these decisions based on shared, policy-driven interests. Considerable efforts and resources are devoted to achieving cultural and linguistic breadth and balance in the assessment materials. Stringent quality-assurance mechanisms are applied in designing the test, in translation, sampling and data collection. As a result, PISA findings have a high degree of validity and reliability.

Box 1.2 Key features of PISA 2009

Content

- The main focus of PISA 2009 was reading. The survey also updated performance assessments in mathematics and science. PISA considers students' knowledge in these areas not in isolation, but in relation to their ability to reflect on their knowledge and experience and to apply them to real-world issues. The emphasis is on mastering processes, understanding concepts and functioning in various contexts within each assessment area.
- For the first time, the PISA 2009 survey also assessed 15-year-old students' ability to read, understand and apply digital texts.

Methods

- Around 470 000 students completed the assessment in 2009, representing about 26 million 15-year-olds in the schools of the 65 participating countries and economies. Some 50 000 students took part in a second round of this assessment in 2010, representing about 2 million 15-year-olds from 10 additional partner countries and economies.
- Each participating student spent two hours carrying out pencil-and-paper tasks in reading, mathematics and science. In 20 countries, students were given additional questions via computer to assess their capacity to read digital texts.
- The assessment included tasks requiring students to construct their own answers as well as multiple-choice questions. The latter were typically organised in units based on a written passage or graphic, much like the kind of texts or figures that students might encounter in real life.
- Students also answered a questionnaire that took about 30 minutes to complete. This questionnaire focused on their background, learning habits, attitudes towards reading, and their involvement and motivation.
- School principals completed a questionnaire about their school that included demographic characteristics and an assessment of the quality of the learning environment at school.

Outcomes

PISA 2009 results provide:

- a profile of knowledge and skills among 15-year-olds in 2009, consisting of a detailed profile for reading and an update for mathematics and science;
- contextual indicators relating performance results to student and school characteristics;
- an assessment of students' engagement in reading activities, and their knowledge and use of different learning strategies;
- a knowledge base for policy research and analysis; and
- trend data on changes in student knowledge and skills in reading, mathematics, science, changes in student attitudes and socio-economic indicators, and in the impact of some indicators on performance results.

Future assessments

- The PISA 2012 survey will return to mathematics as the major assessment area, PISA 2015 will focus on science. Thereafter, PISA will turn to another cycle beginning with reading again.
- Future tests will place greater emphasis on assessing students' capacity to read and understand digital texts and solve problems presented in a digital format, reflecting the importance of information and computer technologies in modern societies.



Inevitably, because PISA reports on the achievements of many countries against a common set of benchmarks, it stimulates discussion within participating countries about their education policies, with citizens recognising that their countries' educational performance will not simply need to match average performance, but that they will need to do better if their children want to ensure above-average wages and competitive standards of living. PISA assists this discussion by collecting a wide range of background information about each country's education system and about the perspectives of various stakeholders. This makes it possible to relate aspects of performance with important features of those systems.

Box 1.3 Reporting results from PISA 2009

The results of PISA 2009 are presented in six volumes:

- Volume I, *What Students Know and can Do: Student Performance in Reading, Mathematics and Science*, summarises the performance of students in PISA 2009. It provides the results in the context of how performance is defined, measured and reported, and then examines what students are able to do in reading. After a summary of reading performance, it examines the ways in which this performance varies on subscales representing three aspects of reading. It then breaks down results by different formats of reading texts and considers gender differences in reading, both generally and for different reading aspects and text formats. Any comparison of the outcomes of education systems needs to take into consideration countries' social and economic circumstances, and the resources they devote to education. To address this, the volume also interprets the results within countries' economic and social contexts. The volume concludes with a description of student results in mathematics and science.
- Volume II, *Overcoming Social Background: Equity in Learning Opportunities and Outcomes*, starts by closely examining the performance variation shown in Volume I, particularly the extent to which the overall variation in student performance relates to differences in results achieved by different schools. The volume then looks at how factors such as socio-economic background and immigrant status affect student and school performance, and the role that education policy can play in moderating the impact of these factors.
- Volume III, *Learning to Learn: Student Engagement, Strategies and Practices*, explores the information gathered on students' levels of engagement in reading activities and attitudes towards reading and learning. It describes 15-year-olds' motivation, engagement and strategies to learn.
- Volume IV, *What Makes a School Successful? Resources, Policies and Practices*, explores the relationships between student-, school- and system-level characteristics, and educational quality and equity. It explores what schools and school policies can do to raise overall student performance and, at the same time, moderate the impact of socio-economic background on student performance, with the aim of promoting a more equitable distribution of learning opportunities.
- Volume V, *Learning Trends: Changes in student Performance since 2000*, provides an overview of trends in student performance in reading, mathematics and science from PISA 2000 to PISA 2009. It shows educational outcomes over time and tracks changes in factors related to student and school performance, such as student background and school characteristics and practices.
- Volume VI, *Students On Line: Reading and Using Digital Information*, explains how PISA measures and reports student performance in digital reading, and analyses what students in the 20 countries participating in this assessment are able to do.

HOW CAN PISA BE USED TO HELP IMPROVE EDUCATION SYSTEMS?

On their own, cross-sectional international comparisons such as PISA cannot identify cause-and-effect relationships between certain factors and educational outcomes, especially in relation to the classroom and the processes of teaching and learning that take place there. However, they are an important tool to assess and drive educational change in several ways:

- PISA shows **what achievements are possible in education**. For example, PISA shows that Canadian 15-year-olds, on average, are over one school year ahead of 15-year-olds in the United States in mathematics and more than half a school year ahead in reading and science.³ They also show that socio-economically disadvantaged Canadians are much less at risk of poor educational performance than their counterparts in the United States.



More generally, whether in Asia (e.g. Japan or Korea), Europe (e.g. Finland) or North America (e.g. Canada), many OECD countries display strong overall performance in international assessments and, equally important, some of these countries also show that poor performance in school does not automatically follow from a disadvantaged socio-economic background. Some countries also show a consistent and predictable educational outcome for their children regardless of where they send their children to school. In Finland, for example, which has some of the strongest overall PISA results, there is hardly any variation in average performance between schools.

- PISA is also used to **set policy targets in terms of measurable goals achieved by other systems and to establish trajectories for educational reform**. For example, the 2010 Growth Strategy for Japan sets the goal for Japan to achieve by 2020 a reduction in the proportion of low achievers and an increase of that of high achievers to the level of the highest performing PISA country and to increase the proportion of students with an interest in reading, mathematics and science to a level above the OECD average. Similarly, the Prime Minister of the United Kingdom set in 2010 the goal of raising the country's average student performance to Rank 3 on the PISA mathematics assessment and to Rank 6 on the PISA science assessment. This announcement was accompanied by a range of policies to achieve these targets. The Mexican President established a "PISA performance target" in 2006, to be achieved by 2012, which highlights the gap between national performance and international standards and allows to monitor how educational strategies succeed in closing this gap. The reform trajectory includes a delivery chain of support systems, incentive structures as well as improved access to professional development to assist school leaders and teachers in meeting the target.
- Some countries have systematically **related national performance to international assessments**, for example, by embedding components of the PISA assessments into their national assessments. For example, by linking its national assessment with PISA, Brazil is providing each secondary school with information on the progress it needs to make to match the average PISA performance level by 2021. Germany, Japan and the state of Oregon have embedded PISA items in their national/state assessments.
- PISA can help countries **gauge the pace of their educational progress**. Educators are often faced with a dilemma: if, at the national level, the percentage of students obtaining high score increases, some will claim that the school system has improved. Others will claim that standards must have been lowered, and behind the suspicion that better results reflect lowered standards is often a belief that overall performance in education cannot be raised. International assessments allow improvements to be validated internationally. Poland raised the performance of its 15-year-olds in PISA reading by the equivalent of well over half a school year's progress within six years, catching up with United States performance in 2009 from levels well below United States performance in 2000. It also reduced the proportion of students performing below the baseline level of reading performance from 23% in 2000 to 15% in 2009 (the proportion of bottom performers remained unchanged at 18% in the US during this time). Last but not least, Poland succeeded in halving performance differences between schools.
- PISA can help governments to optimise existing policies or consider more fundamental alternatives, when researchers combine **advanced forms of educational assessment with sophisticated survey research methods**. PISA collects reliable data on students' ability to apply high levels of knowledge and highly complex thinking to real-world problems. PISA's survey research also gathers a wide range of background data surrounding the education of the students being assessed. By relating these two bodies of data, and assuming that characteristic of students and principals about their educational contexts are predictive of students' long-term education experiences, one can associate certain patterns of students performance with a multitude of background data such as the qualifications of their teachers, how much those teachers are paid, the degree to which decisions are devolved from higher authorities to the school faculty, the socio-economic or minority status of the students, the nature of the assessments that students must take, the nature of the qualifications they might earn and so on, in great detail. In this way, while the causal nature of such relationships might not be established, an extensive web of correlations can be drawn between certain dimensions of student performance and a large range of factors that could conceivably affect that performance.

RESEARCH METHODS EMPLOYED FOR THE COUNTRY CHAPTERS

This volume complements the uses of PISA just described with a form of industrial benchmarking (Box 1.4). The aim of the research presented in this volume is to relate differences in student achievement between one country and another to certain features of those countries' education systems. Education is highly value-laden. Systems develop for historical reasons that reflect the values and preferences of parents, students, administrators, politicians and many others. Yet such values and preferences evolve and education systems must change to accommodate them. Decision-makers in the education arena can benefit from benchmarking research in the same way as heads of firms, learning about the range of factors that lead to success, taking inspiration from the lessons of others, and then adapting the operational elements to the local context while adding unique elements that make their own education system one of a kind.



Box 1.4 The approach of industrial benchmarking

Industrial benchmarking gained currency at the close of the 1970s and the early 1980s when Japanese firms began to challenge large multi-national American firms globally. Many American firms did not survive that challenge. But many that did survive did so because of their use of the benchmarking techniques they employed.

The aim of the American firms was to learn enough from their competitors to beat them at their own game. To do this, they identified their most successful competitors. But they also identified the companies that led the league tables in each of their major business process areas (e.g. accounting, sales, inventory). They collected all the information they could possibly find concerning their direct competitors and the companies that led the league tables in the relevant business processes. Some of this information appeared in the business press, some in major academic studies usually conducted and published by business school faculty, some through papers presented by staff members of their competitors in industry journals. After they had learned everything they could possibly learn in this way, they did their best to visit their competitors' work sites, sending their own leading experts to examine product designs, manufacturing techniques, forms of work organisation, training methods, anything they thought might contribute to their competitor's success.

When this research was complete, they would analyse all the information and research they had gathered. Their aim was not to replicate anything they had seen, but to build a better mousetrap than any they had seen anywhere by combining the best they had seen in one place with the best they had seen in another, along with their own ideas, to make something that would be superior to anything they had seen anywhere.com

What they discovered, of course, was that the methods, protocols, techniques and strategies they had seen were all, in one way or another built to address a particular set of circumstances. The firm doing the research rarely faced the same set of circumstances. So the firm doing the research had no need to incorporate in their design some of the workarounds that another firm had had to invent to get around some particular challenge in their own environment that no one else faced. Of course, it was equally true that the firm doing the research might have to build their own workarounds to deal with problems that other firms did not face. The important point here is that firms doing the research were not interested in replicating anything both because they were trying to build something superior to anything they had seen, but also because they did not want to incorporate unnecessary workarounds in their own designs.

The dominant research methodology in education is not built on the industrial benchmarking model but rather on the clinical research model used in medical research. In that arena, the aim is to identify the most successful drug or procedure available for any particular presenting disease. The method typically used to do this research is experimental designs in which subjects are randomly assigned to treatments. This method is preferred in order to ensure that there are no systematic differences between the groups assigned to different treatments. That being so, the observer can attribute differences in results for the individuals to the different treatments they received. Treatment A can be said to have "caused" result B.

The intent of this volume is not to specify a formula for success. This volume does not contain policy prescriptions. Rather the objective is to describe the experience of countries whose education systems have proven exceptionally successful to help identify policy options for consideration. It is intended as a resource for decision making.

While quantitative analysis can be used to apportion the relative influence of a variety of factors in determining variations in student performance in PISA, the data collected by PISA alone leave many questions unanswered. For instance, it is not possible to determine from PISA results whether teachers in the schools of a particular country are using a very powerful instructional system that would be equally effective in another country with very different class sizes. PISA data do not reveal whether new political leadership reframed the issues in education policy in such a way that facilitated the introduction of new reforms. PISA data do not show how awareness of weak education performance can mobilise a country's education establishment to reform and radically improve its education outcomes. Nor do PISA data reveal how a country's industrial and educational institutions are able to work together to leverage a qualifications structure that produces incentives for high-level student performance.

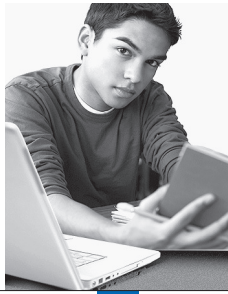


This volume provides complementary qualitative analysis of high-performing and rapidly-improving education systems to reveal possible contextual influences on education performance. The research undertaken for this volume entailed an enquiry of historians, policymakers, economists, education experts, ordinary citizens, journalists, industrialists, and educators that have allowed for an alternative benchmarking. The research began with a document review and was enriched by interviews with current and former leading policy makers and other education stakeholders in the countries and education systems concerned. The PISA data provided the basis for country selection as well as important clues for the points of investigation. The country studies have not only suggested some possible answers to interesting questions, but have also uncovered some new questions for consideration in future PISA assessments. The lessons suggested in this report emerge from instances in which PISA data and country analysis tend to converge.



Notes

1. The United States ranks third of OECD countries in terms of the proportion of adults aged between 25 and 64 with both high school education and college level/other tertiary qualifications (Tables A1.2a and A1.3a in the 2010 edition of OECD's *Education at a Glance*).
2. In the early 20th century an American mechanical engineer, Frederick Winslow Taylor, developed a scientific theory of management now known as Taylorism that was based on precise procedures and a high level of managerial control over employee work practices.
3. The progress students typically achieve over a school year was estimated as follows: Data on the grade in which students are enrolled were obtained both from the Student Questionnaire and from the Student Tracking Forms. The relationship between the grade and student performance was estimated through a multilevel model accounting for the following background variables: *i)* the *PISA index of economic, social and cultural status*; *ii)* the *PISA index of economic, social and cultural status squared*; *iii)* the school mean of the *PISA index of economic, social and cultural status*; *iv)* an indicator as to whether students were foreign born (first-generation students); *v)* the percentage of first-generation students in the school; and *vi)* students' gender. Table A2.1 in the PISA 2009 report presents the results of the multilevel model, which are fairly consistent across countries. Column 1 in Table A2.1 estimates the score point difference that is associated with one grade level (or school year). This difference can be estimated for the 28 OECD countries in which a sizeable number of 15-year-olds in the PISA samples were enrolled in at least two different grades. Since 15-year-olds cannot be assumed to be distributed at random across the grade levels, adjustments had to be made for the above-mentioned contextual factors that may relate to the assignment of students to the different grade levels. These adjustments are documented in columns 2 to 7 of the table. While it is possible to estimate the typical performance difference among students in two adjacent grades net of the effects of selection and contextual factors, this difference cannot automatically be equated with the progress that students have made over the last school year but should be interpreted as a lower boundary of the progress achieved. This is not only because different students were assessed but also because the content of the PISA assessment was not expressly designed to match what students had learned in the preceding school year but more broadly to assess the cumulative outcome of learning in school up to age 15.



2

Viewing Education in the United States Through the Prism of PISA



This chapter examines the United States' performance in PISA compared with high-performing and rapidly improving education systems and other international benchmarks. This serves as the backdrop for the examination of other education systems in Chapters 3 through 9, which look at the trajectories of education policies and practices in the benchmark systems. The concluding chapter of this report then draws some possible lessons for the United States from both the comparative data and the education policies of the countries portrayed in this report.

Since the focus of the PISA 2009 assessment was on reading, results on reading are examined in greater detail than results in mathematics and science. Unless noted otherwise, references to tables and figures refer to OECD's *PISA 2009 Results*.


LEARNING OUTCOMES

Mean performance of United States' 15-year-olds in the middle of the rankings

On the 2009 PISA assessment of 15-year-olds, the United States performs around the average in reading (rank 14¹) and science (rank 17²) and below the average in mathematics (rank 25³) among the 34 OECD countries (Table 2.1). Figures 2.16, 2.17 and 2.18 at the end of this chapter show the relative standing of the United States compared to the benchmark countries examined in the subsequent chapters and other OECD countries.

Table 2.1 United States' mean scores on reading, mathematics and science scales in PISA

	PISA 2000	PISA 2003	PISA 2006	PISA 2009
	Mean score	Mean score	Mean score	Mean score
Reading	504	495		500
Mathematics		483	474	487
Science			489	502

Source: OECD (2010), *PISA 2009 Results: What Students Know and Can Do: Student Performance in Reading, Mathematics and Science (Volume I)*, OECD Publishing.
StatLink  <http://dx.doi.org/10.1787/888932366636>

There is, of course, significant performance variability within the United States, including between individual states. Unlike other federal nations, the United States did not measure the performance of states individually on PISA. However, it is possible to compare the performance of public schools among groups of states. Such a comparison suggests that in reading, public schools in the northeast of the United States would perform at 510 PISA score points – 17 score points above the OECD average (comparable with the performance of the Netherlands) but still well below the high-performing education systems examined in this volume – followed by the midwest with 500 score points (comparable with the performance of Poland), the west with 486 score points (comparable with the performance of Italy) and the south with 483 score points (comparable with the performance of Greece). Note, however, that because of the way in which the sample was drawn, the performance estimates for the groups of states are associated with considerable error.

Performance varies even more between schools and social contexts. For example, despite the fact that the relationship between socio-economic background and learning outcomes is stronger in the United States than in the high-performing systems examined in this volume, over 20% of American 15-year-olds enrolled in socio-economically disadvantaged schools reach the average performance standards of Finland, one of the best-performing education systems.⁴

The United States has seen significant performance gains in science since 2006, which were mainly driven by improvements at the bottom of the performance distribution (visible in higher performance at the 10th and 25th percentiles) while performance remained unchanged at the top end of the performance distribution. Student performance in reading and mathematics has remained broadly unchanged since 2000 and 2003, respectively, when PISA began to measure these trends.

Average performance needs to be seen against a range of socio-economic background indicators, most of which give the United States a significant advantage compared with other industrialised countries (Box 2.1 and Table I.2.20 in *PISA 2009 Results Volume I*).



Box 2.1 A context for interpreting the performance of countries

The wealth of the United States means it can spend more on education. As shown in Volume II of *PISA 2009 Results, Overcoming Social Background*, the wealth of families influences the educational performance of their children. Similarly, the relative prosperity of some countries allows them to spend more on education, while other countries find themselves constrained by a lower national income. In fact, the relationship suggests that 6% of the variation between OECD countries' mean scores can be predicted on the basis of their GDP per capita. The United States, which ranks 3rd after Luxembourg and Norway in terms of GDP per capita, has a substantial economic advantage over other OECD countries because of the amount of money it has available to spend on education (Table I.1.20 in *PISA 2009 Results Volume I*).

Only Luxembourg spends more per student. While GDP per capita reflects the potential resources available for education in each country, it does not directly measure the financial resources actually invested in education. However, a comparison of countries' actual spending per student, from the age of 6 up to 15, on average, puts the United States at an even greater advantage, since only Luxembourg spends more than the United States on school education per student, on average. Across OECD countries, expenditure per student explains 9% of the variation in PISA mean performance between countries. Deviations from the trend line suggest that moderate spending per student cannot automatically be equated with poor performance by education systems. For example, Estonia and Poland, which spend around USD 40 000 per student, perform at the same level as Norway and the United States, which spend over USD 100 000 per student.⁵ Similarly, New Zealand, one of the highest-performing countries in reading, spends well below the average per student (Table I.1.20 in *PISA 2009 Results Volume I*).

It is not just the volume of resources that matters but also how countries invest these, and how well they succeed in **directing the money where it can make the most difference**. The United States is one of only three OECD countries in which, for example, socio-economically disadvantaged schools have to cope with less favourable student-teacher ratios than socio-economically advantaged schools, which implies that students from disadvantaged backgrounds may end up with considerably lower spending per student than what the above figures on average spending would suggest. With respect to spending on instruction, the United States spends a far lower proportion than the average OECD country on the salaries of high-school teachers.

At the same time, high school teachers in the United States teach far more hours, which reduces costs, but smaller class sizes are driving costs upwards (Table B7.3 in the 2010 edition of OECD's *Education at a Glance*). By contrast, Japan or Korea pay their teachers comparatively well and provide them with ample time for other work than teaching, which drives costs upwards, while paying for this with comparatively large class sizes. Finland puts emphasis on non-salary aspects of the working conditions of high-school teachers and also pays for the costs with comparatively large class sizes. Finally, the OECD indicators also show that the United States spends 11.6% of its resources for schools on capital outlays, a figure that is higher only in the Netherlands, Norway and Luxembourg (OECD average 7.6%) (Table B6.2b in the 2010 edition of OECD's *Education at a Glance*).

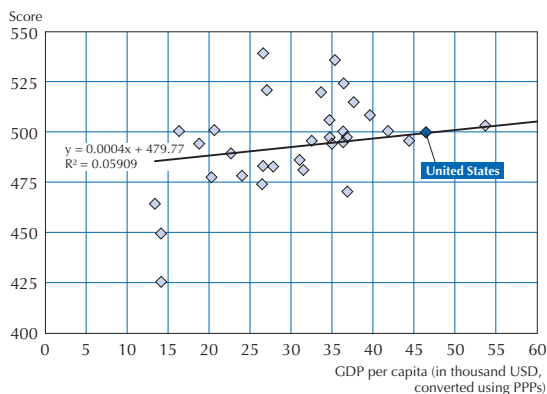
Parents in the United States are better educated than in most other countries. Given the close interrelationship between a student's performance and his or her parents' level of education observed in Volume II of *PISA 2009 Results*, it is also important to bear in mind the educational attainment of adult populations when comparing the performance of OECD countries, since countries with more highly educated adults are at an advantage over countries in which parents have less education. A comparison of the percentage of 35-to-44-year-olds that have attained upper secondary or tertiary levels of education, which roughly corresponds to the age group of parents of the 15-year-olds assessed in PISA, ranks the United States 8th among the 34 OECD countries (Table A1.2 in the 2010 edition of OECD's *Education at a Glance*).

The share of students from disadvantaged backgrounds in the United States is about average. Socio-economic disadvantage and heterogeneity in student populations pose other challenges for teachers and education systems. As shown in Volume II of *PISA 2009 Results*, teachers instructing socio-economically disadvantaged children are likely to face greater challenges than teachers with students from more privileged socio-economic backgrounds.

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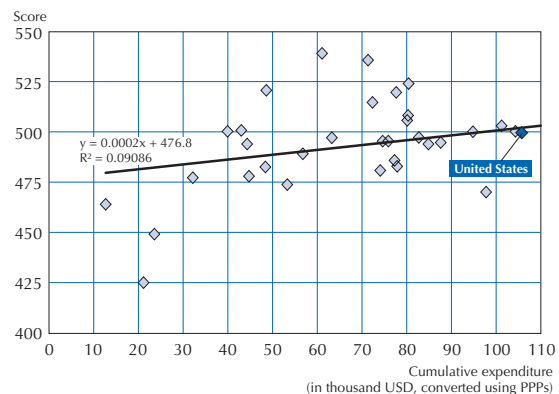


■ Figure 2.1a ■
Reading performance and GDP



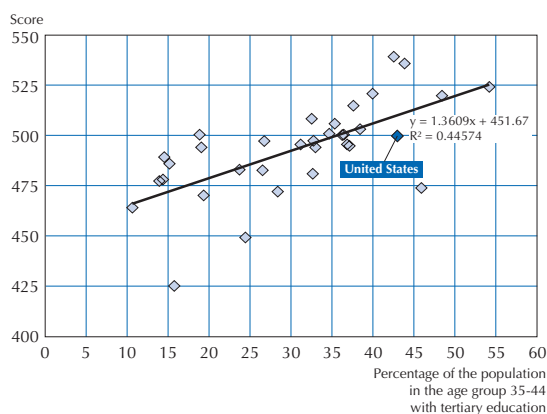
Source: OECD (2010), *PISA 2009 Results, Volume I, Table I.2.20.*
StatLink <http://dx.doi.org/10.1787/888932366636>

■ Figure 2.1b ■
Reading performance and spending on education



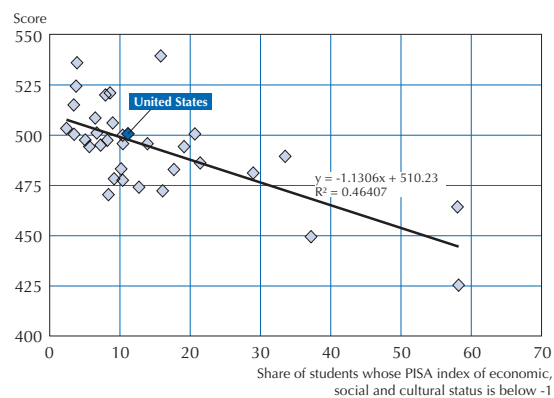
Source: OECD (2010), *PISA 2009 Results, Volume I, Table I.2.20.*
StatLink <http://dx.doi.org/10.1787/888932366636>

■ Figure 2.1c ■
Reading performance and parents' education



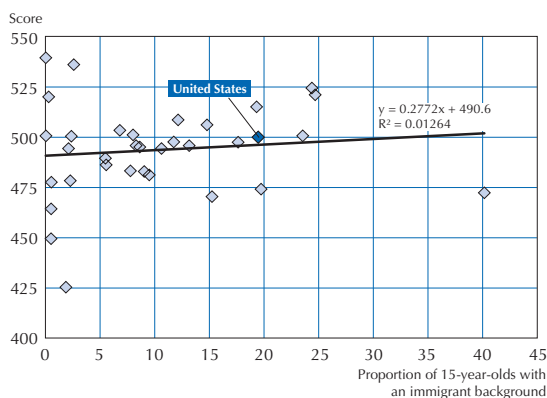
Source: OECD (2010), *PISA 2009 Results, Volume I, Table I.2.20.*
StatLink <http://dx.doi.org/10.1787/888932366636>

■ Figure 2.1d ■
Reading performance and share of socio-economically disadvantaged students



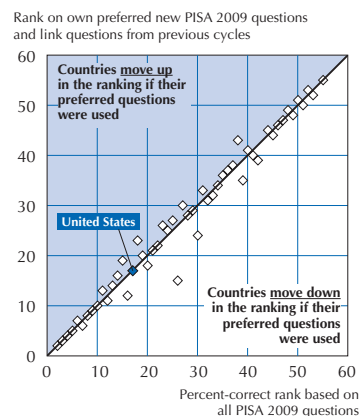
Source: OECD (2010), *PISA 2009 Results, Volume I, Table I.2.20.*
StatLink <http://dx.doi.org/10.1787/888932366636>

■ Figure 2.1e ■
Reading performance and proportion of students from an immigrant background



Source: OECD (2010), *PISA 2009 Results, Volume I, Table I.2.20.*
StatLink <http://dx.doi.org/10.1787/888932366636>

■ Figure 2.1f ■
Equivalence of the PISA test across cultures and languages



Source: OECD (2010), *PISA 2009 Results, Volume I, Table I.2.21.*
StatLink <http://dx.doi.org/10.1787/888932366636>

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A comparison of the socio-economic background of the most disadvantaged quarter of students puts the United States around the OECD average while the socio-economic background of the student population as a whole ranks clearly above the OECD average.⁶ In other words, while the overall socio-economic context of students in the United States is above that of a typical OECD country, the proportion of students from disadvantaged backgrounds is similar in the United States to that of OECD countries in general. The greater socio-economic variability in the United States thus does not result from a disproportional share of students from poor families, but rather from an above-average share of students from socio-economically advantaged backgrounds.

Among OECD countries the United States has the 6th largest proportion of students with an immigrant background. Integrating students with an immigrant background is part of the socio-economic challenge, and the performance levels of students who immigrated to the country in which they were assessed in PISA can only be partially attributed to the education system of their host country. With 19.5%, the United States has the 6th highest share of students with an immigrant background among OECD countries. However, the share of students with an immigrant background explains just 3% of the performance variation between countries. Among the 8 OECD countries that have between 15% and 30% of students with an immigrant background, which includes the United States, four show a smaller performance gap for immigrants on PISA while three show a larger performance gap for immigrants than the United States (Figure II.4.3 in *PISA 2009 Results, Volume II*).

The data in Figure 2.1 show that countries vary in their demographic, social and economic contexts. These differences need to be taken into account when interpreting differences in student performance. At the same time, the future economic and social prospects of both individuals and countries depends on the results they actually achieve, not on the performance they might have achieved under different social and economic conditions. That is why the results that are actually achieved by students, schools and countries are the focus of the subsequent analysis in this chapter.

Even after accounting for the demographic, economic and social contexts of education systems, the question remains: to what extent is an international test meaningful when differences in languages and cultures lead to very different ways in which subjects such as language, mathematics or science are taught and learned across countries? It is inevitable that not all tasks on the PISA assessments are equally appropriate in different cultural contexts and equally relevant in different curricular and instructional contexts. To gauge this, PISA asked every country to identify those tasks from the PISA tests that it considered most appropriate for an international test. Countries were advised to give an on-balance rating for each task with regard to its relevance to “preparedness for life”, authenticity and interest for 15-year-olds. Tasks given a high rating by each country are referred to as that country’s most preferred questions for PISA. PISA then scored every country on its own most preferred questions and compared the resulting performance with the performance on the entire set of PISA tasks. For the United States, its relative standing remains the same, irrespective of whether all PISA items or the items “preferred” by the United States are used as a basis for comparisons.

Relative shares of students “at risk”

Eighteen per cent of 15-year-olds in the United States do not reach the PISA baseline Level 2 of reading proficiency, a percentage that is around the OECD average and that has remained unchanged since 2000. Excluding students with an immigrant background reduces the percentage of poorly performing students slightly to 16%. By contrast, in Shanghai-China, Hong Kong-China, Canada, Finland and Korea, the proportion of poor performers is 10% or less (Figure I.2.14 in *PISA 2009 Results Volume I*).

Level 2 on the PISA reading scale can be considered a baseline level of proficiency, at which students begin to demonstrate the reading competencies that will enable them to participate effectively and productively in life. Students proficient at Level 2 are capable of very basic tasks, such as locating information that meets several conditions, making comparisons or contrasts around a single feature, working out what a well-defined part of a text means even when the information is not prominent, and making connections between the text and personal experience. Some tasks at this level require students to locate one or more pieces of information, which may need to be inferred and may need to meet several conditions. Others require recognising the main idea in a text, understanding relationships, or construing meaning within a limited part of the text when the information is not prominent and the reader must make low-level inferences. Tasks at this level may involve comparisons or contrasts based on a single feature in the text. Typical reflective tasks at this level require students to make a comparison or several connections between the text and outside knowledge, by drawing on personal experience and attitudes.

■ Figure 2.2 ■

Summary descriptions for the seven levels of proficiency in reading

Level	Lower score limit	Percentage of students able to perform tasks at each level or above (OECD average)	Characteristics of tasks
6	698	0.8% of students across the OECD can perform tasks at Level 6 on the reading scale	Tasks at this level typically require the reader to make multiple inferences, comparisons and contrasts that are both detailed and precise. They require demonstration of a full and detailed understanding of one or more texts and may involve integrating information from more than one text. Tasks may require the reader to deal with unfamiliar ideas, in the presence of prominent competing information, and to generate abstract categories for interpretations. <i>Reflect and evaluate</i> tasks may require the reader to hypothesise about or critically evaluate a complex text on an unfamiliar topic, taking into account multiple criteria or perspectives, and applying sophisticated understandings from beyond the text. A salient condition for <i>access and retrieve</i> tasks at this level is precision of analysis and fine attention to detail that is inconspicuous in the texts.
5	626	7.6% of students across the OECD can perform tasks at least at Level 5 on the reading scale	Tasks at this level that involve retrieving information require the reader to locate and organise several pieces of deeply embedded information, inferring which information in the text is relevant. Reflective tasks require critical evaluation or hypothesis, drawing on specialised knowledge. Both interpretative and reflective tasks require a full and detailed understanding of a text whose content or form is unfamiliar. For all aspects of reading, tasks at this level typically involve dealing with concepts that are contrary to expectations.
4	553	28.3% of students across the OECD can perform tasks at least at Level 4 on the reading scale	Tasks at this level that involve retrieving information require the reader to locate and organise several pieces of embedded information. Some tasks at this level require interpreting the meaning of nuances of language in a section of text by taking into account the text as a whole. Other interpretative tasks require understanding and applying categories in an unfamiliar context. Reflective tasks at this level require readers to use formal or public knowledge to hypothesise about or critically evaluate a text. Readers must demonstrate an accurate understanding of long or complex texts whose content or form may be unfamiliar.
3	480	57.2% of students across the OECD can perform tasks at least at Level 3 on the reading scale	Tasks at this level require the reader to locate, and in some cases recognise the relationship between, several pieces of information that must meet multiple conditions. Interpretative tasks at this level require the reader to integrate several parts of a text in order to identify a main idea, understand a relationship or construe the meaning of a word or phrase. They need to take into account many features in comparing, contrasting or categorising. Often the required information is not prominent or there is much competing information; or there are other obstacles in the text, such as ideas that are contrary to expectation or negatively worded. Reflective tasks at this level may require connections, comparisons, and explanations, or they may require the reader to evaluate a feature of the text. Some reflective tasks require readers to demonstrate a fine understanding of the text in relation to familiar, everyday knowledge. Other tasks do not require detailed text comprehension but require the reader to draw on less common knowledge.
2	407	81.2% of students across the OECD can perform tasks at least at Level 2 on the reading scale	Some tasks at this level require the reader to locate one or more pieces of information, which may need to be inferred and may need to meet several conditions. Others require recognising the main idea in a text, understanding relationships, or construing meaning within a limited part of the text when the information is not prominent and the reader must make low level inferences. Tasks at this level may involve comparisons or contrasts based on a single feature in the text. Typical reflective tasks at this level require readers to make a comparison or several connections between the text and outside knowledge, by drawing on personal experience and attitudes.
1a	335	94.3% of students across the OECD can perform tasks at least at Level 1a on the reading scale	Tasks at this level require the reader: to locate one or more independent pieces of explicitly stated information; to recognise the main theme or author's purpose in a text about a familiar topic; or to make a simple connection between information in the text and common, everyday knowledge. Typically the required information in the text is prominent and there is little, if any, competing information. The reader is explicitly directed to consider relevant factors in the task and in the text.
1b	262	98.9% of students across the OECD can perform tasks at least at Level 1b on the reading scale	Tasks at this level require the reader to locate a single piece of explicitly stated information in a prominent position in a short, syntactically simple text with a familiar context and text type, such as a narrative or a simple list. The text typically provides support to the reader, such as repetition of information, pictures or familiar symbols. There is minimal competing information. In tasks requiring interpretation the reader may need to make simple connections between adjacent pieces of information.



A follow-up of students who were assessed by PISA in 2000 as part of the Canadian Youth in Transitions Survey shows that students scoring below Level 2 face a disproportionately higher risk of poor post-secondary participation or low labour-market outcomes at age 19, and even more so at age 21, the latest age for which data are currently available. For example, the odds of Canadian students who had reached PISA Level 5 in reading at age 15 to achieve a successful transition to post-secondary education by age 21 were 20 times higher than for those who had not achieved the baseline Level 2, even after adjustments for socio-economic differences are made (OECD, 2010e).⁷ Similarly, of the Canadian students who performed below Level 2 in 2000, over 60% had not gone on to any post-school education by the age of 21; by contrast, more than half of the students (55%) who had performed at Level 2 as their highest level were at college or university.

In mathematics, the proportion of students below Level 2 on the PISA mathematics scale is 23.4% (OECD average of 20.8%) and remained similar to the percentage in 2003 (25.7%) (Table V.3.2 in *PISA 2009 Results Volume V*). Students proficient at Level 2 in mathematics can employ basic algorithms, formulae, procedures or conventions. They can interpret and recognise mathematical situations in contexts that require no more than direct inference and extract relevant information from a single source and make use of a single representational mode. They are capable of direct reasoning and making literal interpretations of the results.

In science, the proportion of students below Level 2 on the PISA science scale is, at 18.1%, around the OECD average but has declined from 24.4% in 2006 (Table V.3.4 in *PISA 2009 Results Volume V*). To reach Level 2 requires competencies such as identifying key features of a scientific investigation, recalling single scientific concepts and information relating to a situation, and using results of a scientific experiment represented in a data table as they support a personal decision. In contrast, students who do not reach Level 2 in science often confuse key features of an investigation, apply incorrect scientific information, and mix personal beliefs with scientific facts in support of a decision.

Relative shares of top-performing students

At the other end of the performance scale, students in the United States do comparatively well at the very highest levels of reading proficiency (Levels 5 and 6), have an average share of top performers in science, but a below-average share of top performers in mathematics (Figures I.2.14, I.3.9 and I.3.20 in *PISA 2009 Results Volume I*).

Students proficient at Level 6 on the PISA reading scale are capable of conducting fine-grained analysis of texts, which requires detailed comprehension of both explicit information and unstated implications; and capable of reflecting on and evaluating what they read at a more general level. They can overcome preconceptions in the face of new information, even when that information is contrary to expectations. They are capable of recognising what is provided in a text, both conspicuously and more subtly, while at the same time being able to apply a critical perspective to it, drawing on sophisticated understandings from beyond the text. This combination of a capacity to absorb the new and to evaluate it is greatly valued in knowledge economies, which depend on innovation and nuanced decision-making that draw on all the available evidence. At 1.5%, the United States has a significantly higher share of the highest-performing readers than the average (0.8%). However, in Australia, Canada, Finland, Japan, New Zealand, Singapore or Shanghai-China, the corresponding percentages are even higher, ranging from 1.8 to 2.9%.

At the next highest level, Level 5 on the PISA reading literacy scale, students can still handle texts that are unfamiliar in either form or content. They can find information in such texts, demonstrate detailed understanding, and infer which information is relevant to the task. Using such texts, they are also able to evaluate critically and build hypotheses, draw on specialised knowledge and accommodate concepts that may be contrary to expectations. The United States has, at 10%, an above-average share of students who perform at Level 5 or above (average 8%). However, in Shanghai-China (19.5%), New Zealand and Singapore (15.7%), Finland (14.5%) and Japan (13.4%) the corresponding percentages are higher.

Only 2% of students in the United States reach the highest level of performance in mathematics, compared with an OECD average of 3%, and figures ranging up to 27% in Shanghai-China (Table I.3.1 in *PISA 2009 Results Volume I*). Students proficient at Level 6 on the mathematics scale are capable of advanced mathematical thinking and reasoning. These students can apply insight and understanding, along with a mastery of symbolic and formal mathematical operations and relationships, to develop new approaches and strategies for addressing novel situations. They can formulate and accurately communicate their actions and reflections regarding their findings, interpretations, arguments and the appropriateness of these to the given situations. At the next highest level, Level 5 on the PISA mathematics scale, students can still develop and work with models in complex situations, identifying constraints and specifying assumptions.



They can select, compare and evaluate appropriate problem-solving strategies for dealing with complex problems related to these models. Students at this level can work strategically using broad, well-developed thinking and reasoning skills, appropriate linked representations, symbolic and formal characterisations, and insight pertaining to these situations. Ten per cent of students in the United States reach the PISA mathematics Level 5, compared with 13% on average across OECD countries. In Shanghai-China, half of the students reach Level 5, in Singapore and Hong Kong-China over 30% do, and in Chinese Taipei, Korea, Switzerland, Finland, Japan and Belgium over 20% do.

Students proficient at Level 6 in science can consistently identify, explain and apply scientific knowledge and knowledge about science in a variety of complex life situations. They can link different information sources and explanations and use evidence from those sources to justify decisions. They clearly and consistently demonstrate advanced scientific thinking and reasoning, and they use their scientific understanding to solve unfamiliar scientific and technological situations. Students at this level can use scientific knowledge and develop arguments in support of recommendations and decisions that centre on personal, social or global situations. One per cent of students in the United States reach Level 6 in science, which corresponds to the OECD average. In Singapore, the percentage is 4.6%, in Shanghai-China 3.9%, in New Zealand 3.6%, in Finland 3.3% and in Australia 3%.

Students proficient at the PISA science Level 5 can identify the scientific components of many complex life situations, apply both scientific concepts and knowledge about science to these situations, and can compare, select and evaluate appropriate scientific evidence for responding to life situations. Students at this level can use well-developed inquiry abilities, link knowledge appropriately and bring critical insights to situations. They can construct explanations based on evidence and arguments that emerge from their critical analysis. Nine per cent of students in the United States reach this level, which again corresponds to the OECD average. In Shanghai-China, 24.3% of students do, in Singapore 19.9%, in Finland 18.7%, in New Zealand 17.6% and in Japan, Hong Kong-China, Australia, Germany, the Netherlands and Canada, between 12.1% and 16.6% of students reach this level.

EQUITY IN THE DISTRIBUTION OF LEARNING OPPORTUNITIES

PISA explores equity in education from three perspectives: first, it examines differences in the distribution of learning outcomes of students and schools; second, it studies the extent to which students and schools of different socio-economic backgrounds have access to similar educational resources, both in terms of quantity and quality; and third, it looks at the impact of students' family background and school location on learning outcomes. The first perspective was discussed in the preceding section; the last two are discussed below.

Equity in access to resources

A first potential source of inequities in learning opportunities lies in the distribution of resources across students and schools. In a school system characterised by an equitable distribution of educational resources, the quality or quantity of school resources would not be related to a school's average socio-economic background, as all schools would enjoy similar resources. Therefore, if there is a positive relationship between the socio-economic background of students and schools and the quantity or quality of resources, this signals that more advantaged schools enjoy more or better resources. A negative relationship implies that more or better resources are devoted to disadvantaged schools. No relationship implies that resources are distributed similarly among schools attended by socio-economically advantaged and disadvantaged students.

In around half of OECD countries, the student-teacher ratio relates positively to the socio-economic background of schools – in other words, disadvantaged schools tend to have more teachers per student. This positive relationship is particularly pronounced in Belgium, Denmark, Estonia, Germany, Iceland, Ireland, Italy, Japan, Korea, Luxembourg, the Netherlands, Portugal and Spain. This important measure of resource allocation indicates that these countries use the student-teacher ratio to moderate disadvantage. Among OECD countries, only Israel, Slovenia, Turkey and the United States favour socio-economically advantaged schools with access to more teachers (Figure 2.3). The financing of schools in the United States, which is dependent on local taxation and thus closely related to housing costs, may contribute to concentrations of disadvantaged pupils in poorly resourced schools.

In the majority of OECD countries, including the United States, more advantaged students also enjoy a higher proportion of better-qualified full-time teachers. The picture is similar when examining schools whose principals report that the lack of qualified teachers hinders learning. All of this suggests that ensuring an equitable distribution of resources is still a major challenge for the United States, but also for other countries, if not in terms of the quantity of resources, then in terms of their quality. Figure 2.3 compares the United States with the benchmark countries examined in subsequent chapters as well as with other OECD countries.



■ Figure 2.3 ■

Relationship between school average socio-economic background and school resources

- Disadvantaged schools are more likely to have more or better resources, in **bold** if relationship is statistically different from the OECD average
- Advantaged schools are more likely to have more or better resources, in **bold** if relationship is statistically different from the OECD average
- Within country correlation is not statistically significant

Simple correlation between the school mean socio-economic background and:						
	Percentage of full-time teachers	Percentage of certified teachers among all full-time teachers	Percentage of teachers with university-level (ISCED 5A) among all full-time teachers	Index of quality of school's educational resources	Computer/student ratio	Student/teacher ratio ¹
OECD	Australia	-0.21	-0.05	0.02	0.31	-0.07
	Austria	-0.13	0.21	0.64	0.03	-0.07
	Belgium	-0.18	0.05	0.58	0.02	0.66
	Canada	0.01	0.14	0.03	0.18	0.09
	Chile	-0.04	-0.01	0.25	0.35	0.32
	Czech Republic	-0.32	0.29	0.37	0.00	0.15
	Denmark	0.01	-0.17	0.16	0.04	-0.08
	Estonia	0.14	0.00	0.00	0.10	-0.09
	Finland	0.17	-0.01	-0.01	0.13	-0.01
	France	c	c	c	c	c
	Germany	-0.15	-0.02	-0.02	0.06	-0.18
	Greece	-0.11	0.06	0.24	0.16	-0.12
	Hungary	-0.33	0.07	0.07	0.11	-0.20
	Iceland	0.20	0.39	0.30	0.06	-0.41
	Ireland	0.12	-0.10	-0.08	0.16	-0.03
	Israel	-0.08	-0.06	0.20	0.25	0.08
	Italy	-0.06	0.16	0.13	0.15	-0.19
	Japan	-0.14	0.04	0.20	0.17	-0.34
	Korea	-0.14	0.00	-0.03	-0.04	-0.53
	Luxembourg	-0.16	-0.01	0.39	0.13	-0.13
	Mexico	-0.09	-0.13	-0.04	0.59	0.14
	Netherlands	-0.34	-0.12	0.62	0.06	-0.16
	New Zealand	-0.04	0.08	0.07	0.16	-0.02
	Norway	-0.05	0.04	0.15	0.14	-0.02
	Poland	-0.02	0.03	-0.05	0.06	-0.16
	Portugal	0.14	-0.05	0.04	0.24	-0.02
	Slovak Republic	-0.09	0.28	-0.21	-0.05	-0.06
	Slovenia	0.46	0.32	0.55	0.13	-0.21
	Spain	-0.29	c	c	0.10	-0.16
	Sweden	0.05	0.01	-0.04	0.26	0.13
	Switzerland	-0.11	-0.07	0.24	0.10	0.03
	Turkey	0.12	-0.04	0.04	0.04	-0.06
	United Kingdom	-0.36	0.05	-0.03	0.00	0.01
	United States	-0.42	-0.24	0.10	0.22	0.06
	OECD average	-0.07	0.04	0.15	0.13	-0.08
Partners	Albania	-0.25	0.00	0.38	0.44	0.24
	Argentina	0.13	0.13	0.22	0.51	0.21
	Azerbaijan	0.05	-0.06	0.44	0.19	0.17
	Brazil	-0.03	0.10	0.03	0.52	0.25
	Bulgaria	-0.08	0.17	0.17	0.09	-0.17
	Colombia	-0.24	-0.16	-0.08	0.53	0.19
	Croatia	0.09	0.02	0.28	0.09	0.17
	Dubai (UAE)	0.32	0.61	-0.01	0.34	0.47
	Hong Kong-China	-0.19	-0.06	0.12	0.06	0.04
	Indonesia	0.24	0.27	0.16	0.44	0.14
	Jordan	-0.04	0.00	-0.02	0.26	0.05
	Kazakhstan	0.23	0.04	0.34	0.21	-0.12
	Kyrgyzstan	0.17	0.08	0.35	0.27	0.13
	Latvia	0.19	-0.03	0.19	0.14	0.00
	Liechtenstein	-0.15	0.02	0.57	-0.91	0.79
	Lithuania	0.21	0.09	0.19	-0.02	-0.49
	Macao-China	0.11	0.05	-0.18	0.26	0.22
	Montenegro	0.07	0.32	0.38	-0.11	-0.19
	Panama	-0.51	-0.47	-0.13	0.68	0.38
	Peru	-0.21	0.08	0.48	0.53	0.46
	Qatar	0.03	-0.04	-0.07	0.23	0.19
	Romania	0.05	0.10	0.11	0.20	-0.07
	Russian Federation	0.18	0.08	0.31	0.26	0.02
	Serbia	0.10	0.06	0.06	-0.01	0.00
	Shanghai-China	0.14	0.13	0.32	0.16	-0.10
	Singapore	-0.13	0.00	0.22	0.10	-0.18
	Chinese Taipei	0.12	0.34	0.29	0.19	-0.04
	Thailand	0.07	0.06	0.16	0.39	0.00
	Trinidad and Tobago	-0.19	0.09	0.56	0.12	0.08
	Tunisia	-0.06	0.00	0.20	0.13	0.15
	Uruguay	-0.01	0.27	0.08	0.33	0.30

1. In contrast to the other columns, negative correlations indicate more favourable characteristics for advantaged students.

Source: OECD, PISA 2009 Database, Table II.2.2.

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Moderating the impact of socio-economic background on learning outcomes

Students who did not surpass the most basic performance level on PISA were not a random group and the results show that socio-economic disadvantage has a particularly strong impact on student performance in the United States: 17% of the variation in student performance in the United States is explained by students' socio-economic background. This contrasts with just 9% in Canada or Japan, two of the benchmark countries described later in this volume. In other words, in the United States, two students from a different socio-economic background vary much more in their learning outcomes than is normally the case in OECD countries. Among OECD countries, only Hungary, Belgium, Turkey, Luxembourg, Chile and Germany show a larger impact of socio-economic background on reading performance than the United States. It is important to emphasise that these countries, including the United States, do not necessarily have a more disadvantaged socio-economic student intake than other countries; but socio-economic differences among students translate into a particularly strong impact on student learning outcomes (Figure 2.4).

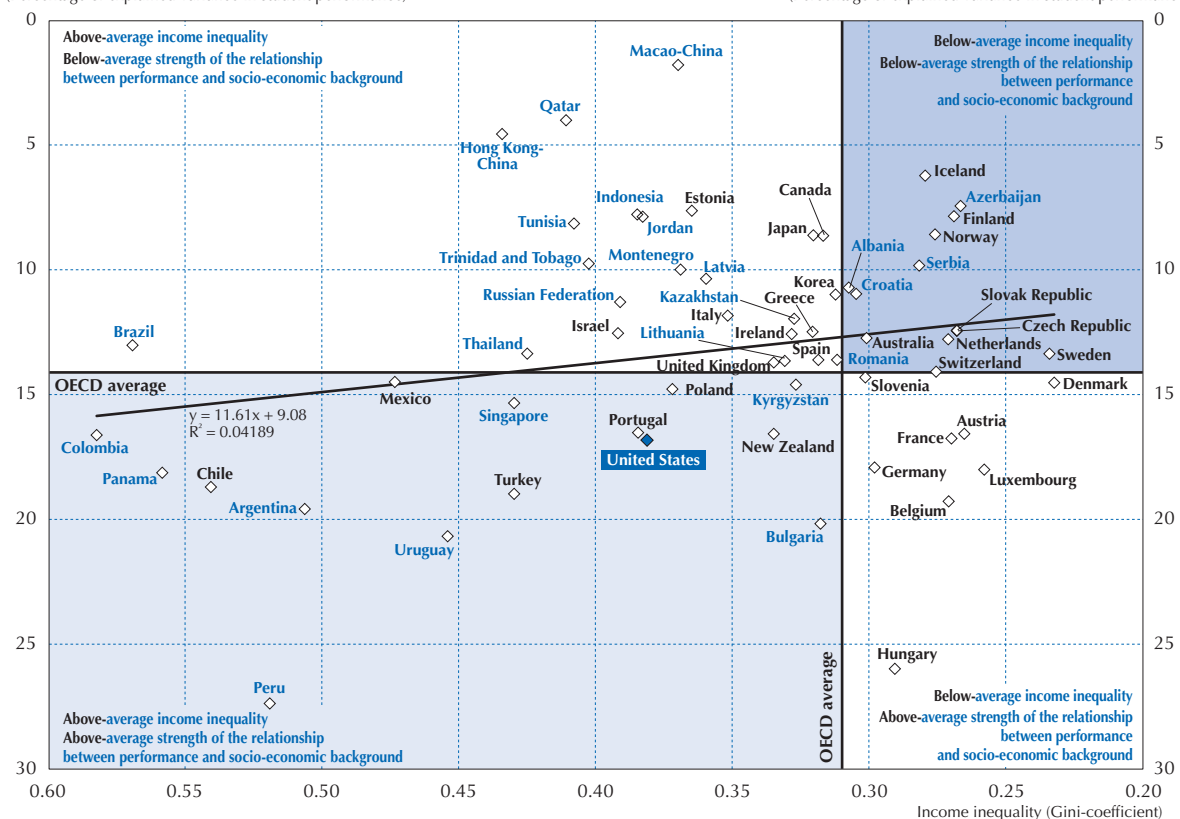
Similarly, among the 25 countries participating in PISA that show a more unequal distribution of income in their populations than the United States (among OECD countries, these include only Chile, Israel, Mexico, Portugal and Turkey) only Panama, Chile, Peru, Argentina, Uruguay and Turkey show a larger impact of socio-economic background on learning outcomes at school (Figure 2.4). The comparatively close relationship between the learning outcomes of students in the United States and socio-economic background is therefore not simply explained by a more socio-economically heterogeneous student population or society but, as noted before, mainly because socio-economic disadvantage translates more directly into poor educational performance in the United States than is the case in many other countries.

■ Figure 2.4 ■

Income inequality in the population and strength of the relationship between socio-economic background and performance

Strength of the relationship between performance and the PISA index of economic, social and cultural status (Percentage of explained variance in student performance)

Strength of the relationship between performance and the PISA index of economic, social and cultural status (Percentage of explained variance in student performance)



Note: The Gini coefficient measures the extent to which the distribution of income among individuals or households within an economy deviates from a perfectly equal distribution. The Gini index measures the area between the Lorenz curve and the hypothetical line of absolute equality, expressed as a proportion of the maximum area under the line. A Gini index of zero represents perfect equality and 1, perfect inequality.

Source: OECD, PISA 2009 Database, Table II.1.1.

StatLink <http://dx.doi.org/10.1787/888932366636>



If social inequities in societies were always closely linked to the impact of social disadvantage on learning outcomes, the role for public policy to improve equity in the distribution of learning opportunities would be limited, at least in the short term. However, there is almost no relationship between income inequalities in countries and the impact of socio-economic background on learning outcomes (Figure 2.4), that is, some countries succeed, even under difficult conditions, to moderate the impact of socio-economic background on educational success.

Also in the United States, the relationship between socio-economic background and learning outcomes is far from deterministic (Figure 2.5). For example, some of the most socio-economically disadvantaged schools match the performance of schools in Finland.⁸ Furthermore, as noted before, a quarter of American 15-year-olds enrolled in socio-economically disadvantaged schools reach the average performance standards of Finland, one of the best-performing education systems.⁹

It is useful to examine four of the aspects of socio-economic background and their relationship to student performance in greater detail.

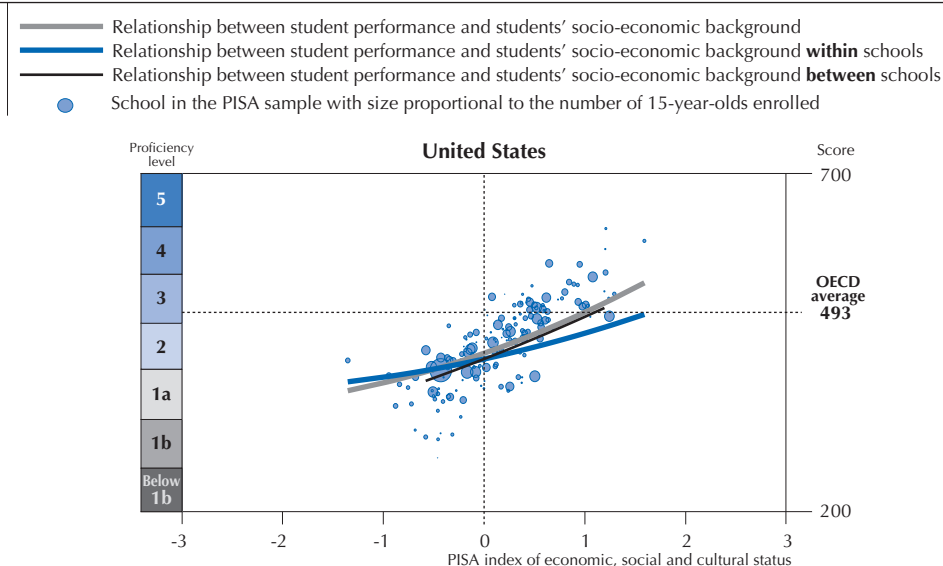
Community size: While students in the United States in large cities (students attending schools located in cities with over one million inhabitants) perform at 485 score points on the PISA reading scale, below the OECD average of 493 score points, suburban schools perform, on average, just slightly higher than the OECD average. The performance challenges for the United States therefore do not just relate to poor students in poor neighbourhoods, but to many students in many neighbourhoods.¹⁰

Family composition: While results from PISA show that single-parent families are more prevalent in the United States than on average across OECD countries (24% of 15-year-olds in the United States come from a single-parent family compared with an average of 17%), they also show that 15-year-olds in the United States from single-parent families face a much higher risk of low performance than is the case across OECD countries (Table II.2.5 in *PISA 2009 Results Volume II*).


Immigrant students: Thirty per cent of schools in the United States have more than a quarter of students with an immigrant background. Among OECD countries, only Luxembourg, Switzerland, Australia, New Zealand, Canada and Israel show a higher concentration of students with an immigrant background in schools (the OECD average is 14%). Twelve per cent of students in the United States are enrolled in schools in which the share of immigrant students even exceeds 50%, a percentage that only Luxembourg, Canada and New Zealand exceed (Table II.4.6 in *PISA 2009 Results Volume II*). What PISA data also show is that students in the United States with an immigrant background tend to attend schools with a socio-economically more disadvantaged background, that have a lower quality of educational resources, a more disadvantaged student/staff ratio, and greater teacher shortage as reported by school principals (Table II.4.9 in *PISA 2009 Results Volume II*). Such challenges are, however, not uncommon across OECD countries.

■ Figure 2.5 ■

Relationship between school performance and schools' socio-economic background in United States



Source: OECD, *PISA 2009 Database*.

StatLink  <http://dx.doi.org/10.1787/888932366636>



While it might be tempting to attribute a performance lag of countries to the challenges that immigrant inflows pose to the education system, the reading performance of students in the United States without an immigrant background is, at 506 score points, only marginally higher than the performance of all students. In fact, the reading performance gap between students with and without an immigrant background is smaller in the United States than the average gap across OECD countries (Table II.4.1 in *PISA 2009 Results Volume II*), and particularly after the socio-economic background of students is accounted for (Table II.4.1 in *PISA 2009 Results Volume II*). The same holds if the language spoken at home, instead of the immigrant background of the student, is used for comparing student groups. Among the countries that took part in the latest PISA assessment, Switzerland, Canada and New Zealand have larger immigrant intakes than the United States, but score significantly better (Figure 2.6).

■ Figure 2.6 ■

Students' reading performance, by percentage of students with an immigrant background

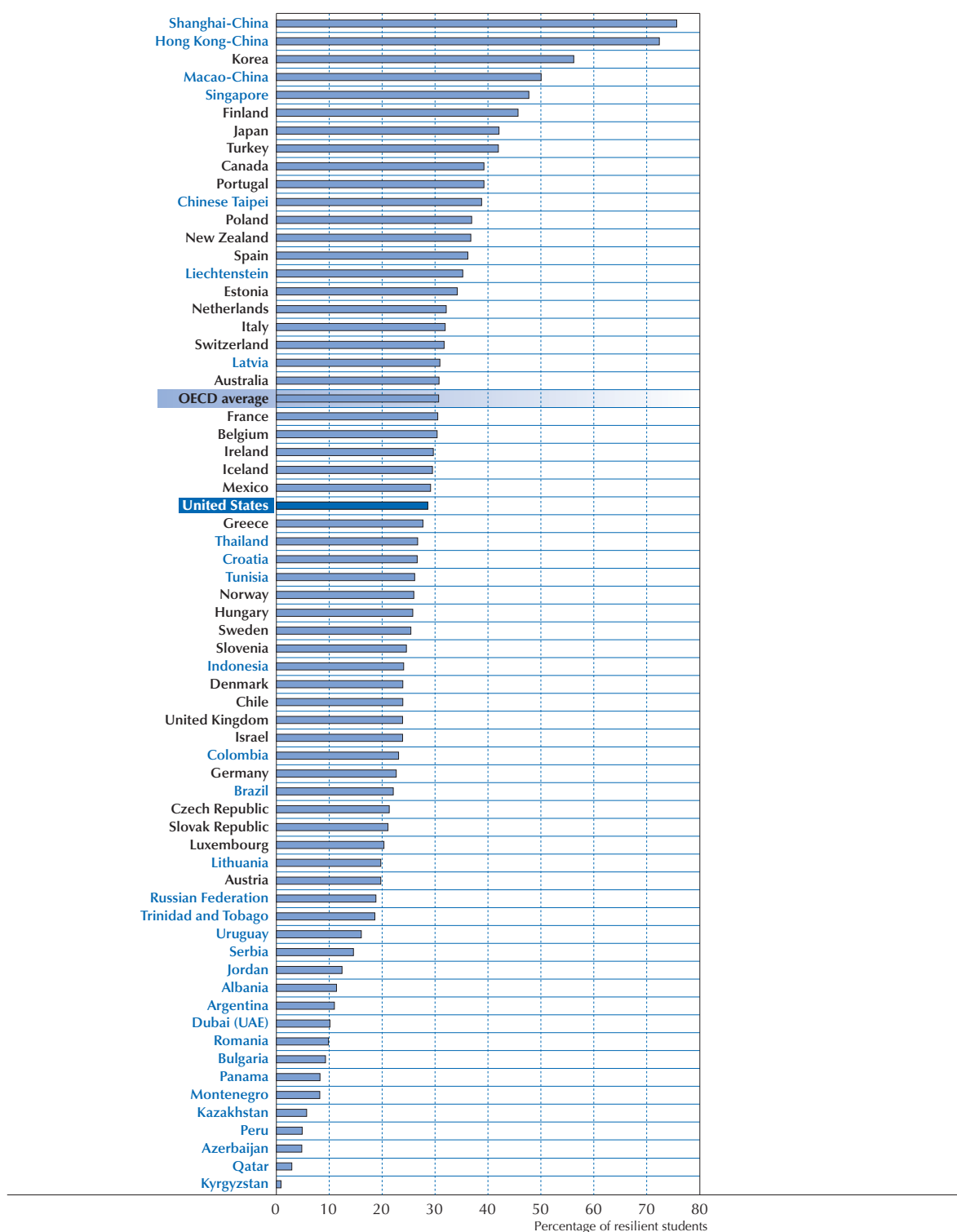


Source: OECD, *PISA 2009 Database*, Table II.4.1.
 StatLink  <http://dx.doi.org/10.1787/888932366636>



■ Figure 2.7 ■

Percentage of resilient students among disadvantaged students



Note: A student is classified as resilient if he or she is in the bottom quarter of the PISA index of economic, social and cultural status (ESCS) in the country of assessment and performs in the top quarter across students from all countries after accounting for socio-economic background. The share of resilient students among all students has been multiplied by 4 so that the percentage values presented here reflect the proportion of resilient students among disadvantaged students (those in the bottom quarter of the PISA index of social, economic and cultural status).

Source: OECD, *PISA 2009 Database*, Table II.3.3.

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Concentration of socio-economic disadvantaged students in schools: In the United States, there are 32% of students in schools with a socio-economically disadvantaged intake, of which 61% are students who are socio-economically disadvantaged themselves (*i.e.* they are grossly over-represented), while 30% of students are in socio-economically privileged schools of which only 6% are socio-economically disadvantaged themselves. Disadvantaged students tend to do as expected in disadvantaged schools and advantaged students tend to do worse than expected, but by about the same margin as in many other OECD countries. In schools with a mixed socio-economic intake, disadvantaged students tend to do better than expected, again by the same margin as in the OECD in general, and advantaged students tend to do as expected. In schools with a privileged socio-economic intake, disadvantaged students tend to do better than expected (but by a smaller margin compared to other OECD countries) and advantaged students tend to do better than expected (within a similar margin of other OECD countries) (Table II.5.11 in *PISA 2009 Results, Volume II*).

In general, the accuracy with which socio-economic background predicts student performance varies considerably across countries. Most of the students who perform poorly in PISA share a challenging socio-economic background and yet some of their socio-economically disadvantaged peers excel in PISA and beat the odds working against them. These students show that overcoming socio-economic barriers to achievement is possible. While the prevalence of resilience is not the same across educational systems, it is possible to identify substantial numbers of resilient students in practically all OECD countries.¹¹ In the United States, 7% of students can be considered resilient, in the sense that they come from the 25% of the most socio-economically disadvantaged students but nevertheless perform much better than would be predicted based on their socio-economic background (7% is also the average in the OECD) (Figure 2.7). However, in Korea, Hong Kong-China and Shanghai-China, the share of disadvantaged students who excel at school despite their disadvantaged background is about twice as high.

The cost of the achievement gap

The international achievement gap is imposing on the United States economy an invisible yet recurring economic loss that is greater than the output shortfall in what has been called the worst economic crisis since the Great Depression. Using economic modelling to relate cognitive skills – as measured by PISA and other international instruments – to economic growth shows (with some caveats) that even small improvements in the skills of a nation's labour force can have large impacts on that country's future well-being. A recent study carried out by the OECD, in collaboration with the Hoover Institute at Stanford University, suggests that a modest goal of having the United States boost its average PISA scores by 25 points over the next 20 years – which corresponds to the performance gains that some countries achieved between 2000 and 2009 alone – could imply a gain of USD 41 trillion for the United States economy over the lifetime of the generation born in 2010 (as evaluated at the start of reform in terms of the real present value of future improvements in GDP). Bringing the United States up to the average performance of Finland, the best-performing education system among OECD countries, could result in gains in the order of USD 103 trillion. Narrowing the achievement gap by bringing all students to a baseline level of proficiency for the OECD (a PISA score of about 400) could imply GDP increases for the United States of USD 72 trillion, according to historical growth relationships (OECD, 2010b). Longitudinal studies have also demonstrated that student performance at school is a good indicator of subsequent successful education and labour-market pathways (OECD, 2010a).

Although there are uncertainties associated with these estimates, the gains from improved learning outcomes, put in terms of current GDP, exceed today's value of the short-run business-cycle management. This is not to say that efforts should not be directed towards mitigating the short-term effects of the economic recession, but it is to say that long-term issues should not be neglected.

THE LEARNING ENVIRONMENT IN THE CLASSROOM AND AT SCHOOL

The effects of educational policies and practices on student achievement depend heavily on how they translate into increased learning in the classroom. Results from PISA suggest that, across OECD countries, schools and countries where students work in a climate characterised by expectations of high performance and the readiness to invest effort, good teacher-student relations and high teacher morale tend to achieve better results, on average across countries and particularly in some countries. Even after accounting for socio-economic background and other aspects of the learning environment measured by PISA, the results show that reading performance is positively related to higher values on the *PISA index of teacher-student relationship* in 10 OECD countries, including the United States; on the *index of disciplinary climate* in 16 OECD countries, including the United States; and on the *index of teacher-related factors affecting school climate* in 14 OECD countries, including the United States (Table IV.2.13c in *PISA 2009 Results Volume IV*). It is noteworthy that in no country is there a negative relationship between any of these factors and learning outcomes.



The learning environment is also shaped by parents and school principals. Parents who are interested in their children's education are more likely to support their school's efforts and participate in school activities, thus adding to available resources. These parents also tend to have an advantaged socio-economic background. In addition, school principals can define their schools' educational objectives and guide their schools towards them. PISA shows that school principals' perceptions of parents' constant pressure to adopt high academic standards and to raise student achievement tend to be positively related to higher school performance in 19 OECD countries, although that relationship is not apparent in the United States. In some other countries, much of this relationship is mediated by socio-economic factors (Tables IV.2.13b and IV.2.13c in *PISA 2009 Results Volume IV*).

PISA also shows that the socio-economic background of students and schools and key features of the learning environment are closely interrelated. Both link to performance in important ways, perhaps because students from socio-economically advantaged backgrounds bring with them a higher level of discipline and more positive perceptions of school values, or perhaps because parental expectations of good classroom discipline are higher, and teacher commitment is stronger, in schools with advantaged socio-economic intake. Conversely, disadvantaged schools may be under less parental pressure to reinforce effective disciplinary practices or ensure that absent or unmotivated teachers are replaced. In summary, students perform better in schools with a more positive school climate, partly because such schools tend to have more students from advantaged backgrounds who generally perform well, partly because the favourable socio-economic characteristics of students reinforce the favourable climate, and partly for reasons unrelated to socio-economic variables. In many countries, the effect of parental pressure is particularly closely related to socio-economic background, with little independent effect, whereas factors related to the climate within the school, such as discipline and teacher-student relations, are also related to performance independently of socio-economic and demographic variables.

Some of the factors underlying these analyses are examined in greater detail in the following sections, which also position the United States along the various dimensions.

Teacher-student relations

Positive teacher-student relations can help to establish an environment that is conducive to learning. Research finds that students, particularly disadvantaged students, tend to learn more and have fewer disciplinary problems when they feel that their teachers take them seriously. One explanation is that positive teacher-student relations help foster social relationships, create communal learning environments and promote and strengthen adherence to norms conducive to learning. PISA asked students to agree or disagree with several statements regarding their relationships with their teachers in school. These statements include whether students get along with the teachers and whether teachers are interested in their personal well-being, whether teachers take the student seriously, whether teachers are a source of support if students need extra help, and whether teachers treat the student fairly. Students in the United States reported one of the best teacher-student relations among OECD countries (Figure IV.4.1 in *PISA 2009 Results Volume IV*). For example, over 80% of students in the United States agree or strongly agree that their teachers are interested in their well-being, whereas only 28% of students in Japan do so. As in the majority of countries, there is a positive relationship between teacher-student relations and student performance in both the United States and Japan. For example, the quarter of students in the United States who reported the poorest relationships with their teachers are 1.6 times more likely to be also among the quarter of the poorest performing students (for Japan the odds are 2.0).¹² Differences in student-reported teacher interest in their well-being may reflect either different student expectations of the level of involvement of their teachers, or different roles that teachers assume with respect to their students. A low percentage of agreement with these statements suggests a possible mismatch between student expectations and what teachers are actually doing.

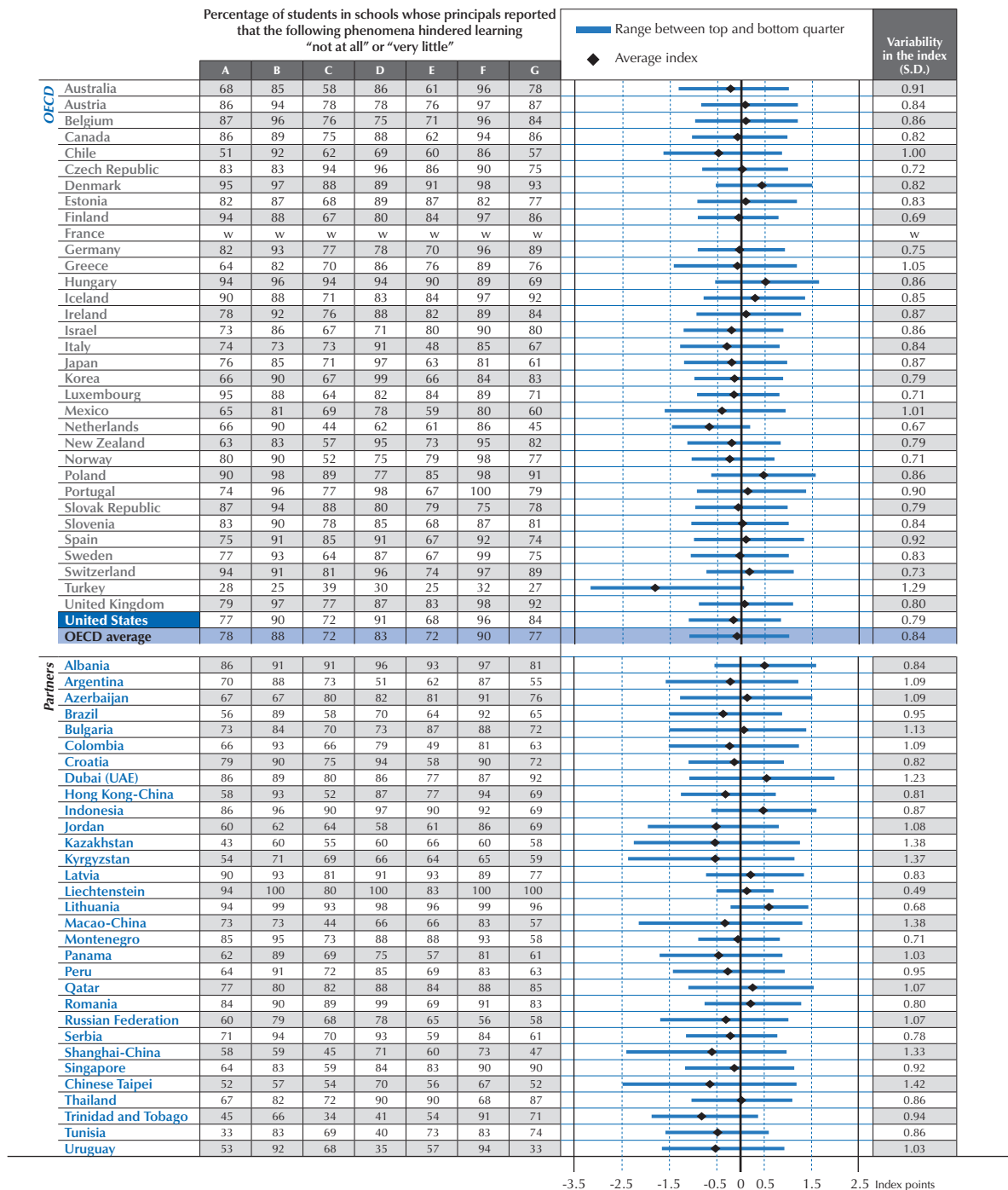
Disciplinary climate

The disciplinary climate in the classroom and school can also affect learning. Classrooms and schools with more disciplinary problems are less conducive to learning, since teachers have to spend more time creating an orderly environment before instruction can begin. More interruptions within the classroom disrupt students' engagement and their ability to follow the lessons. PISA asked students to describe the frequency with which interruptions occur in reading lessons. The disciplinary climate is indicated in PISA by how often students do not listen to the teacher during lessons on the language of instruction; there is noise and disorder; the teacher has to wait a long time for students to quiet down; students cannot work well; and students do not start working for a long time after the lesson begins. The majority of students in OECD countries enjoy orderly classrooms in their language classes. Some 75% of students report that they never or only in some lessons feel that students do not start working for a long time after the lesson begins; 71% of students report that they never or only in some lessons feel that students do not listen; 68% report that noise never or only in some lessons affects learning; 72% say that their teacher never or only in some lessons has to wait a long time before students settle down; and 81% of the students attend classrooms where they feel they can work well practically most of the time (Figure IV.4.2 in *PISA 2009 Results Volume IV*).

■ Figure 2.8 ■

School principals' views of how teacher behaviour affects students' learning*Index of teacher-related factors affecting school climate based on school principals' reports*

- A Teachers' low expectations of students
- B Poor student-teacher relations
- C Teachers not meeting individual students' needs
- D Teacher absenteeism
- E Staff resisting change
- F Teachers being too strict with students
- G Students not being encouraged to achieve their full potential



Note: Higher values on the index indicate a positive teacher behaviour.

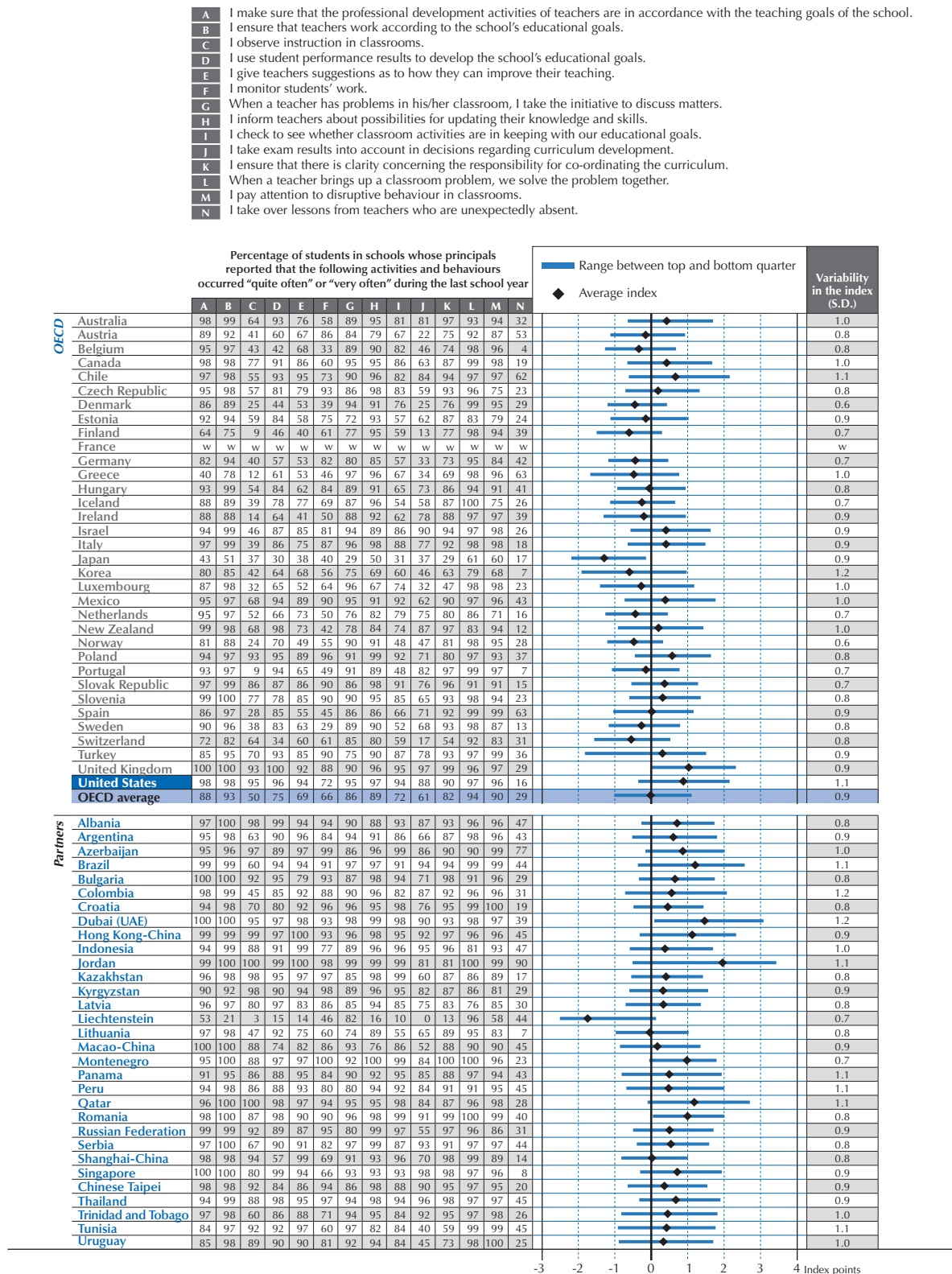
Source: OECD, *PISA 2009 Database*, Table IV.4.5.StatLink <http://dx.doi.org/10.1787/888932366636>



Figure 2.9


School principals' views of their involvement in school matters

Index of school principal's leadership based on school principals' reports



Note: Higher values on the index indicate greater involvement of school principals in school matters.

Source: OECD, PISA 2009 Database, Table IV.4.8.

StatLink  <http://dx.doi.org/10.1787/888932366636>



The United States does reasonably well on this measure, but the benchmark countries Japan, Korea or Germany show a significantly better disciplinary climate. What is also noteworthy is that there is considerable variation on this measure among students in the United States, and the quarter of students who reported the poorest disciplinary climate are twice as likely to be poor performers. This odds ratio is the second highest among all countries participating in PISA (OECD average odds 1.4) (Table IV.4.2 in *PISA 2009 Results Volume IV*).

It is noteworthy that the judgment of school principals on the disciplinary climate in the United States is less positive than what students report, and the mismatch between these perspectives may indicate differences in what students and school principals perceive to be problems (Table IV.4.4 in *PISA 2009 Results Volume IV*).¹³

Teacher-related factors affecting the school climate

To determine the extent to which teacher behaviour influences student learning, school principals in PISA were asked to report the extent to which they perceived learning in their schools to be hindered by such factors as teachers' low expectations of students, poor student-teacher relations, absenteeism among teachers, staff resistance to change, teachers not meeting individual students' needs, teachers being too strict with students, and students not being encouraged to achieve their full potential. The United States performed around the OECD average on these measures, but the reports from school principals highlight a number of challenges: 23% of students in the United States are enrolled in schools whose principals reported that teachers' low expectations of students hinder learning to some extent or a lot (in contrast, in the benchmark country Finland, that percentage is just 6%), 28% that this is the case because teachers do not meet individual students' needs, and 32% because staff resist change (Figure 2.8). In contrast, only 4% of school principals see teachers being too strict with students as a problem, and 10% or less see poor student-teacher relationships or teacher absenteeism as a problem that hinders learning.

HOW SCHOOLING IS ORGANISED

Governance of school systems

Many countries have pursued a shift in public and governmental concern away from mere control over the resources and content of education towards a focus on outcomes. This becomes evident when the distribution of decision-making responsibilities in education is reviewed across successive PISA assessments. In addition, school systems have made efforts to devolve responsibility to the frontline, encouraging responsiveness to local needs, and strengthening accountability (Figures 2.10 and 2.11). PISA shows a clear relationship between learning outcomes and the relative autonomy of schools in managing instructional policies and practices across systems when autonomy is coupled with accountability. Of course, the United States is a decentralised education system too, but while many systems have decentralised decisions concerning the delivery of educational services while keeping tight control over the definition of outcomes, the design of curricula, standards and testing, the United States is different in that it has decentralised both inputs and control over outcomes. That has only just begun to change with the recent introduction and progressive adoption, by individual states, of common core educational standards. Moreover, while the United States has devolved responsibilities to local authorities or districts, their schools often have less discretion in decision-making than is the case in many OECD countries. In this sense, the question for the United States is not just how many charter schools it establishes but how to build the capacity for all schools to exercise responsible autonomy, as happens in most of the benchmark systems.

Important organisational features of school systems are the degree to which students and parents can choose schools, and the degree to which schools are considered autonomous entities that make organisational decisions independently of district, regional or national entities. Results from PISA suggest that school autonomy in defining curricula and assessments relates positively to the systems' overall performance (Figure 2.11, Figures IV.3.3 and IV.2.4a in *PISA 2009 Results Volume IV*). For example, school systems that provide schools with greater discretion in making decisions regarding student assessment policies, the courses offered, the course content and the textbooks used, tend to be school systems that perform at higher levels.

Data from PISA also show that in school systems where most schools post achievement data publicly, schools with greater discretion in managing their resources tend to show higher levels of performance. In school systems where schools do not post achievement data publicly, a student who attends a school with greater autonomy in resource management than the average OECD school tends to perform 3.2 score points lower in reading than a student attending a school with an average level of autonomy. In contrast, in school systems where schools do post achievement data publicly, a student who attends a school with above-average autonomy scores 2.6 points *higher* in reading than a student attending a school with an average level of autonomy (Table IV.2.5 in *PISA 2009 Results Volume IV*).

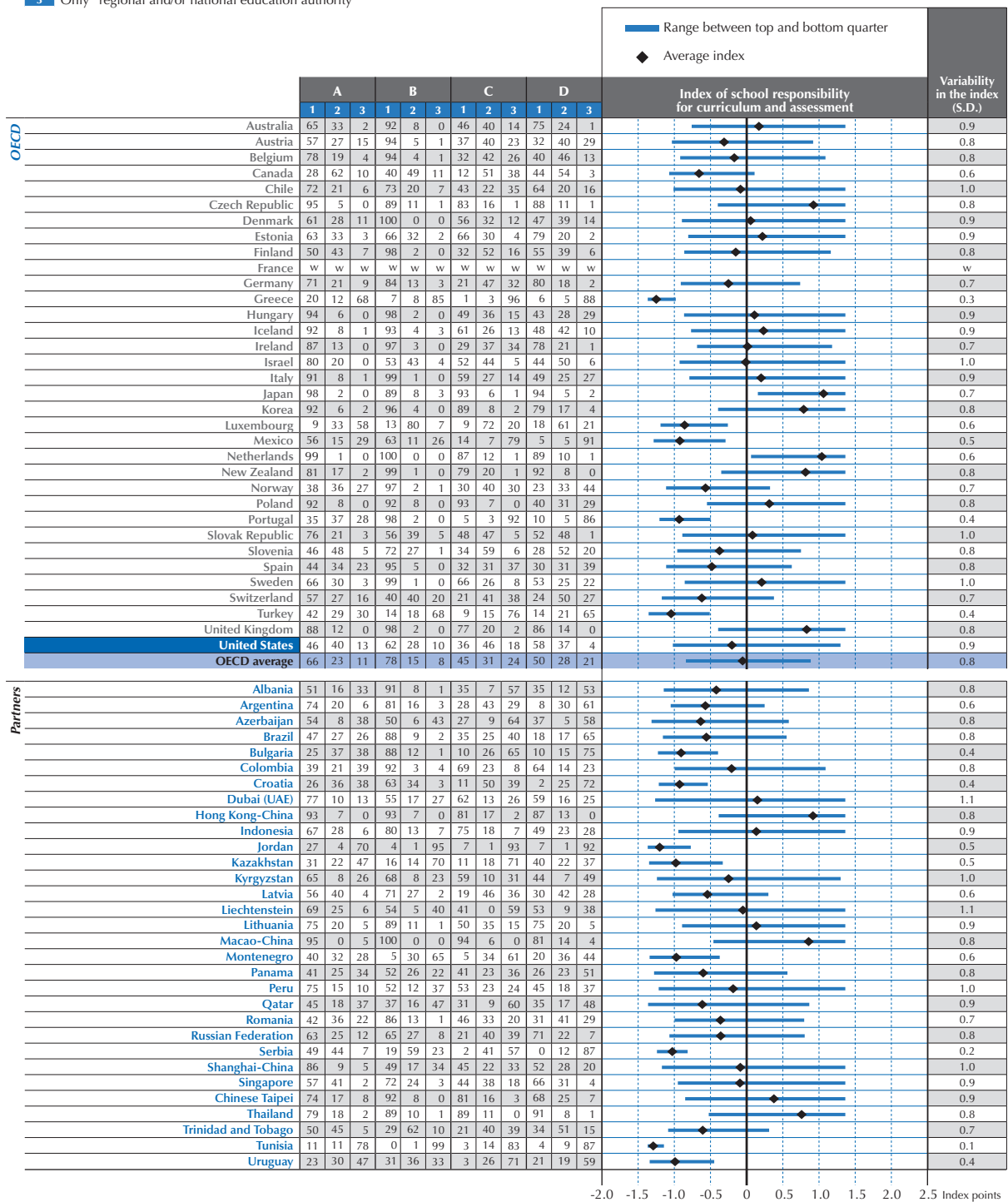
Figure 2.11

How much autonomy individual schools have over curricula and assessments

Percentage of students in schools whose principals reported that only "principals and/or teachers", only "regional and/or national education authority" or both "principals and/or teachers" and "regional and/or national education authority" have a considerable responsibility for the following tasks

- A Establishing student assessment policies
B Choosing which textbooks are used
C Determining course content
D Deciding which courses are offered

- 1 Only "principals and/or teachers"
2 Both "principals and/or teachers" and "regional and/or national education authority"
3 Only "regional and/or national education authority"



Source: OECD, PISA 2009 Database, Table IV.3.6.

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PISA classifies OECD countries into four groups that share similar profiles in the way they allow schools and parents to make decisions that affect their children's education. The grouping is based on the levels of school autonomy and school competition. Two categories are identified for each dimension and the interplay between these dimensions results in four groups: school systems that offer high levels of autonomy to schools in designing and using curricula and assessments and encourage more competition between schools; school systems that offer low levels of autonomy to schools and limit competition between schools; school systems that offer high levels of autonomy to schools, but with limited competition between schools; and school systems that offer low levels of autonomy to schools, yet encourage more competition between schools (Figure IV.3.5 in *PISA 2009 Results Volume IV*).

Across OECD countries, the most common configuration is the one that gives schools the freedom to make curricular decisions, yet restricts competition for enrolment among schools. These school systems have relatively limited levels of choice for parents and students and there is little competition for enrolment among schools. Private schools are not widely available in these countries. Twenty-two OECD countries, including the United States, fall into this category.

School systems that offer relatively low levels of autonomy to schools and low levels of choice to parents are also fairly common across OECD countries: four OECD countries share this configuration and 11 partner countries and economies do.

Six other OECD countries offer high levels of autonomy and choice, either in the form of a high prevalence private schools or competition among schools for enrolment. In these school systems, schools have the freedom to choose teaching methods to meet learning objectives, and parents and students can choose among a variety of schools for enrolment. Some of the variables underlying this classification are examined in greater detail below.

School choice

Students in some school systems are encouraged or even obliged to attend their neighbourhood school. However, reforms over the past decades in many countries have tended to give more authority to parents and students to choose schools that meet their educational needs or preferences best. The assumption has been that if students and parents have sound information and choose schools based on academic criteria, this will foster competition among schools and create incentives for institutions to organise programmes and teaching in ways that better respond to diverse student requirements and interests, thus reducing the costs of failure and mismatches. In some school systems, schools not only compete for student enrolment, but also for funding. Direct public funding of independently managed institutions, based on student enrolments or student credit-hours, is one model for this. Giving money to students and their families to spend in public or private educational institutions of their choice through, for example, scholarships or vouchers, is another method (Figure 2.12).

According to the responses of school principals in PISA, across OECD countries, 76% of students attend schools competing with at least one other school for enrolment. Only in Switzerland, Norway and Slovenia do less than 50% of students attend schools that compete with other schools for enrolment. In contrast, in the Netherlands, Australia, Belgium, the Slovak Republic and Japan, over 90% of students attend schools that compete with other schools for enrolment (Table IV.3.8a in *PISA 2009 Results Volume IV*).

Some 13 OECD countries allow parents and students to choose public schools and also incorporate vouchers or tax credits in their school-choice arrangements. Eleven OECD countries provide for freedom in the choice of public schools, but do not offer vouchers or tax credits; two OECD countries restrict parents and students in the choice of public schools, but offer tax or voucher credits to attend other schools; and in four OECD countries, parents and students must attend the public school nearest to where they live and are not offered any kind of subsidy to attend other schools (Table IV.3.7 in *PISA 2009 Results Volume IV*).

Competition among schools, as reported by school principals in PISA, is consistent with these school-choice arrangements as reported by central and regional governments, and is greatest in school systems that grant parents and students the freedom to choose public schools and offer subsidies in the form of vouchers or tax credits to attend other schools. In countries with these characteristics, 85% of students attend schools whose principals reported that they compete with at least one other school for enrolment. The lowest levels of school competition are found in countries that restrict attendance to public schools and do not offer subsidies to attend other schools. In the average country in this category, 52% of students attend schools whose principals reported that they compete for student enrolment with at least one other school (Figure 2.12). Levels of school competition are similar in countries that restrict attendance to public schools and offer subsidies, and in countries that do not restrict attendance to

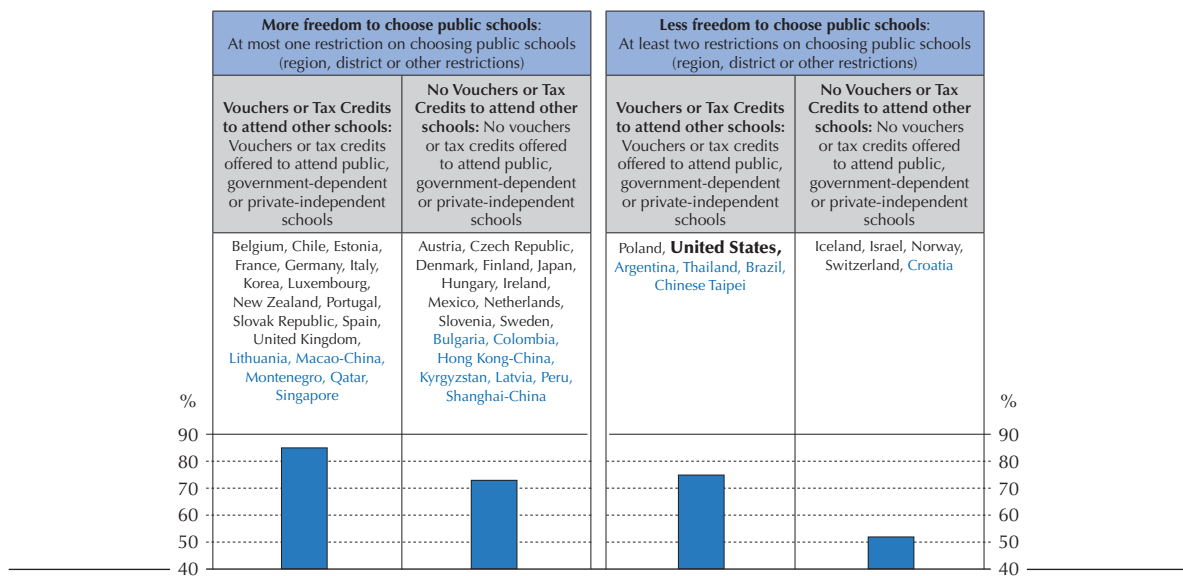


public schools yet offer no subsidies. In these countries, around 75% of students attend schools whose principals reported that they compete with other schools for enrolment. The use of vouchers or tax credits and opening choice among public schools enhances school competition for students. However, competition among schools is less frequent in remote and rural areas, where public schools are usually located at greater distances from each other, making it more difficult for parents and students to choose a school other than the one that is closest to their home (Table IV.2.6 in *PISA 2009 Results Volume IV*).

■ Figure 2.12 ■

Countries in which parents can choose schools for their children

Prevalence of school competition by school choice arrangements



Note: Bars represent the average percentages of school competition in OECD countries, by four categories of school choice arrangements.

Source: OECD, *PISA 2009 Database*, Tables IV.3.7 and IV.3.8a.

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Among schools within a country, competition and performance do seem related; but once the socio-economic profile of students and schools are taken into consideration, the relationship weakens, since privileged students are more likely to attend schools that compete for enrolment (Tables IV.2.4b and IV.2.4c in *PISA 2009 Results Volume IV*). This may reflect the fact that socio-economically advantaged students, who tend to achieve higher scores, are also more likely to attend schools that compete for enrolment, even after accounting for location and attendance in private schools (Table IV.2.6 in *PISA 2009 Results Volume IV*).

Why are socio-economically advantaged students more likely to attend schools of their choice? To understand differences in how parents choose schools for their children, PISA asked a series of questions regarding school choice in the questionnaire for parents that was distributed in eight OECD countries (no data from parents are available for the United States). On average, socio-economically disadvantaged parents are over 13 percentage points more likely than advantaged parents to report that they considered “low expenses” and “financial aid” to be very important determining factors in choosing a school (Table IV.2.7 in *PISA 2009 Results Volume IV*). While parents from all backgrounds cite academic achievement as an important consideration when choosing a school for their children, socio-economically advantaged parents are, on average, 10 percentage points more likely than disadvantaged parents to cite that consideration as “very important”. It is possible that there can be differences in the parent’s reasons due to socio-economic status because some of the priorities are already met in schools available to advantaged parents. Still, these differences suggest that socio-economically disadvantaged parents believe that they have more limited choices of schools for their children because of financial constraints. If children from socio-economically disadvantaged backgrounds cannot attend high-performing schools because of financial constraints, then school systems that offer parents more choice of schools for their children will necessarily be less effective in improving the performance of all students.



Public and private schools

School education takes place mainly in public schools. Nevertheless, with an increasing variety of educational opportunities, programmes and providers, governments are forging new partnerships to mobilise resources for education and to design new policies that allow all stakeholders to participate more fully and share costs and benefits more equitably. Privately provided education is not only a way of mobilising resources from a wider range of funding sources, it is sometimes also considered a way of making education more cost-effective. Publicly financed schools are not necessarily also publicly managed. Instead, governments can transfer funds to public and private educational institutions according to various allocation mechanisms. Indeed, publicly funded private schools are the most common model of private education in OECD countries (see section on school choice, above).

Across OECD countries, 15% of students are enrolled in privately managed schools that are either privately or government funded, although in many countries government authorities retain significant control over these schools, including the power to shut down non-performing schools. Enrolment in privately managed schools exceeds 50% of 15-year-old students in the Netherlands, Ireland and Chile, and between 35% and 40% in Australia and Korea. In contrast, in Turkey, Iceland and Norway, more than 98% of students attend schools that are publicly managed (Table IV.3.9 in *PISA 2009 Results Volume IV*).

On average across OECD countries, privately managed schools show a performance advantage of 30 score points on the PISA reading scale (in the United States, that advantage reaches 65 score points). However, once the socio-economic background of students and schools is accounted for, public schools come out with a slight advantage of seven score points, on average across OECD countries (in the United States, public and privately managed schools do not show a difference in performance once the socio-economic background is accounted for).

Selection of students into schools, grades and programmes

While teaching and learning are at the heart of schooling, they are supported by a complex organisation responsible for everything from selecting and admitting students to schools and classrooms, to evaluating their progress, formulating curricula, promoting successful approaches to teaching and learning, creating incentives to motivate students and teachers and deciding on the distribution of financial, material and human resources – all with the aim of providing quality education. This section looks at how school systems are organised to allocate students to programmes, schools and classes.

In the high-performing benchmark countries of this volume, it is the responsibility of schools and teachers to engage constructively with the diversity of student interests, capacities and socio-economic contexts, without having the option of making students repeat the school year or transferring them to educational tracks or school types with lower performance requirements. The data from PISA show that creating homogeneous schools and/or classrooms through selection is unrelated to the average performance of education systems, but clearly associated with larger variation in student achievement and a significantly larger impact of socio-economic background on learning outcomes. In particular, the earlier in the student's career the selection occurs, the greater the impact of socio-economic background on learning outcomes. That suggests that selection tends to reinforce inequities as students from disadvantaged backgrounds tend to be exposed to lower quality learning opportunities when compared to their peers from more advantaged socio-economic backgrounds (Figure IV.2.1 in *PISA 2009 Results Volume IV*).

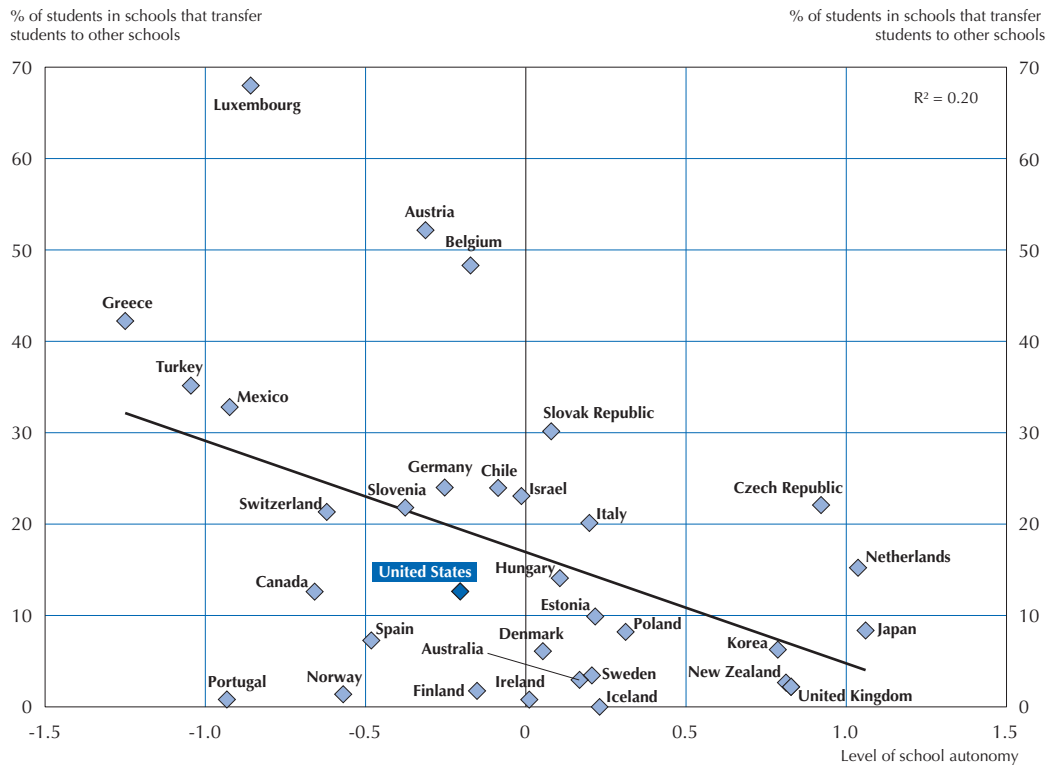
PISA data also show grade repetition to be not only negatively related to equity but also negatively related to the average performance of education systems. That is, school systems with high grade repetition rates tend to also be school systems with lower student performance. Moreover, the more schools group students by ability across all subjects, and the more frequently schools transfer students to other schools because of students' low academic achievement, behavioural problems or special learning needs, the lower the school systems' overall performance, even after accounting for national income. While transferring difficult students out of a school may be advantageous to the school, it seems to relate negatively to the performance of the education system as a whole, and to larger performance differences between schools (Figure IV.2.1a in *PISA 2009 Results Volume IV*). School transfers may hurt student achievement because changing schools implies a loss of social capital inasmuch students have limited access to the resources that are shared in the school they are moving out of and need to recreate support and friendship networks. Furthermore, when transfers are motivated by behavioural problems, low academic achievement and special learning needs, students that are transferred out are more likely to be received by schools with a higher prevalence of similar students. Students that are transferred for these reasons not only pay the cost in terms of lost social capital, but are also less likely to benefit from higher-achieving peers. Also, in systems where transferring students or grade repetition is commonplace, teachers and the school community have an incentive



to evade problems by transferring students, rather than committing effort and resources to solving the underlying problems. They also tend to have more autonomy to adapt the learning environment in their schools (Figure 2.13). Equally important, a higher rate of student transfers also seems to be related to greater socio-economic inequities.


■ Figure 2.13 ■

School systems with low transfer rates tend to give more autonomy to schools to determine curricula and assessments



Note: The level of school autonomy is measured by the index of school responsibility for curriculum and assessment. Positive values indicate greater autonomy.

Source: OECD, *PISA 2009 Database*, Tables IV.3.3a and IV.3.6.

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PISA classifies school systems attended by 15-year-old students into 12 groups according to the policies and practices they adopt concerning differentiation (Figure IV.3.2 in *PISA 2009 Results Volume IV*).¹⁴

Together with 12 other OECD countries, the United States is characterised by relatively low levels of formal differentiation. Students are generally not formally streamed, schools are not selective in their admissions process, and students usually do not repeat grades and few tend to be transferred to other schools. However, there is a high prevalence of informal streaming and tracking within schools in the United States, often starting in the early grades and particularly so in high schools (e.g. Advanced Placement courses, honours courses, etc.), which is not accounted for by this indicator. In addition, as shown above, there is also considerable socio-economic segregation between schools in the United States. And those few schools in the United States that do show high rates of grade repetition or schools transferring students with low performance or behavioural problems tend to perform more poorly and tend to be socio-economically disadvantaged schools (Tables IV.2.2b and IV.2.2c in *PISA 2009 Results Volume IV*).

School systems in six other OECD countries stratify students into different programmes based on students' academic performance, usually before they are 15 years old. Grade repetition is not common in these school systems, nor is horizontal differentiation at the school level. In five other OECD countries, school systems also provide differentiation at the system level. These school systems are characterised by their use of streaming and early selection into these programmes based on students' academic performance, but they generally do not use grade repetition or school-level differentiation.



Countries whose school systems use grade-repetition policies and similar devices to create homogeneous learning environments can be divided into two groups. While both groups make limited use of school-level horizontal differentiation, they differ in the extent to which they use vertical differentiation at the system level. While one system uses vertical differentiation and streaming of students into educational programmes (two OECD countries and three partner countries and economies), the other uses vertical differentiation as the primary and almost only form of selection and distributing students (one OECD country and four partner countries and economies).

In sum, the data suggest that in most of the countries that performed well in PISA, it is the primary responsibility of schools and teachers to engage constructively with the diversity of student interests, capacities and socio-economic contexts, without having the option of making students repeat the school year, or transferring them to educational tracks or school types with lower performance requirements. As shown in the subsequent chapters of this volume, many of the benchmark countries have developed elaborate support systems to foster the motivation of *all* students to become independent and lifelong learners. They tend to train teachers to be better at diagnosing learning difficulties so that they can be addressed through personalised instruction methods. They also help individual teachers to become aware of specific weaknesses in their own practices, which often means not just creating awareness of what they do, but also changing the underlying mindset. In addition, they seek to provide their teachers with an understanding of specific best practices and encourage teachers to make the necessary changes with a variety of incentives that goes well beyond material rewards. As noted above, the personalisation in these countries is provided in flexible learning pathways through the education system, rather than by establishing individualised goals or institutional tracking, which have often been shown to lower performance expectations for students and tend to provide easy ways for teachers and schools to defer, rather than solve, problems.

ASSESSMENT AND ACCOUNTABILITY ARRANGEMENTS

Educational standards

Fifteen-year-olds in the United States usually rate themselves comparatively highly in academic performance in PISA, even if they did not do well comparatively. This may be partly due to culture, but one interpretation is also that students are being commended for work that would not be acceptable in high-performing education systems. One trend across countries over recent years has been efforts to articulate the expectations that societies have in relation to learning outcomes and to translate these expectations into educational goals and standards. The approaches to standard-setting that OECD countries have pursued range from defining broad educational goals to formulating concise performance expectations in well-defined subject areas.

Educational standards have influenced many OECD education systems in various ways, helping them to: establish rigorous, focused and coherent content at all grade levels; reduce overlap in curricula across grades; reduce variation in implemented curricula across classrooms; facilitate co-ordination of various policy drivers, ranging from curricula to teacher training; and reduce inequity in curricula across socio-economic groups. The move by states to establish “common core standards” in the United States is a similar step that could address the current problem of widely discrepant state standards and cut scores that have led to non-comparable results. These discrepancies often mean that a school’s fate depends more than anything else on where it is located and, perhaps even more important, that students across the United States are not equally well prepared to compete in the United States labour market.

Examinations

Setting performance standards has, in turn, led to the establishment of accountability systems. As discussed in the 2009 edition of *OECD’s Education at a Glance* over the past decade, assessments of student performance have become common in many OECD countries – and often the results are widely reported and used in both public and specialised debate. However, the rationale for assessments and the nature of the instruments used vary greatly within and across countries. Methods employed in OECD countries include different forms of external assessment, external evaluation or inspection, and schools’ own quality assurance and self-evaluation efforts. For students, tests may be the motivation needed to work harder. For teachers, student-based standardised assessments can provide information regarding the learning needs of students and may be used to personalise learning opportunities accordingly.

One aspect relating to accountability systems concerns the existence of standards-based external examinations. These are examinations that focus on a specific school subject and assess a major portion of what students who study this subject are expected to know or be able to do. Essentially, they define performance relative to an external standard, not relative to other students in the classroom or school. These examinations usually have a direct impact on students’ education – and even on their futures – and may thus motivate students to invest greater efforts into learning. Other standardised tests, which may be voluntary and implemented by schools, often have only indirect



consequences for students. For teachers, standardised assessments can provide information on students' learning needs and can be used to tailor their instruction accordingly. In some countries, such as Brazil, Hungary, Italy, Malaysia, Mexico, Poland and the Slovak Republic, such tests are also used to determine teachers' salaries or to guide professional development (for data, see the 2009 edition of *Education at a Glance*). At the school level, information from standardised tests can be used to determine the allocation of additional resources, and what interventions are required to establish performance targets and monitor progress.

Across OECD countries, students in school systems that require standards-based external examinations perform, on average, over 16 points higher than those in school systems that do not use such examinations (Figure IV.2.6a in *PISA 2009 Results Volume IV*).

Among OECD countries, in the Czech Republic, Denmark, Estonia, Finland, France, Hungary, Iceland, Ireland, Israel, Italy, Japan, Korea, Luxembourg, the Netherlands, New Zealand, Norway, Poland, the Slovak Republic, Slovenia, Turkey and the United Kingdom, standards-based external examinations exist throughout the systems for students attending secondary school. In Australia, they cover 81% of secondary students, in Canada 51% and in Germany 35%. In Austria, Belgium, Chile, Greece, Mexico, Portugal, Spain, Sweden and Switzerland, such examinations do not exist or exist only in minor parts of the system (Table IV.3.11 in *PISA 2009 Results Volume IV*).

ASSESSMENT POLICIES AND PRACTICES

In PISA 2009, school principals were asked to report the types and frequency of assessments used: standardised tests, teacher-developed tests, teachers' judgemental ratings, student portfolios or student assignments. An average of 76% of students in OECD countries are enrolled in schools that use standardised tests. Standardised tests are relatively uncommon in Slovenia, Belgium, Spain, Austria and Germany, where less than half of students attend schools that use standardised tests for assessments. In contrast, the use of standardised tests is practically universal in Luxembourg, Finland, Korea, the United States, Poland, Denmark, Sweden and Norway, where over 95% of students attend schools that use this assessment at least once a year (Table IV.3.10 in *PISA 2009 Results Volume IV*).

The purposes of assessments vary greatly across countries. At the school level, these assessments can be used by schools to compare themselves to other schools, to monitor progress, or to make decisions about instruction. Some 59% of students across OECD countries are in schools that use achievement data to compare their students' achievement levels with those in other schools or against regional/national benchmarks. This practice is most common in the United States, New Zealand and the United Kingdom, where over 90% of students attend schools that use achievement data for comparative purposes. In Belgium, Japan, Austria, Spain and Greece, less than one-third of students attend schools that use achievement information this way (Table IV.3.12 in *PISA 2009 Results Volume IV*).

It is more common for schools to use achievement information to monitor school progress from year to year: on average across OECD countries, some 77% of students are in schools that do so. In 21 countries, more than 80% of students attend schools that use achievement data this way. Only in Denmark, Luxembourg, Switzerland and Austria do less than 50% of students attend schools that use achievement data to monitor progress.

Data on student achievement can also be used to identify aspects of instruction or the curriculum that could be improved. Across OECD countries, 77% of students are in schools whose principals reported doing so, and over 90% of students in New Zealand, the United States, the United Kingdom, Iceland, Poland, Mexico, Chile, Spain and Israel attend schools whose principals reported using achievement data in this way. Curriculum and instructional assessment using achievement data is less common in Greece and Switzerland, where less than 50% of students attend schools that use achievement data this way.

In contrast to standards-based external examinations, PISA does not show the prevalence of standardised tests to be systematically related to performance (Figure IV.2.6b in *PISA 2009 Results Volume IV*). This may be because, in part, the content and use of standardised tests vary considerably across schools and systems. However, education systems with a higher prevalence of standardised tests tend to show smaller socio-economic inequalities between schools and consequently show a smaller impact of school socio-economic background on performance (Table IV.2.10 in *PISA 2009 Results Volume IV*). The same holds for the use of assessment data to identify aspects of instruction or the curriculum that could be improved and the high proportions of schools where achievement data is tracked over time by administrative authorities.

PISA arranges OECD countries into four groups sharing similar profiles based on two dimensions (Figure 2.14): whether achievement data are used for various benchmarking and information purposes; and whether achievement data are used to make decisions that affect the school. The idea is that school systems that use achievement data for benchmarking and information purposes are more likely to use this data to compare themselves with other schools,



monitor progress across time, have their progress tracked by administrative authorities, make their achievement data public, and provide parents with their child's achievement benchmarked to national or regional populations. School systems that use achievement data for decision making are more likely to use achievement data to determine the allocation of resources, make curricular decisions, and evaluate teachers' performance.

A first group of countries, composed of 16 OECD countries, including the United States, tend to use achievement data for benchmarking and information purposes and also for decisions that affect the school.

Four OECD countries use achievement data for benchmarking and information, but not for decisions affecting the school.

A third group, comprising four OECD countries, uses achievement data for decisions affecting the school, but not for benchmarking and information.

The fourth group, composed of nine OECD countries, is less likely to have schools that use achievement data for either for benchmarking and information or for decision making.

Some of the factors underlying this classification are examined in greater detail below.

■ Figure 2.14 ■

How school systems use student assessments


		Infrequent use of assessment or achievement data for benchmarking and information purposes	Frequent use of assessment or achievement data for benchmarking and information purposes
		Provide comparative information to parents: 32%	Provide comparative information to parents: 64%
		Compare the school with other schools: 38%	Compare the school with other schools: 73%
		Monitor progress over time: 57%	Monitor progress over time: 89%
		Post achievement data publicly: 20%	Post achievement data publicly: 47%
		Have their progress tracked by administrative authorities: 46%	Have their progress tracked by administrative authorities: 79%
Infrequent use of assessment or achievement data for decision making	Make curricular decisions: 60% Allocate resources: 21% Monitor teacher practices: 50%	Austria, Belgium, ¹ Finland, ² Germany, Greece, Ireland, Luxembourg, Netherlands, ¹ Switzerland, ¹ Liechtenstein	Hungary, Norway, ² Turkey, Montenegro, Tunisia, Slovenia
Frequent use of assessment or achievement data for decision making	Making curricular decisions: 88% Allocating resources: 40% Monitor teacher practices: 65%	Denmark, Italy, Japan, ² Spain, Argentina, Macao-China, Chinese Taipei, Uruguay	Australia, ¹ Canada, ² Chile, Czech Republic, Estonia, ² Iceland, ² Israel, Korea, ² Mexico, New Zealand, ¹ Poland, ¹ Portugal, Slovak Republic, Sweden, United Kingdom, United States , Albania, Azerbaijan, Brazil, Bulgaria, Colombia, Croatia, Dubai (UAE), Hong Kong-China, ² Indonesia, Jordan, Kazakhstan, Kyrgyzstan, Latvia, Lithuania, Panama, Peru, Qatar, Romania, Russian Federation, Shanghai-China, ¹ Singapore, ¹ Thailand, Trinidad and Tobago, Serbia

Note: The estimates in the grey cells indicate the average values of the variables used in latent profile analysis in each group. See Annex A5 for technical details.

1. Perform higher than the OECD average in reading.

2. Perform higher than the OECD average in reading and where the relationship between students' socio-economic background and reading performance is weaker than the OECD average.

Source: OECD, PISA 2009 Database.

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Accountability arrangements

While performance data in the United States are often used for punitive accountability purposes, other countries tend to give greater weight to guide intervention, reveal best practices and identify shared problems. Where school performance is systematically assessed, the primary purpose is often not to support contestability of public services or market mechanisms in the allocation of resources; rather it is to reveal best practices and identify common problems in order to encourage teachers and schools to develop more supportive and productive learning environments. To achieve this, many education systems try to develop assessment and accountability systems that include progressive learning targets that explicitly describe the steps that learners follow as they become more proficient, and define what a student should know and be able to do at each level of advancement. The trend among OECD countries here is leading towards multi-layered, coherent assessment systems, from classrooms to schools to regional to national to



international levels, that: support improvement of learning at all levels of the system; are increasingly performance-based; add value for teaching and learning by providing information that can be acted on by students, teachers, and administrators; and are part of a comprehensive and well-aligned learning system that includes syllabi, associated instructional materials, matching exams, professional scoring and teacher training.

PISA 2009 collected data on the nature of accountability systems and the ways in which the resulting information was used and made available to various stakeholders and the public at large (Table IV.3.13 in *PISA 2009 Results Volume IV*). Some school systems make achievement data public to make stakeholders aware of the comparative performance of schools and, where school-choice programmes are available, to make parents aware of the choices available to them. Across OECD countries, an average of 37% of students attend schools that make achievement data available to the public; but in Belgium, Finland, Switzerland, Japan, Austria and Spain, less than 10% of students attend schools that make their data publicly available. In the United States and the United Kingdom, by contrast, more than 80% of students attend schools that make student achievement data publicly available. In seven OECD countries and nine partner countries and economies, schools whose school principals reported that student achievement data are posted publicly perform better than schools whose achievement data is not made publicly available, before accounting for the socio-economic and demographic background of students and schools; however no such relationship is seen in the United States. Moreover, since in most of the countries the schools that post achievement data publicly tend to be socio-economically advantaged schools, this performance advantage is often not observed once socio-economic background is accounted for (Figure IV.2.6b in *PISA 2009 Results Volume IV*).

School-level achievement data is often tracked over time by administrative authorities: across OECD countries, an average of 66% of students attend schools whose achievement data are tracked over time by administrative authorities. In 25 OECD countries, among them the United States, with the highest percentage (96%), more than 50% of students attend schools whose achievement data is so tracked (Table IV.3.13 in *PISA 2009 Results Volume IV*).

Achievement data can also be used to determine how resources are distributed. Across OECD countries, an average of 33% of students attend schools that use achievement data in this way. In Israel, Chile and the United States, more than 70% of students attend schools in which the principals reported that instructional resources are allocated according to the school's achievement data. This practice is least common in Iceland, Greece, Japan, Czech Republic and Finland, where less than 10% of students attend schools whose achievement data are used this way.

Some school systems make achievement data available to parents in the form of report cards and by sending teacher-formulated assessments home. Some school systems also provide information on the students' academic standing compared with other students in the country or region or within the school (Table IV.3.14 in *PISA 2009 Results Volume IV*). Across OECD countries, an average of 52% of students attend schools that use achievement data relative to national or regional benchmarks and/or as a group relative to students in the same grade in other schools; but in 17 countries, over 50% of students attend schools that do not provide any information regarding the academic standing of students in either of these ways. In contrast, in Sweden, the United States, Korea, Chile, Norway and Turkey, more than 80% of students attend schools that provide parents with this information compared with national or regional student populations.

Achievement data from students can also be used to monitor teacher practices, and an average of 59% of students across OECD countries attend schools whose principals reported doing so. Over 80% of students in Poland, Israel, the United Kingdom, Turkey, Mexico, Austria and the United States attend schools whose principals reported using achievement data to monitor teacher practices. Many schools across OECD countries complement this information with qualitative assessments, such as teacher peer reviews, assessments for school principals or senior staff, or observations by inspectors or other persons external to the school. Most schools across OECD countries use either student-derived, direct observations or reviews to monitor teachers, but school principals in Finland rarely use either to monitor teacher practices. Some 18% of students in Finland attend schools that use student assessments to monitor teachers; around 20% of students attend schools that use more qualitative and direct methods to monitor teacher practices; and only 2% of students attend schools that monitor teacher practices using observations of classes by inspectors or other persons external to the school (Table IV.3.15 in *PISA 2009 Results Volume IV*). There has also been a growing trend among OECD countries to use outstanding performance in teaching as criteria for base salary and additional payments awarded to teachers in public institutions. While in 2002 such practices were used in 38% of the 29 countries with available data, in 2008, 45% of countries with available data used such practices (Table D.3.3 in the 2010 edition of OECD's *Education at a Glance*).



RESOURCES

Effective school systems require the right combination of trained and talented personnel, adequate educational resources and facilities, and motivated students ready to learn. But performance on international comparisons cannot simply be tied to money, since only Luxembourg spends more per student than the United States. The results for the United States reflect rather a range of inefficiencies. That point is reinforced by the fact that, in international comparisons of children in primary school (TIMSS and PIRLS), the United States does relatively well by international standards, which, given the country's wealth, is what would be expected. The problem is that as they get older, children make less progress each year than children in the best-performing countries do. As discussed in the section *Equity in access to resources* above, and illustrated, in particular, in the country chapters on Canada, Finland and Shanghai-China, it is noteworthy that spending patterns in many of the world's successful education systems are markedly different from those in the United States. These countries invest money where the challenges are greatest, rather than making the resources that are devoted to schools dependent on the wealth of the local communities in which schools are located, and they put in place incentives and support systems that attract the most talented school teachers into the most difficult classrooms. They have often reformed inherited, traditional and bureaucratic systems of recruiting and training teachers and leaders, of paying and rewarding them and of shaping their incentives, both short-term and long-term.

Research usually shows a weak relationship between educational resources and student performance, with more variation explained by the quality of human resources (*i.e.* teachers and school principals) than by material and financial resources, particularly among industrialised nations. The generally weak relationship between resources and performance observed in past research is also seen in PISA. At the level of the education system, and net of the level of national income, the only type of resource that PISA shows to be correlated with student performance is the level of teachers' salaries relative to national income (Figure IV.2.8 in *PISA 2009 Results Volume IV*). Teachers' salaries are related to class size in that if spending levels are similar, school systems often make trade-offs between smaller classes and higher salaries for teachers. The findings from PISA suggest that systems prioritising higher teacher salaries over smaller classes tend to perform better. The lack of correlation between the level of resources and performance among school systems does not mean that resource levels do not affect performance at all. Rather, it implies that, given the variation in resources observed in PISA, they are unrelated to performance or equity. A school system that lacks teachers, infrastructure and textbooks will almost certainly perform at lower levels; but given that most school systems in PISA appear to satisfy the minimum resource requirements for teaching and learning, the lack of a relationship between many of the resource aspects and both equity and performance may result simply from a lack of sufficient variation among OECD countries.

Many of the high-performing countries share a commitment to professionalised teaching, in ways that imply that teachers are accorded the same status as other highly-regarded professions. The subsequent chapters show that, to achieve this, countries often do four things well: first, they attract the best graduates to become teachers, realising that the quality of an education system cannot exceed the quality of its teachers. For example, the benchmark country, Finland, recruits its teachers from the top 10% of graduates. Second, they develop these teachers into effective instructors, through, for example, coaching classroom practice, moving teacher training into the classroom, developing strong school leaders and enabling teachers to share their knowledge and spread innovation. Singaporean teachers, for example, get 100 hours of fully paid professional development training each year; teachers in Shanghai-China get 240 hours over a five-year period. Third, countries put in place incentives and differentiated support systems to ensure that every child is able to benefit from excellent instruction. The image here is of teachers who use data to evaluate the learning needs of their students, and are constantly expanding their repertoire of pedagogic strategies to address the diversity of students' interests and abilities. Such systems also often adopt innovative approaches to staffing classrooms.

It is also important that, within school systems, much of the relationship between school resources and student performance is closely associated with schools' socio-economic and demographic profiles. This suggests the need for more consideration on how to distribute resources for schools more equitably. Across OECD countries, and considering aspects that relate to class size, instruction time, participation in after-school lessons, availability of extra-curricular activities, and the school principal's perception of teacher shortages and a lack of material resources that adversely affects instruction, only 5% of the variation in student performance is attributable solely to the differences in the educational resources available to schools. In contrast, 18% of the variation in student performance is attributable jointly to spending on education and to socio-economic and demographic background (Figure IV.2.9 and Table IV.2.12a in *PISA 2009 Results Volume IV*). Improving equity will thus require considering the disparities in resources among schools.



In other words, while much of the variation in student performance cannot be predicted solely by levels of resources, resources are closely related to the socio-economic composition of individual schools, such that socio-economically advantaged students attend schools with better resources. Whether and how long students are enrolled in pre-primary education is also an important resource consideration. Many of the inequities that exist within school systems are already present once students enter formal schooling and persist as students' progress through school. Earlier entrance into the school system may reduce educational inequities, since participation is then universal. On average across OECD countries, 72% of today's 15-year-old students reported in PISA that they had attended pre-primary education for more than one year when they were children. Attendance in more than one year of pre-primary education was practically universal in Japan, the Netherlands, Hungary, Belgium, Iceland and France, where over 90% of 15-year-old students reported that they had attended pre-primary school for more than one year. More than 90% of students in 27 OECD countries had attended pre-primary school for at least some time, and 98% or more of students in Japan, Hungary, France and the United States reported having done so. Pre-primary education is rare in Turkey, where less than 30% of 15-year-olds had attended pre-primary school for at least a year. More than one year of pre-primary education is uncommon in Chile, Ireland, Canada and Poland, where less than 50% of students had attended pre-primary school for that length of time (Table IV.3.18 in *PISA 2009 Results Volume IV*).

PISA 2009 results show that, in general, students who had attended pre-primary education perform better in reading at the age of 15 than students who had not (Figure 2.15, Figure II.5.9 and Table II.5.5 in *PISA 2009 Results Volume II*). In 32 OECD countries, students who had attended pre-primary education for more than one year outperformed students who had not attended pre-primary education at all, in many countries by the equivalent of well over a school year. This finding remains unchanged in most countries even after the socio-economic background of students is accounted for. However, across countries, there is considerable variation in the impact of students' attendance in pre-primary education on their 15-year-old reading performance. Among OECD countries, in Israel, Belgium, Italy and France, students who had attended pre-primary education for more than one year perform at least 64 score points higher in reading than students who had not attended pre-primary education, which corresponds to the equivalent of roughly one-and-a-half school years. This was the case even after students' socio-economic background was accounted for. On the other hand, in Estonia, Finland, the United States and Korea, there is no marked difference in reading scores between those students who had attended pre-primary education (for more than one year) and those who hadn't after the socio-economic background of students is accounted for. In the United States, the performance advantage of students who had attended pre-primary education for one year or less is 33 score points on the PISA reading scale – roughly the equivalent of one school year at age 15 – and the advantage of students who had attended pre-primary education for one year or more is 46 score points. However, in the United States, a large part of that advantage is explained by socio-economic characteristics, that is, students from more privileged socio-economic backgrounds tend to take greater advantage of pre-primary education. While these results underline the importance of pre-primary education, international comparisons of children in primary school show that the United States does well by international standards. The problem is that as they get older, these children make less progress each year than children in many other countries. In other words, more pre-primary education can only be part of the solution.

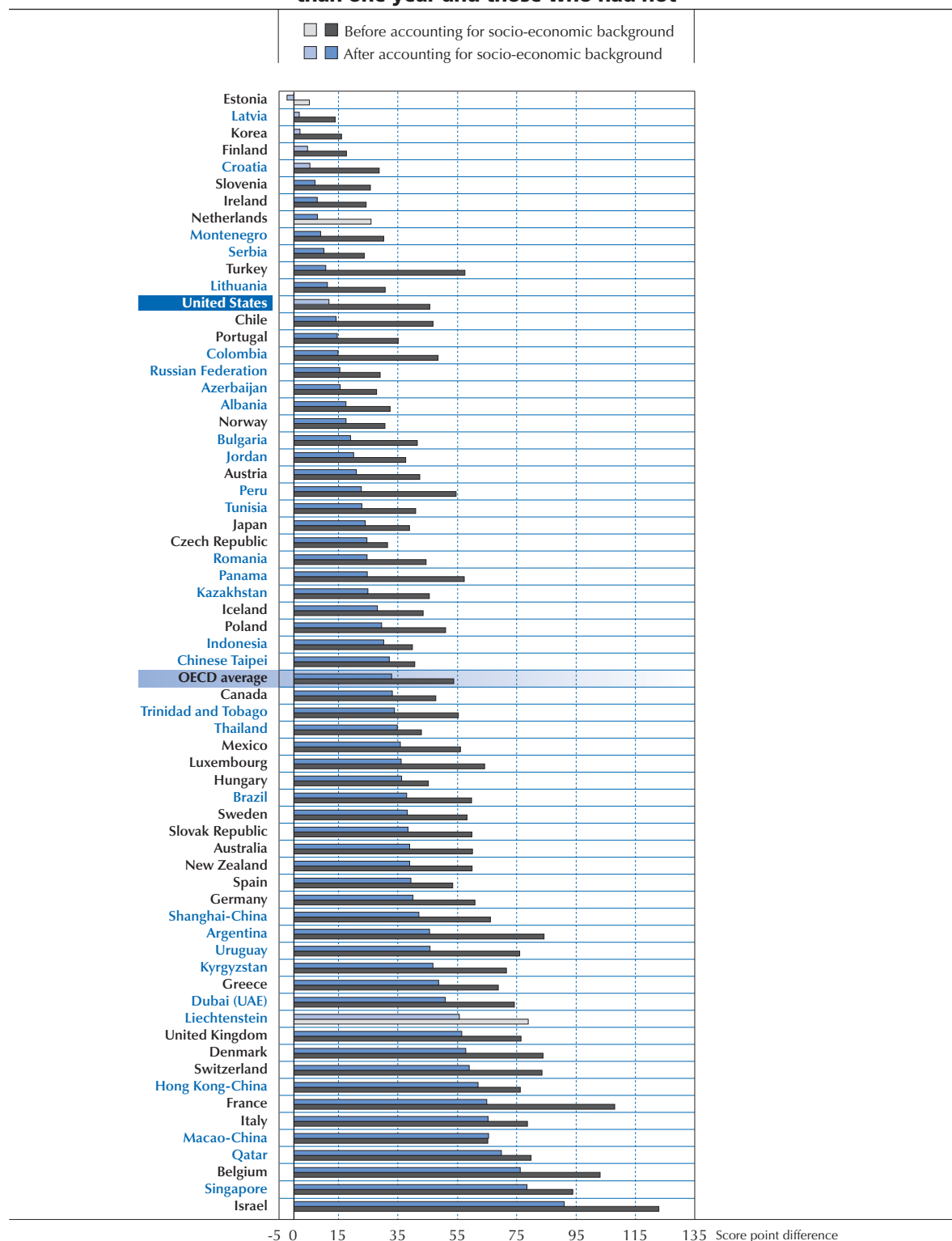
One hypothesis to explain the variability in the impact of pre-primary education on later school performance is the quality of pre-primary education. This hypothesis is supported by the fact that the impact of pre-primary education attendance on performance tends to be greater in education systems with a longer duration of pre-primary education, smaller pupil-to-teacher ratio in pre-primary education, or higher public expenditure per pupil at the pre-primary education level (Table II.5.6 in *PISA 2009 Results Volume II*).

When the impact of pre-primary education attendance on reading performance at age 15 is compared between different socio-economic backgrounds, no significant difference is found between students from socio-economically disadvantaged and advantaged backgrounds (Table II.5.8 in *PISA 2009 Results Volume II*). Socio-economically disadvantaged and advantaged students benefit equally from pre-primary education attendance in 31 OECD countries and 25 partner countries and economies. The United States is the only OECD country where PISA shows evidence that disadvantaged students benefit more from pre-primary education. Part of the difference in the impact of attendance in pre-primary education on the performance of students from different socio-economic backgrounds may be due to the fact that many other factors apart from attendance in pre-primary education (e.g. education in and out of school that students received between the ages of 6 and 15) may influence 15-year-olds' performance.



Figure 2.15

Performance difference between students who had attended pre-primary school for more than one year and those who had not



Note: Score point differences that are statistically significant are marked in a darker tone.

Countries are ranked in ascending order of the score point difference between students who report having attended pre-primary school (ISCED 0) for more than one year and those without pre-primary school attendance after accounting for socio-economic background.

Source: OECD, PISA 2009 Database, Table II.5.5.

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When the impact of pre-primary education on performance at age 15 is compared between students with immigrant backgrounds and native students, a significant difference is found in some countries (Table II.5.9 in *PISA 2009 Results Volume II*). In Finland, Ireland, Canada and the partner country Qatar, the impact of attendance in pre-primary education on performance is greater for immigrant students than for native students.

In countries that spend more public resources on pre-primary education per student, students with immigrant backgrounds tend to benefit more from pre-primary education than native students (Table II.5.10 in *PISA 2009 Results Volume II*). However, other measures of quality of pre-primary education, such as a higher enrolment rate for pre-primary education, a longer duration of pre-primary education, and smaller pupil-to-teacher ratio in pre-primary education are more closely related to the performance advantage observed by PISA.


The following chapters will describe some of the success stories of high-performing and rapidly improving education systems in detail before the concluding chapter lays out possible lessons for the United States.



■ Figure 2.16 ■
Comparing countries' performance in reading

		Statistically significantly above the OECD average
		Not statistically significantly different from the OECD average
		Statistically significantly below the OECD average
Mean	Comparison country	Countries whose mean score is NOT statistically significantly different from that of the comparison country
556	Shanghai-China	
539	Korea	Finland, Hong Kong-China
536	Finland	Korea, Hong Kong-China
533	Hong Kong-China	Korea, Finland
526	Singapore	Canada, New Zealand, Japan
524	Canada	Singapore, New Zealand, Japan
521	New Zealand	Singapore, Canada, Japan, Australia
520	Japan	Singapore, Canada, New Zealand, Australia, Netherlands
515	Australia	New Zealand, Japan, Netherlands
508	Netherlands	Japan, Australia, Belgium, Norway, Estonia, Switzerland, Poland, Iceland, United States, Liechtenstein, Sweden, Germany
506	Belgium	Netherlands, Norway, Estonia, Switzerland, Poland, United States, Liechtenstein
503	Norway	Netherlands, Belgium, Estonia, Switzerland, Poland, Iceland, United States, Liechtenstein, Sweden, Germany, Ireland, France
501	Estonia	Netherlands, Belgium, Norway, Switzerland, Poland, Iceland, United States, Liechtenstein, Sweden, Germany, Ireland, France, Chinese Taipei, Denmark, United Kingdom, Hungary
501	Switzerland	Netherlands, Belgium, Norway, Estonia, Poland, Iceland, United States, Liechtenstein, Sweden, Germany, Ireland, France, Chinese Taipei, Denmark, United Kingdom, Hungary
500	Poland	Netherlands, Belgium, Norway, Estonia, Switzerland, Iceland, United States, Liechtenstein, Sweden, Germany, Ireland, France, Chinese Taipei, Denmark, United Kingdom, Hungary
500	Iceland	Netherlands, Norway, Estonia, Switzerland, Poland, United States, Liechtenstein, Sweden, Germany, Ireland, France, Chinese Taipei, Hungary
500	United States	Netherlands, Belgium, Norway, Estonia, Switzerland, Poland, Iceland, Liechtenstein, Sweden, Germany, Ireland, France, Chinese Taipei, Denmark, United Kingdom, Hungary
499	Liechtenstein	Netherlands, Belgium, Norway, Estonia, Switzerland, Poland, Iceland, United States, Sweden, Germany, Ireland, France, Chinese Taipei, Denmark, United Kingdom, Hungary
497	Sweden	Netherlands, Norway, Estonia, Switzerland, Poland, Iceland, United States, Liechtenstein, Germany, Ireland, France, Chinese Taipei, Denmark, United Kingdom, Hungary, Portugal
497	Germany	Netherlands, Norway, Estonia, Switzerland, Poland, Iceland, United States, Liechtenstein, Sweden, Ireland, France, Chinese Taipei, Denmark, United Kingdom, Hungary
496	Ireland	Norway, Estonia, Switzerland, Poland, Iceland, United States, Liechtenstein, Sweden, Germany, France, Chinese Taipei, Denmark, United Kingdom, Hungary, Portugal
496	France	Norway, Estonia, Switzerland, Poland, Iceland, United States, Liechtenstein, Sweden, Germany, Ireland, Chinese Taipei, Denmark, United Kingdom, Hungary, Portugal
495	Chinese Taipei	Estonia, Switzerland, Poland, Iceland, United States, Liechtenstein, Sweden, Germany, Ireland, France, Denmark, United Kingdom, Hungary, Portugal
495	Denmark	Estonia, Switzerland, Poland, United States, Liechtenstein, Sweden, Germany, Ireland, France, Chinese Taipei, United Kingdom, Hungary, Portugal
494	United Kingdom	Estonia, Switzerland, Poland, United States, Liechtenstein, Sweden, Germany, Ireland, France, Chinese Taipei, Denmark, Hungary, Portugal
494	Hungary	Estonia, Switzerland, Poland, Iceland, United States, Liechtenstein, Sweden, Germany, Ireland, France, Chinese Taipei, Denmark, United Kingdom, Portugal
489	Portugal	Sweden, Ireland, France, Chinese Taipei, Denmark, United Kingdom, Hungary, Macao-China, Italy, Latvia, Slovenia, Greece
487	Macao-China	Portugal, Italy, Latvia, Greece
486	Italy	Portugal, Macao-China, Latvia, Slovenia, Greece, Spain
484	Latvia	Portugal, Macao-China, Italy, Slovenia, Greece, Spain, Czech Republic, Slovak Republic
483	Slovenia	Portugal, Italy, Latvia, Greece, Spain, Czech Republic
483	Greece	Portugal, Macao-China, Italy, Latvia, Slovenia, Spain, Czech Republic, Slovak Republic, Croatia, Israel
481	Spain	Italy, Latvia, Slovenia, Greece, Czech Republic, Slovak Republic, Croatia, Israel
478	Czech Republic	Latvia, Slovenia, Greece, Spain, Slovak Republic, Croatia, Israel, Luxembourg, Austria
477	Slovak Republic	Latvia, Greece, Spain, Czech Republic, Croatia, Israel, Luxembourg, Austria
476	Croatia	Greece, Spain, Czech Republic, Slovak Republic, Israel, Luxembourg, Austria, Lithuania
474	Israel	Greece, Spain, Czech Republic, Slovak Republic, Croatia, Luxembourg, Austria, Lithuania, Turkey
472	Luxembourg	Czech Republic, Slovak Republic, Croatia, Israel, Austria, Lithuania
470	Austria	Czech Republic, Slovak Republic, Croatia, Israel, Luxembourg, Lithuania, Turkey
468	Lithuania	Croatia, Israel, Luxembourg, Austria, Turkey
464	Turkey	Israel, Austria, Lithuania, Dubai (UAE), Russian Federation
459	Dubai (UAE)	Turkey, Russian Federation
459	Russian Federation	Turkey, Dubai (UAE)
449	Chile	Serbia
442	Serbia	Chile, Bulgaria
429	Bulgaria	Serbia, Uruguay, Mexico, Romania, Thailand, Trinidad and Tobago
426	Uruguay	Bulgaria, Mexico, Romania, Thailand
425	Mexico	Bulgaria, Uruguay, Romania, Thailand
424	Romania	Bulgaria, Uruguay, Mexico, Thailand, Trinidad and Tobago
421	Thailand	Bulgaria, Uruguay, Mexico, Romania, Trinidad and Tobago, Colombia
416	Trinidad and Tobago	Bulgaria, Romania, Thailand, Colombia, Brazil
413	Colombia	Thailand, Trinidad and Tobago, Brazil, Montenegro, Jordan
412	Brazil	Trinidad and Tobago, Colombia, Montenegro, Jordan
408	Montenegro	Colombia, Brazil, Jordan, Tunisia, Indonesia, Argentina
405	Jordan	Colombia, Brazil, Montenegro, Tunisia, Indonesia, Argentina
404	Tunisia	Montenegro, Jordan, Indonesia, Argentina
402	Indonesia	Montenegro, Jordan, Tunisia, Argentina
398	Argentina	Montenegro, Jordan, Tunisia, Indonesia, Kazakhstan
390	Kazakhstan	Argentina, Albania
385	Albania	Kazakhstan, Panama
372	Qatar	Panama, Peru
371	Panama	Albania, Qatar, Peru, Azerbaijan
370	Peru	Qatar, Panama, Azerbaijan
362	Azerbaijan	Panama, Peru
314	Kyrgyzstan	

Source: OECD, PISA 2009 Database.

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■ Figure 2.17 ■

Comparing countries' performance in mathematics

	Statistically significantly above the OECD average
	Not statistically significantly different from the OECD average
	Statistically significantly below the OECD average

Mean	Comparison country	Countries whose mean score is NOT statistically significantly different from that of the comparison country
600	Shanghai-China	
562	Singapore	
555	Hong Kong-China	Korea
546	Korea	Hong Kong-China, Chinese Taipei, Finland, Liechtenstein
543	Chinese Taipei	Korea, Finland, Liechtenstein, Switzerland
541	Finland	Korea, Chinese Taipei, Liechtenstein, Switzerland
536	Liechtenstein	Korea, Chinese Taipei, Finland, Switzerland, Japan, Netherlands
534	Switzerland	Chinese Taipei, Finland, Liechtenstein, Japan, Canada, Netherlands
529	Japan	Liechtenstein, Switzerland, Canada, Netherlands, Macao-China
527	Canada	Switzerland, Japan, Netherlands, Macao-China
526	Netherlands	Liechtenstein, Switzerland, Japan, Canada, Macao-China, New Zealand
525	Macao-China	Japan, Canada, Netherlands
519	New Zealand	Netherlands, Belgium, Australia, Germany
515	Belgium	New Zealand, Australia, Germany, Estonia
514	Australia	New Zealand, Belgium, Germany, Estonia
513	Germany	New Zealand, Belgium, Australia, Estonia, Iceland
512	Estonia	Belgium, Australia, Germany, Iceland
507	Iceland	Germany, Estonia, Denmark
503	Denmark	Iceland, Slovenia, Norway, France, Slovak Republic
501	Slovenia	Denmark, Norway, France, Slovak Republic, Austria
498	Norway	Denmark, Slovenia, France, Slovak Republic, Austria, Poland, Sweden, Czech Republic, United Kingdom, Hungary
497	France	Denmark, Slovenia, Norway, Slovak Republic, Austria, Poland, Sweden, Czech Republic, United Kingdom, Hungary
497	Slovak Republic	Denmark, Slovenia, Norway, France, Austria, Poland, Sweden, Czech Republic, United Kingdom, Hungary
496	Austria	Slovenia, Norway, France, Slovak Republic, Poland, Sweden, Czech Republic, United Kingdom, Hungary, United States
495	Poland	Norway, France, Slovak Republic, Austria, Sweden, Czech Republic, United Kingdom, Hungary, Luxembourg, United States, Portugal
494	Sweden	Norway, France, Slovak Republic, Austria, Poland, Czech Republic, United Kingdom, Hungary, Luxembourg, United States, Ireland, Portugal
493	Czech Republic	Norway, France, Slovak Republic, Austria, Poland, Sweden, United Kingdom, Hungary, Luxembourg, United States, Ireland, Portugal
492	United Kingdom	Norway, France, Slovak Republic, Austria, Poland, Sweden, Czech Republic, Hungary, Luxembourg, United States, Ireland, Portugal
490	Hungary	Norway, France, Slovak Republic, Austria, Poland, Sweden, Czech Republic, United Kingdom, Luxembourg, United States, Ireland, Portugal, Spain, Italy, Latvia
489	Luxembourg	Poland, Sweden, Czech Republic, United Kingdom, Hungary, United States, Ireland, Portugal
487	United States	Austria, Poland, Sweden, Czech Republic, United Kingdom, Hungary, Luxembourg, Ireland, Portugal, Spain, Italy, Latvia
487	Ireland	Sweden, Czech Republic, United Kingdom, Hungary, Luxembourg, United States, Portugal, Spain, Italy, Latvia
487	Portugal	Poland, Sweden, Czech Republic, United Kingdom, Hungary, Luxembourg, United States, Ireland, Spain, Italy, Latvia
483	Spain	Hungary, United States, Ireland, Portugal, Italy, Latvia
483	Italy	Hungary, United States, Ireland, Portugal, Spain, Latvia
482	Latvia	Hungary, United States, Ireland, Portugal, Spain, Italy, Lithuania
477	Lithuania	Latvia
468	Russian Federation	Greece, Croatia
466	Greece	Russian Federation, Croatia
460	Croatia	Russian Federation, Greece
453	Dubai (UAE)	Israel, Turkey
447	Israel	Dubai (UAE), Turkey, Serbia
445	Turkey	Dubai (UAE), Israel, Serbia
442	Serbia	Israel, Turkey
431	Azerbaijan	Bulgaria, Romania, Uruguay
428	Bulgaria	Azerbaijan, Romania, Uruguay, Chile, Thailand, Mexico
427	Romania	Azerbaijan, Bulgaria, Uruguay, Chile, Thailand
427	Uruguay	Azerbaijan, Bulgaria, Romania, Chile
421	Chile	Bulgaria, Romania, Uruguay, Thailand, Mexico
419	Thailand	Bulgaria, Romania, Chile, Mexico, Trinidad and Tobago
419	Mexico	Bulgaria, Chile, Thailand
414	Trinidad and Tobago	Thailand
405	Kazakhstan	Montenegro
403	Montenegro	Kazakhstan
388	Argentina	Jordan, Brazil, Colombia, Albania
387	Jordan	Argentina, Brazil, Colombia, Albania
386	Brazil	Argentina, Jordan, Colombia, Albania
381	Colombia	Argentina, Jordan, Brazil, Albania, Indonesia
377	Albania	Argentina, Jordan, Brazil, Colombia, Tunisia, Indonesia
371	Tunisia	Albania, Indonesia, Qatar, Peru, Panama
371	Indonesia	Colombia, Albania, Tunisia, Qatar, Peru, Panama
368	Qatar	Tunisia, Indonesia, Peru, Panama
365	Peru	Tunisia, Indonesia, Qatar, Panama
360	Panama	Tunisia, Indonesia, Qatar, Peru
331	Kyrgyzstan	


Source: OECD, *PISA 2009 Database*.
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■ Figure 2.18 ■
Comparing countries' performance in science

<div> <div></div> Statistically significantly above the OECD average <div></div> Not statistically significantly different from the OECD average <div></div> Statistically significantly below the OECD average </div>		
Mean	Comparison country	Countries whose mean score is NOT statistically significantly different from that comparison country
575	Shanghai-China	
554	Finland	Hong Kong-China
549	Hong Kong-China	Finland
542	Singapore	Japan, Korea
539	Japan	Singapore, Korea, New Zealand
538	Korea	Singapore, Japan, New Zealand
532	New Zealand	Japan, Korea, Canada, Estonia, Australia, Netherlands
529	Canada	New Zealand, Estonia, Australia, Netherlands
528	Estonia	New Zealand, Canada, Australia, Netherlands, Germany, Liechtenstein
527	Australia	New Zealand, Canada, Estonia, Netherlands, Chinese Taipei, Germany, Liechtenstein
522	Netherlands	New Zealand, Canada, Estonia, Australia, Chinese Taipei, Germany, Liechtenstein, Switzerland, United Kingdom, Slovenia
520	Chinese Taipei	Australia, Netherlands, Germany, Liechtenstein, Switzerland, United Kingdom
520	Germany	Estonia, Australia, Netherlands, Chinese Taipei, Liechtenstein, Switzerland, United Kingdom
520	Liechtenstein	Estonia, Australia, Netherlands, Chinese Taipei, Germany, Switzerland, United Kingdom
517	Switzerland	Netherlands, Chinese Taipei, Germany, Liechtenstein, United Kingdom, Slovenia, Macao-China
514	United Kingdom	Netherlands, Chinese Taipei, Germany, Liechtenstein, Switzerland, Slovenia, Macao-China, Poland, Ireland
512	Slovenia	Netherlands, Switzerland, United Kingdom, Macao-China, Poland, Ireland, Belgium
511	Macao-China	Switzerland, United Kingdom, Slovenia, Poland, Ireland, Belgium
508	Poland	United Kingdom, Slovenia, Macao-China, Ireland, Belgium, Hungary, United States
508	Ireland	United Kingdom, Slovenia, Macao-China, Poland, Belgium, Hungary, United States, Czech Republic, Norway
507	Belgium	Slovenia, Macao-China, Poland, Ireland, Hungary, United States, Czech Republic, Norway, France
503	Hungary	Poland, Ireland, Belgium, United States, Czech Republic, Norway, Denmark, France, Sweden, Austria
502	United States	Poland, Ireland, Belgium, Hungary, Czech Republic, Norway, Denmark, France, Iceland, Sweden, Austria, Latvia, Portugal
500	Czech Republic	Ireland, Belgium, Hungary, United States, Norway, Denmark, France, Iceland, Sweden, Austria, Latvia, Portugal
500	Norway	Ireland, Belgium, Hungary, United States, Czech Republic, Denmark, France, Iceland, Sweden, Austria, Latvia, Portugal
499	Denmark	Hungary, United States, Czech Republic, Norway, France, Iceland, Sweden, Austria, Latvia, Portugal
498	France	Belgium, Hungary, United States, Czech Republic, Norway, Denmark, Iceland, Sweden, Austria, Latvia, Portugal, Lithuania, Slovak Republic
496	Iceland	United States, Czech Republic, Norway, Denmark, France, Sweden, Austria, Latvia, Portugal, Lithuania, Slovak Republic
495	Sweden	Hungary, United States, Czech Republic, Norway, Denmark, France, Iceland, Austria, Latvia, Portugal, Lithuania, Slovak Republic, Italy
494	Austria	Hungary, United States, Czech Republic, Norway, Denmark, France, Iceland, Sweden, Latvia, Portugal, Lithuania, Slovak Republic, Italy, Spain, Croatia
494	Latvia	United States, Czech Republic, Norway, Denmark, France, Iceland, Sweden, Austria, Portugal, Lithuania, Slovak Republic, Italy, Spain, Croatia
493	Portugal	United States, Czech Republic, Norway, Denmark, France, Iceland, Sweden, Austria, Latvia, Lithuania, Slovak Republic, Italy, Spain, Croatia
491	Lithuania	France, Iceland, Sweden, Austria, Latvia, Portugal, Slovak Republic, Italy, Spain, Croatia
490	Slovak Republic	France, Iceland, Sweden, Austria, Latvia, Portugal, Lithuania, Italy, Spain, Croatia
489	Italy	Sweden, Austria, Latvia, Portugal, Lithuania, Slovak Republic, Spain, Croatia
488	Spain	Austria, Latvia, Portugal, Lithuania, Slovak Republic, Italy, Croatia, Luxembourg
486	Croatia	Austria, Latvia, Portugal, Lithuania, Slovak Republic, Italy, Spain, Luxembourg, Russian Federation
484	Luxembourg	Spain, Croatia, Russian Federation
478	Russian Federation	Croatia, Luxembourg, Greece
470	Greece	Russian Federation, Dubai (UAE)
466	Dubai (UAE)	Greece
455	Israel	Turkey, Chile
454	Turkey	Israel, Chile
447	Chile	Israel, Turkey, Serbia, Bulgaria
443	Serbia	Chile, Bulgaria
439	Bulgaria	Chile, Serbia, Romania, Uruguay
428	Romania	Bulgaria, Uruguay, Thailand
427	Uruguay	Bulgaria, Romania, Thailand
425	Thailand	Romania, Uruguay
416	Mexico	Jordan
415	Jordan	Mexico, Trinidad and Tobago
410	Trinidad and Tobago	Jordan, Brazil
405	Brazil	Trinidad and Tobago, Colombia, Montenegro, Argentina, Tunisia, Kazakhstan
402	Colombia	Brazil, Montenegro, Argentina, Tunisia, Kazakhstan
401	Montenegro	Brazil, Colombia, Argentina, Tunisia, Kazakhstan
401	Argentina	Brazil, Colombia, Montenegro, Tunisia, Kazakhstan, Albania
401	Tunisia	Brazil, Colombia, Montenegro, Argentina, Kazakhstan
400	Kazakhstan	Brazil, Colombia, Montenegro, Argentina, Tunisia, Albania
391	Albania	Argentina, Kazakhstan, Indonesia
383	Indonesia	Albania, Qatar, Panama, Azerbaijan
379	Qatar	Indonesia, Panama
376	Panama	Indonesia, Qatar, Azerbaijan, Peru
373	Azerbaijan	Indonesia, Panama, Peru
369	Peru	Panama, Azerbaijan
330	Kyrgyzstan	


Source: OECD, PISA 2009 Database.

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■ Figure 2.19 ■
United States: Profile data

Language(s)	American English
Population	304 228 300 ¹⁵
Youth population	20.2% ¹⁶ (OECD average 18.7%)
Elderly population	12.7% ¹⁷ (OECD average 14.4%)
Growth rate	0.95% ¹⁸ (OECD 0.68%) ¹⁹
Foreign-born population	13.6% ²⁰ (OECD average 12.9%)
GDP per capita	USD 47 495 ²¹ (OECD average 33 732) ²²
Economy-origin of GDP	Services: 30.8%; Other: 28.2%; Finance, insurance and real estate: 18.2%; Government and government enterprises: 13%; Manufacturing: 9.7% ²³
Unemployment/youth unemployment	5.8% (2008) ²⁴ (OECD average 6.1%) ²⁵ 12.8% (OECD average 13.8%) ²⁶
Expenditure on education	5.3% of GDP; (OECD average 5.2%) 3.7% on primary, secondary and post-secondary non-tertiary 1.2% on tertiary ²⁷ education ²⁸ (OECD average 3.5%; 1.2% respectively) 14.1% of total public expenditure (OECD average 13.3%) 9.9% on primary, secondary and post-secondary non-tertiary 3.3% on tertiary education ²⁹ (OECD average 9%; 3.1% respectively)
Enrolment ratio, early childhood education	46.9% ³⁰ (OECD average 71.5%) ³¹
Enrolment ratio, primary education	98.6% ³² (OECD average 98.8%) ³³
Enrolment ratio, secondary education	80.8% ³⁴ (OECD average 81.5%) ³⁵
Enrolment ratio, tertiary education	23.2% ³⁶ (OECD average 24.9%) ³⁷
Students in primary education, by type of institution or mode of enrolment³⁸	Public: 90.3% (OECD average 89.6%) Government-dependent private: no data ³⁹ (OECD average 8.1%) Independent, private: 9.7% (OECD average 2.9%)
Students in lower secondary education, by type of institution or mode of enrolment⁴⁰	Public: 91.1% (OECD average 83.2%) Government-dependent private: no data ⁴¹ (OECD average 10.9%) Independent, private: 8.9% (OECD average 3.5%)
Students in upper secondary education, by type of institution or mode of enrolment⁴²	Public: 91.4% (OECD avg 82%) Government-dependent private: no data ⁴³ (OECD average 13.6%) Independent, private: 8.6% (OECD average 5.5%)
Students in tertiary education, by type of institution or mode of enrolment⁴⁴	Tertiary type B education: Public: 81.1% Government-dependent private: no data ⁴⁵ Independent-private: 18.9% (OECD average Public: 61.8% Government-dependent private: 19.2% Independent-private: 16.6%) Tertiary type A education: Public: 71.7% Government-dependent private: no data ⁴⁶ Independent-private: 28.3% (OECD average Public: 77.1% Government-dependent private: 9.6% Independent-private: 15%)
Teachers' salaries	Average annual starting salary in lower secondary education: USD 35 915 (OECD average USD 30 750) ⁴⁷ Ratio of salary in lower secondary education after 15 years of experience to GDP per capita: 94 ⁴⁸ (OECD average: 1.22) ⁴⁹
Upper secondary graduation rates	77% (OECD average 80%) ⁵⁰

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- OECD (2010c), *Employment Outlook*, OECD Publishing.
- OECD (2010d), *Education at a Glance 2010*, OECD Publishing.
- OECD (2010e), *Pathways to Success*, OECD Publishing.
- OECD (2010f), *PISA 2009 Results, Volume I-V*, OECD Publishing.

Notes

1. Though rank 14 is the best estimate, due to sampling and measurement error the rank could be between 8 and 19.
2. Though rank 17 is the best estimate, due to sampling and measurement error the rank could be between 13 and 22.
3. Though rank 23 is the best estimate, due to sampling and measurement error the rank could be between 21 and 29.
4. Twenty-six per cent of US students in socio-economically disadvantaged schools performed at or above the average performance in Finland. Disadvantaged schools are defined as schools for which the *PISA index of economic, social and cultural status* is below the average of the United States, which is equal to -.0634 index points.
5. All figures shown in purchasing power parities.
6. This is measured by the *PISA index of economic, social and cultural status* of students. The index has an average of 0 and a standard deviation of 1 for OECD countries. The index value for the most disadvantaged quarter of students is -1.05 for the United States and -1.14 for the OECD average. The index value for the entire student population is 0.17 for the United States and 0.00 for the OECD average.
7. No such data are available for the United States.
8. Among the students in socio-economically disadvantaged schools, 2% of American students are in schools that compare with the average school in Finland.
9. Twenty-six per cent of US students in socio-economically disadvantaged schools performed at or above the average performance in Finland. Disadvantaged schools are defined as schools for which the *PISA index of economic, social and cultural status* is below the average of the United States, which is equal to -.0634 index points.
10. Students in the United States attending schools located in a city with between 100 000 and 1 000 000 inhabitants performed, on average, at 504 score points, students attending schools in towns with between 15 000 and 100 000 inhabitants reached 506 score points, and students attending schools located in a small town with between 3 000 and 15 000 inhabitants reached 502 score points.
11. Resilient students are those who come from a socio-economically disadvantaged background and perform much higher than would be predicted by their background. To identify these students, first, the relationship between performance and socio-economic background across all students participating in the PISA 2009 assessment is established. Then the actual performance of each disadvantaged student is compared with the performance predicted by the average relationship among students from similar socio-economic backgrounds across countries. This difference is defined as the student's residual performance. A disadvantaged student is classified as resilient if his or her residual performance is found to be among the top quarter of students' residual performance from all countries.
12. In the United States, one unit of the *PISA index of student-teacher relationship* is positively associated with 14.9 score points on the PISA reading scale (Table IV.4.1).
13. An average proportion of school principals in the United States report that a number of student-related factors hinder learning "to some extent" or "a lot."
14. Vertical differentiation refers to the ways in which students progress through the education systems as they become older. Even though the student population is differentiated into grade levels in practically all schools in PISA, in some countries, all 15-year-old students attend the same grade level, while in other countries they are dispersed throughout various grade levels as a result of policies governing the age of entrance into the school system and/or grade repetition. Horizontal differentiation refers to differences in instruction within a grade or education level. Horizontal differentiation, which can be applied by the education system or by individual schools, groups students according to their interests and/or performance. At the system level, horizontal differentiation can be applied by schools that select students on the basis of their academic records, by offering specific programmes (vocational or academic, for example), and by setting the age at which students are admitted into these programmes. Individual schools can apply horizontal differentiation by grouping students according to ability or transferring students out of the school because of low performance, behavioural problems or special needs.



15. OECD (2010a), *OECD Factbook 2010*, OECD Paris.
16. OECD (2010a), *OECD Factbook 2010*, OECD Paris. Ratio of population aged less than 15 to the total population (data from 2008).
17. OECD (2010a), *OECD Factbook 2010*, OECD Paris. Ratio of population aged 65 and older to the total population, (data from 2008).
18. OECD (2010a), *OECD Factbook 2010*, OECD Paris. Annual population growth rate (data from 2007).
19. OECD (2010a), *OECD Factbook 2010*, OECD Paris. Annual population growth in percentage, OECD total, (data from 2007).
20. OECD (2010a), *OECD Factbook 2010*, OECD Paris. Foreign-born population as per cent of the total population, (data from 2007).
21. OECD (2010b), *OECD Economic Surveys: United States 2010*, OECD Publishing. Data from 2009.
22. OECD (2010a), *OECD Factbook 2010*, OECD Paris, Current prices and PPPs (data from 2008).
23. OECD (2010b), *OECD Economic Surveys: United States 2010*, OECD Publishing. Origin of national income in 2009 (per cent of national income).
24. OECD (2010a), *OECD Factbook 2010*, OECD Paris. Total unemployment rates as percentage of total labour force (data from 2008).
25. OECD (2010a), *OECD Factbook 2010*, OECD Paris. Total unemployment rates as percentage of total labour force (data from 2008).
26. OECD (2010c), *Employment Outlook*, OECD Publishing. Unemployed as a percentage of the labour force in the age group: youth aged 15-24 (data from 2008).
27. The OECD follows standard international conventions in using the term “tertiary education” to refer to all post-secondary programmes at ISCED levels 5B, 5A and 6, regardless of the institutions in which they are offered. OECD (2008), *Tertiary Education for the Knowledge Society: Volume 1*, OECD Publishing.
28. OECD (2010d), *Education at a Glance 2010*, OECD Publishing. Public expenditure presented in this table includes public subsidies to households for living costs (scholarships and grants to students/households and students loans), which are not spent on educational institutions (data from 2006).
29. OECD (2010d), *Education at a Glance 2010*, OECD Publishing. Public expenditure presented in this table includes public subsidies to households for living costs (scholarships and grants to students/households and students loans), which are not spent on educational institutions (data from 2006).
30. OECD (2010d), *Education at a Glance 2010*, OECD Publishing. Net enrolment rates of ages 4 and under as a percentage of the population aged 3 to 4 (data from 2008).
31. OECD (2010d), *Education at a Glance 2010*, OECD Publishing. OECD average net enrolment rates of ages 4 and under as a percentage of the population aged 3 to 4 (data from 2008).
32. OECD (2010d), *Education at a Glance 2010*, OECD Publishing. Net enrolment rates of ages 5 to 14 as a percentage of the population aged 5 to 14 (data from 2008).
33. OECD (2010d), *Education at a Glance 2010*, OECD Publishing. OECD average net enrolment rates of ages 5 to 14 as a percentage of the population aged 5 to 14 (data from 2008).
34. OECD (2010d), *Education at a Glance 2010*, OECD Publishing. Net enrolment rates of ages 15 to 19 as a percentage of the population aged 15 to 19 (data from 2008).
35. OECD (2010d), *Education at a Glance 2010*, OECD Publishing. OECD average net enrolment rates of ages 15 to 19 as a percentage of the population aged 15 to 19 (data from 2008).
36. OECD (2010d), Net enrolment rates of ages 20 to 29 as a percentage of the population aged 20 to 29 (data from 2008). This figure includes all 20-29 year olds, including those in employment, etc. The Gross Enrolment Ratio (GER), measured by the United Nations as the number of actual students enrolled/number of potential students enrolled, is generally higher. The GER for tertiary education in the US in 2008 is 83% (www.WorldBank.org).
37. OECD (2010d), *Education at a Glance 2010*, OECD Publishing. OECD average net enrolment rates of ages 20 to 29 as a percentage of the population aged 20 to 29 (data from 2008).
38. OECD (2010d), *Education at a Glance 2010*, OECD Publishing. Data from 2008.
39. Data is not applicable because category does not apply.
40. OECD (2010d), *Education at a Glance 2010*, OECD Publishing. Data from 2008.
41. Data is not applicable because category does not apply.
42. OECD (2010d), *Education at a Glance 2010*, OECD Publishing. Data from 2008.
43. Data is not applicable because category does not apply.
44. OECD (2010d), *Education at a Glance 2010*, OECD Publishing. Data from 2008.



45. Data is not applicable because category does not apply.

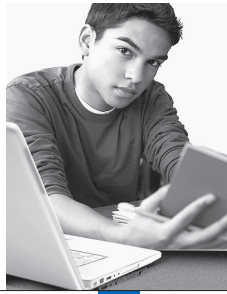
46. Data is not applicable because category does not apply.

47. OECD (2010d), *Education at a Glance 2010*, OECD Publishing. Starting salary/minimum training in USD adjusted for PPP (data from 2008).

48. OECD (2010d), *Education at a Glance 2010*, OECD Publishing. Data from 2008.

49. OECD (2010d), *Education at a Glance 2010*, OECD Publishing. Data from 2008.

50. OECD (2010d), *Education at a Glance 2010*, OECD Publishing. Sum of upper secondary graduation rates for a single year of age (year of reference for OECD average: 2008).



3

Ontario, Canada: Reform to Support High Achievement in a Diverse Context

Since 2000, Canada has become a world leader in its sustained strategy of professionally-driven reform of its education system. Not only do its students perform well, they perform well despite their socio-economic status, first language or whether they are native Canadians or recent immigrants. Canada has achieved success within a highly federated system, which features significant diversity, particularly with respect to issues of language and country of origin. This chapter takes an in-depth look at Canada's success, taking the case study of the nation's largest province, Ontario.

It shows how consistent application of centrally-driven pressure for higher results, combined with extensive capacity building and a climate of relative trust and mutual respect, have enabled the Ontario system to achieve progress on key indicators, while maintaining labour peace and morale throughout the system.




INTRODUCTION

Canada is a relative latecomer to the top of the international rankings. Unlike Japan and Korea, it was not a clear leader in international assessments in the 1980s and 1990s, and it was only after the release of the PISA rankings in 2000 that Canada found itself a leader of the pack (Table 3.1). These results have been confirmed in subsequent PISA tests, which have revealed that Canada has both strong average results as well as less dispersion among its high and low socio-economic status (SES) students than many other nations (OECD, 2010).

Understanding the factors behind this strong performance is not easy for two reasons. First, Canadian education is governed at the provincial level; the federal role is limited, and sometimes non-existent. Thus each of the 10 provinces and 3 territories has its own history, governance structure and educational strategy. Second, because Canada is a newcomer to educational success, there has not yet been the array of visitors, scholars, and other interested observers who could generate the kind of secondary literature which tells a story of Canadian success as a whole. Given those limitations, this report tries to balance breadth and depth by describing the features of the system and the relatively little that is known about the reasons for the success of Canadian education as a whole, coupled with an in-depth look at the recent educational strategy of the nation's largest province, Ontario.

Table 3.1 Canada's mean scores on reading, mathematics and science scales in PISA

	PISA 2000	PISA 2003	PISA 2006	PISA 2009
	Mean score	Mean score	Mean score	Mean score
Reading	534	528	527	524
Mathematics		532	527	527
Science			534	529

Source: OECD (2010), *PISA 2009 Results: What Students Know and Can Do: Student Performance in Reading, Mathematics and Science (Volume I)*, OECD Publishing.
 StatLink  <http://dx.doi.org/10.1787/888932366655>

This report aims to spur further investigations into the work of additional provinces, which would allow for a more definitive assessment of the reasons for Canadian success in future years. This question is especially important because Canada has achieved success within a highly federated system, which features significant diversity, particularly with respect to issues of language and country of origin. Given that many of the other PISA leaders are relatively small and culturally homogenous countries, Canada could provide a model of how to achieve educational success in a large, geographically dispersed, and culturally heterogeneous country.

THE CANADIAN EDUCATION SYSTEM

As mentioned above, the most striking feature of the Canadian system is its decentralisation. It is the only country in the developed world that has no federal office or department of education. Education is the responsibility of its 10 provinces and 3 territories. Four of those provinces hold approximately 80% of Canada's 5 million students: Ontario (2 million), Quebec (1 million), British Columbia (610 000) and Alberta (530 000).

Responsibility within the provinces is divided between the central provincial government and more locally-elected school boards. The provincial government is responsible for setting the curriculum, determining many major policies for schools and providing the majority, if not all, of the funding for schools (funding patterns vary slightly across provinces). The minister of education is chosen by the premier from elected members of the provincial legislature, and becomes a member of the ruling party's cabinet. The deputy minister is a civil servant, who carries much of the operational responsibility for the workings of the department. Tensions can exist between the civil servants in the province's Department of Education, who generally by training and inclination are sympathetic to the views of educators, and elected officials who may have a broader reform agenda.

Local school boards are elected. They employ staff and appoint principals and senior administrators. They also set annual budgets and make decisions on some programmes. Over time, the number of districts has shrunk considerably through consolidation processes. In Alberta, for example, there were historically more than 5 000 districts, which by the end of the 20th century had been consolidated to less than 70. There is no interim level of administration between the provinces and districts in Canada – provinces and districts work directly with one another on province-wide initiatives.



Teachers are unionised in Canada, and the unit of collective bargaining varies across provinces – some bargain at the local level, some at the provincial level, and some are mixed. Teacher training takes place in universities, although the standards for certification have traditionally been set by the provinces. In 1987, British Columbia was the first to make its teachers self-governing, granting to the British Columbia College of Teachers exclusive responsibility for governing entry, discipline, and professional development of teachers. In 1996, Ontario followed suit, creating an Ontario College of Teachers which governs similar functions; on its 31 member governing council sit 17 teachers elected by the College, and 14 members appointed by the Ontario Minister of Education. In both cases, more traditional issues, such as wages, continue to fall under collective bargaining and are separate from the work of these self-regulating bodies.

The Canadian system is also internationally distinctive for its efforts to balance respect for diversity of language and religious affiliation with province-wide educational goals. For religion, Section 93 of the Constitution Act 1867 sought to protect parents' rights to send their children to Protestant and Catholic schools, subject to provincial control over funding and teachers, but using public funding. This structure means that these schools and school boards in Canada are within the public system and under partial control of the Ministry of Education, not in the private sector. These schools were named "separate schools" in Canada West and "dissentient" schools in Canada East. There is variation across provinces in exactly how these arrangements have evolved; in some provinces – like Alberta, Ontario and Saskatchewan – separate public and dissentient schools exist; in others, like Manitoba and British Columbia, parents seeking a Catholic or Protestant education have to send their children to private schools, though even these often receive some degree of public funding.

While initial struggles in Canada were around religious differences, in more recent years language has shown greater salience. Section 23 of the Canadian Charter of Rights and Freedoms protects parents who speak a minority language (English or French), gives their children the right to receive primary and secondary instruction in their native language, and allows for the establishment of "minority language educational facilities," if sufficient numbers warrant it. There has been some controversy over how many students speaking a minority language are required to invoke this right; in Quebec it has generally been interpreted to mean only one, whereas in Nova Scotia one judge felt that 50 students were too few to justify the creation of a French school. Courts have also had to adjudicate what it means to have "minority language educational facilities", with some seeing that as requiring only separate francophone programmes within existing schools, whereas others judge it necessary to create separate francophone schools. The overall consequences of the protection of both language and religious rights is that in some provinces, such as Ontario, as many as four separate systems of public schools can exist within one province (English, English Catholic, French, French Catholic).

Students in Canada are grouped by ability in ways that are very similar to the United States' system. Elementary school-aged children are often placed in ability groups within heterogeneous classrooms. Students in secondary schools are placed into tracks or streams, based on perceived ability levels. Most high schools have tracks such as general, advanced, vocational, or university entrance. These practices have faced criticism for not sufficiently challenging students in the lower tracks, but sorting by perceived ability persists.

The thumbnail history of Canadian educational reform in the post-war period shares much in common with the United States and the rest of the industrialised world. Strong economic growth in the 1950s and 1960s, combined with increasing demand for schooling, led to rapidly increasing spending on schooling between 1950 and 1970, with much of the energy focused on school construction and teacher hiring. Because of the increased demand for teachers, teacher wages rose considerably over this period. Schools and teachers were given more autonomy over what to teach, and the inspection functions of provincial ministries were delimited or eliminated. At the same time, provinces were taking increasing financial responsibility for schooling: in 1950, localities paid 64% of the costs compared to 36% from the provinces, and by 1970 the ratio had largely reversed, with provinces paying 60% and localities 40%. By 1997, eight out of the ten provinces had taken total responsibility for funding. The structure of the Canadian education system is lean and uniform, as shown in Figure 3.1.

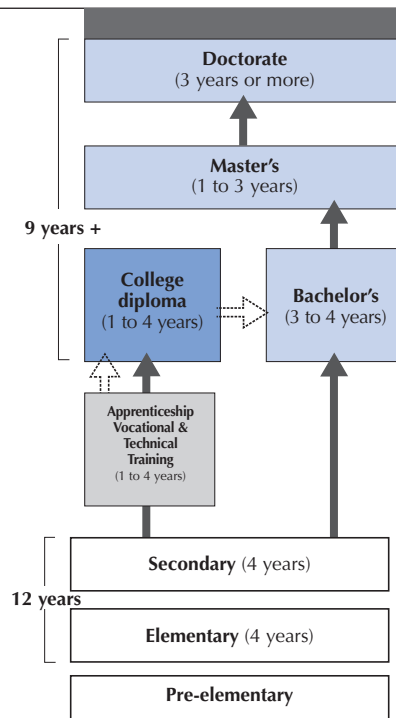
The post-war boom of the 1950s and 1960s gave way to hard economic times in the 1970s, and the final three decades of the 20th century saw Canadian education seeking a way to cut costs while increasing educational outcomes. Globalisation and the arrival of the knowledge economy increased the importance of schooling as a matter of economic competitiveness. A neoliberal emphasis on efficiency pervaded the system, and support for greater choice, growing support for private schools, and increased state accountability became the order of the day.



While all four leading provinces increased the role of centralised testing and curriculum planning in the 1980s and 1990s, some of these efforts combined greater centralised accountability with more school-level control, under a “tight-loose” philosophy of school improvement.¹ The emphasis on testing in Canada was extensive compared to most European systems, but not nearly as prominent as in the United States.

■ Figure 3.1 ■

Canada's education system organisation



The first decade of the 21st century has seen a set of educational reforms which emphasise the centralised standards and assessments which also characterised the earlier reforms of the 1980s and 1990s. However, the new reforms include a strong effort to try to build capacity among teachers, and to generate teacher buy-in to the improvement strategy. While the earlier strategy of testing grew out of an increasing scepticism about the quality of education and a more general distrust of government, the new strategy seeks to address this distrust as a core problem and aims to generate a virtuous cycle of greater performance leading to higher levels of trust, which in turn generate more energy for continued improvement. This strategy is described in some detail below, taking the case of Ontario. But first we discuss the factors behind Canada's general successful educational performance, and especially its success at educating and integrating its immigrant children.

CANADIAN SUCCESS IN EDUCATION

When asked to explain Canada's strong nationwide PISA results, several Canadian officials and informed observers could only offer informed hunches, given the absence of any meaningful national government role in education. These hunches fell generally into three categories: Canadian culture; the Canadian welfare state; and three policy-specific factors (teacher selectivity, equalised funding, and provincial curricula).

Cultural factors

In terms of culture, observers note that parents in Canada are generally supportive of their children's education and can be seen as an asset to the schools. Comparative PISA data on the leisure reading habits of Canadian students suggest that Canadian students are more likely than any other children in the world to read daily for pleasure (Tibbetts, 2007). While culture is notoriously diffuse and difficult to measure, further exploration of its potential influence seems warranted because it could help to explain the similarity of results across provinces that differ in their educational strategies.



The welfare state

Despite its provincial educational structure, Canada does have a strong national welfare state, which was born of the crisis spurred by the Great Depression and which continued to grow in the 1960s. Observers suggest that this has had two important educational consequences. First, children and their parents have access to national health insurance, and adults are protected from the vicissitudes of capitalism by a strong social safety net. While child poverty rates in Canada are fairly high by international standards (Canada had the 7th highest child poverty rate of 23 countries measured), variation across provinces in child poverty rates are correlated with PISA outcomes (e.g. Alberta has the lowest rate at 11.2% and the highest PISA scores).

Second, the idea of a welfare state and a common good is much more firmly entrenched in Canada than in its more individualistic neighbour to the south (the US). The idea that health care and other social services are a right and not a privilege carries over into education, where there is a broadly-shared norm that society is collectively responsible for the educational welfare of all of its children. The combination of this norm with the protection afforded by the welfare state creates a climate in which school success is expected for all students. As Harvard Professor Richard Elmore, who has worked for years with Canadian schools, said during interviews for this report:

While the structure and artefacts of the Canadian system look about the same as the American one (professional learning communities, resource rooms for data driven instruction), the culture in which this work takes place is entirely different. Canadian teachers feel that the state has done its part by delivering the students to the schools ready to learn, and that they, in turn, have a deeply-felt obligation and responsibility to ensure that the students do indeed get educated. (Interview conducted for this report)

Policy factors

In terms of policy, despite the lack of a national co-ordinating body, a number of respondents suggest that the provinces are quite similar in some of their key policies. The reason given was what scholars in other contexts have called “isomorphism”, or the desire to acquire legitimacy by becoming similar to other organisations. Canada possesses a Council of Ministers of Education (CMEC), which is the forum through which the ministers of education in the respective provinces can meet for co-ordination purposes. While this body was consistently described as limited in its impact, because it acted only when all of the ministers agreed (infrequently), it does fulfil an important information-sharing function and enables good ideas and practices to spread across provincial lines.

Neil Guppy, a professor of sociology at the University of British Columbia and author of a textbook on Canadian education, put it this way during an interview for this report:

My own take is that autonomy is overblown – many of the textbooks used by the provinces are identical, our teacher education programs are very similar, the arrangements of schooling (kindergarten, elementary, middle, high) are very similar, unionisation is similar, school administration personnel shuffle between provinces with little problem, etc. To my knowledge all universities treat student grades from each province as substitutable even though we do not have SAT or national exams. Imitation from, and monitoring of, other jurisdictions is high. In most English-speaking provinces you are likely to find as much variation between rural and urban as you are province to province. (Interview conducted for this report)

Three common policy factors (in addition to the welfare state and cultural reasons) were highlighted as potentially important to pan-Canadian educational success:

- The establishment of province-wide curricula. These are developed by the respective ministries of education through a process of extensive consultation with groups of teachers and subject matter experts. In some provinces these curricula are fairly detailed, whereas in others they serve more as guidelines of what should be learned and when. While there is wide variation in the degree to which these curricula actually penetrate classroom practices, they do provide basic guidance as to what should be learned by which students at what ages. In recent years, some of the smaller provinces in the west have moved towards co-ordinating these efforts to establish greater uniformity across provinces, similar to consortia of states in the United States working together towards Common Core standards. Recent PISA results have shown that Alberta is the highest-scoring province, and the Alberta Ministry ascribes this success in part to the quality of its curriculum.
- The high degree of selectivity in choosing teachers. The 2007 McKinsey report on leading PISA countries emphasised that one factor which differentiated PISA leaders from those further down the chart was the degree to which teacher education programmes were able to draw their students from the top end of the talent pool (Barber and Mourshed 2007). Ben Levin, former deputy minister in Ontario and a widely cited scholar on Canadian education, said that Canadian applicants to teachers colleges are in the “top 30%” of their college cohorts.



One Canadian teacher interviewed explained that it was difficult to get into a teachers' college in Canada, although, as he pointed out, "everyone knew that there was a loophole – you could always cross the border to the United States. Anyone can get credentialed there." The education within these teacher training institutions is seen by some to be of high quality; Levin estimates there are perhaps 50 institutions in all of Canada, as opposed to hundreds across the United States, which allows for greater monitoring of training quality. Other respondents agreed that teacher selectivity was high, but were more sceptical of the quality of the training institutions.

- **Equalised funding.** Because funding has shifted entirely or almost entirely to the province level, the provinces are able to provide funding to offset the greater neediness of some of their students. Funding from the provinces to districts is generally split into three categories: block grants based on number of students; categorical grants which are either used to fund particular programmatic needs (e.g. special education) or to help districts meet specific challenges in providing basic services (e.g. more remote districts need more funds for transportation); and equalisation funding, which is used in the districts that retain some local funding to equalise the poorer districts.

These factors represent the views of a small sample of Canadian officials and observers (see interviewee list at end of chapter) about how they understand their own success. However, there is clearly more research and analysis needed. There are many countries and states/provinces elsewhere that have centralised curricula without yielding these kinds of results. There is also an extensive literature debating the importance of funding, which broadly suggests that money can help, but that it all depends on how it is spent. The teacher selectivity argument carries more weight because it is one of the few factors that more generally differentiates PISA leaders from the rest. In general, the major features of the Canadian system don't look that different from many other systems that do much less well on the PISA, and thus it is particularly difficult to know the sources of Canada's success.

Similar structures can actually house very different types of work depending on the culture in which they are situated. Curriculum, funding and teacher talent are resources that provinces and schools can draw upon to create high quality schooling if they are inclined towards collaboration and are willing to take internal collective responsibility for student outcomes. One example of such practice in Ontario will be explored below. Before getting to that, however, it is important to address one unique element in Canada's performance: its education of immigrant children.

CANADIAN SUCCESS EDUCATING IMMIGRANT CHILDREN

One of the most striking things about the Canadian results is their success with immigrant children. By some estimates, Canada has the highest rates of immigration per capita in the world. It is a country of which former prime minister William Lyon MacKenzie King once famously said, "If some countries have too much history, we have too much geography," referring to the way in which Canada is a relatively young nation comprising travellers from all over the world. Canada takes in about 250 000 immigrants per year (in a country of approximately 34 million inhabitants). Given the size of the land area, the relative low density population and low birth rates, immigrants are seen in Canada as an important and needed resource. All of the major political parties currently support either sustaining or increasing rates of immigration; there is no popular support for restricting immigration.

Patterns of immigration have shifted over time. Until the 1970s, the majority of immigrants came from Europe; over the past 40 years, most have come from Asia and the developing world. In 2007, the leading source countries of Canadian immigrants were China and India (about 28 000 each), the Philippines (20 000), and Pakistan (10 000). Smaller groups of immigrants come from Algeria, Colombia, France, Iran, Romania, Russia, South Korea, Sri Lanka, the United Kingdom and the United States, each of whom sends more than 3 500 immigrants per year.² In total, these patterns of immigration mean that there are 40 000 newcomers to public schools each year; 80% of these students are non-English speaking, and 90% will go to school in Montreal, Toronto or Vancouver.

Immigration in Canada is organised into three classes – refugee populations (22 000 in 2008), family class sponsorships (65 000), and workers imported to fill a gap in the Canadian economy (150 000).³ The fact that 60% of immigrants are selected on the basis of their ability to make an economic contribution creates a highly educated immigrant class. In total, 23% of Canadian workers in 2008 were born abroad, as were 49% of doctorate holders and 40% of those with masters' degrees.

PISA results suggest that within three years of arrival in Canada, immigrants score an average of 500 on the PISA exam, which is remarkably strong by international standards. For comparison's sake, in the 2006 PISA assessment of reading, Canadian first generation immigrants scored an average of 520 points, as opposed to less than 490 in the United States and less than 430 in France. Canada is also one of very few countries where there is no gap between



its immigrant and native students on the PISA. (By contrast in the United States the gap in reading is 22 points, and in France and Germany it is around 60 points). Second generation Canadians perform significantly better than first generation Canadians, suggesting that the pattern is of progress by all students over time. Finally, Canada is one of the few countries where there is no difference in performance between students who do not speak the language of instruction at home and those who do.

Why has Canada done so well at educating its immigrant students? Interviewees' responses can be grouped around three factors. First and most importantly, because the majority of immigrants are selected on the basis of their ability to contribute economically, many immigrant children have highly-educated parents. A 2006 OECD report found that, on average, first generation Canadian students had parents with as many or more years of education as native-born parents. These advantages in terms of parental education and socio-economic status also translated into school resources; in the same study, Canada was one of only a few countries in which immigrant students had access to equal or greater resources than native-born students. Specifically, student/teacher ratios, physical infrastructure, classroom climate, and teacher morale were on average higher for the immigrant students sampled than for native students (OECD, 2006).

Second, Canadian multiculturalism provides a distinct philosophy that seeks to both respect the importance of native cultures while also incorporating immigrants into a distinctively Canadian identity. In practice, this has meant that immigrant students are for the most part placed into classes with native students in English and French; native language instruction primarily takes place in non-profit organisations and other work outside of schools.

Third, in some of the provinces that have had the largest influx of immigrants, an explicit policy has sought to support the success of these students. In British Columbia, for example, students participate in the regular curriculum, but the ministry provides funds for additional language support if a series of criteria are met. These include: *i*) evidence that the student lacks proficiency and will not reach it without additional support; *ii*) an annual instruction plan is prepared that meets the needs of the student; *iii*) a teaching specialist participates in the creation and review of the plan; *iv*) the school must provide pull-out and in-class support for the student, as well as support and training for the affected teachers.

All in all, Canada has a positive and reinforcing cycle when it comes to immigration and educating immigrant students. It is an attractive destination for immigrants, and immigrants are welcomed as part of both a cultural commitment and as an economic necessity. The majority of immigrants who come to the country are selected to fill economic needs. This means that they are not seen as a threat or as competing for jobs and increases the political support for their continued arrival. Immigrant students as a group have much the same advantages in terms of parental education and socio-economic status as native-born students, and they attend schools that by all measures are relatively equal. Philosophically, they are welcomed as part of Canada's commitment to multiculturalism, and some programmes are in place to supplement students' learning of English and French, although the emphasis is largely on immersion. Overall, this combination of factors creates a fairly welcoming environment for relatively advantaged immigrants, and as we have seen, they correspondingly fare extremely well by international standards.

THE ONTARIO EXPERIENCE

Education system and context for reform

From 2003 to 2010, Ontario was a world leader in its sustained strategy of professionally-driven reform of its education system. Initiated by Premier Dalton McGuinty following his election in 2003, the Ontario strategy has achieved widespread positive results in increasing elementary literacy and numeracy, improving graduation rates, and reducing the number of low-performing schools. The constellation of elements that came together to allow this strategy to succeed is described below.

Ontario is the largest province in Canada, with an area of 400 000 square miles, and a population of approximately 13 million, or 40% of all Canadians. It is a highly urbanised province, with 80% of students located in metropolitan areas. In terms of diversity, 27% of Ontario students were born outside of Canada and 20% are visible minorities. Toronto, the main city in Ontario, is one of the most diverse cities in the world.

The oversight of education in the province of Ontario is divided between the Ontario Ministry of Education, covering school-level education, and the Ministry of Training, Colleges and Universities, covering vocational and higher education.



For school-level education there are four sets of locally-elected school boards in Ontario, meeting Canada's constitutional requirements for public support of minority languages and religious minorities (Levin, 2008):

- 31 English school boards serve about 1.4 million students;
- 29 English catholic school boards serve about 590 000 students;
- 8 French catholic boards have 70 000 students; and
- 4 French public boards have 23 000 students.

This means that any given area of the province will be served by four boards, introducing some degree of choice into the system. There are about 5 000 schools in the public system; there is no public funding for private schools.

There were two major initiatives pursued by the Ontario Ministry of Education over this time period:

- The Literacy and Numeracy initiative: to increase reading and mathematics outcomes in elementary schools. Through a deep capacity-building strategy (described below), this initiative has succeeded in raising the average pass rate in provincial exams from roughly 55% (2003) to roughly 70% (2010) in reading, mathematics and writing in grade 3. Similar gains of about 10-12 percentage points are apparent in the same subjects in grade six.
- The Student Success initiative: to increase the high school graduation rate to 85%. The background to this programme was that the road to dropping out of high school starts early; by tracking students who have failed one or more courses in 9th grade, it is possible to identify potential dropouts early. By funding a "student success officer" in each school, and creating programmes of "credit recovery" through which students could make up the parts of courses that they failed, the graduation rate has increased from 68% to 79%.

Ontario benefits from a set of background conditions that helped to facilitate much of its success. Politically, the McGuinty Liberal premiership benefitted from following a conservative government that was extremely unpopular with teachers and others working in the sector. The conservative government is generally credited with having created a province-wide curriculum and instituted an accompanying assessment and accountability framework, but it alienated the education community in the process by cutting funding, reducing professional development time by half, running television ads demonising teachers, and increasing support for private schools. During this period 55 000 students left the public system, and polls suggested that more than 15% of public school parents were actively considering private school options. There were several teacher strikes, including a two-week work stoppage protesting government legislation in 1997. Morale was extremely low and the relationship between the government and teachers was highly acrimonious. Union leader Rhonda Kimberly Young, former President of the Ontario Secondary School Teachers Federation, had this to say when interviewed for this report about the years before McGuinty government took over:

Then we got the conservatives and they came in on what they called a "Common Sense Revolution" which implied that there was going to be a miracle. They could lower everybody's taxes. They could cut waste. They could do more with less – better quality services at lower cost. Unfortunately, they were able to sell this idea to the voters. When they took office Mike Harris was the premier and the first education minister that he appointed was a high school dropout. We saw that as fairly indicative of their approach to education. [That they were not] going to be looking at pedagogy, research and those sorts of things but rather were coming in with a hammer...and they did. In 1998 we had a province wide walkout – it was a political protest. (Interview conducted for this report)

In this highly polarised environment the Liberal party made an early decision to make education the central issue in the next provincial election. As opposition leader, McGuinty made a major policy speech in 2001 committing the party to a quite specific set of reforms, including class size reductions, should they be elected. This speech was followed up by the development of a very detailed education platform with 65 policy proposals. By the time the Liberals took office in 2003 they believed they had a strong reform mandate.

McGuinty's first Education Minister, Gerard Kennedy, came in with a running start, for he had been the opposition party's education "critic," *i.e.* shadow minister. In his own words, he came into office unusually well-prepared:

During my time as critic I visited lots of schools and school boards all across the province. I spent a lot of time in lunchrooms with teachers, in meetings after school with parent groups, and I sat down with student councils whenever I had the opportunity. I met with every key stakeholder group not only to build relationships but to engage them in the development of our policy agenda. I must have met with 6,000 people during that period.



We needed to create a new political consensus on education. The current level of politicisation of the system was taking a huge toll on public confidence. In the preceding eight years of Conservative government hundreds and hundreds of hours of school had been lost to strikes and lockouts, and this level of disruption was at the core of public discontent with the system. We felt we had to change that dynamic if we were going to have any chance of successfully moving our reform agenda. We needed to re-establish trust between the government and the profession, and between school boards and teachers. (Interview conducted for this report)

In addition to Minister Kennedy's leadership role, the McGuinty government benefitted from the advice and leadership of a deeply knowledgeable and experienced school reformer, Michael Fullan, a University of Toronto expert who had written widely and lectured around the world on school reform. He became McGuinty's special advisor on education, and helped recruit Ben Levin, another deeply knowledgeable academic and practitioner, to come into the government as Kennedy's Deputy Minister. All of these figures shared a relatively similar vision of capacity-building system change, which helped to anchor and sustain the reforms in the years that followed. McGuinty himself also visited England to learn about somewhat similar British reforms, and the Ontario strategy drew upon the British strategy with some important modifications (described below).

Financially, funding in Ontario had shifted in 1997 so that 100% of school funding came from the province. Thus while the system does have multiple levels, province-wide funding increased the leverage of the ministry.

Leadership, goals and capacity for improvement

The literature and interviewees are all clear that the sustained leadership of Premier McGuinty has been fundamental to the success of the reforms. McGuinty ran on a platform of becoming the education premier, and through his election and re-election in 2007, he has kept a sustained focus on educational improvement. McGuinty was personally involved in the reforms, and has met repeatedly with key educational stakeholders over the course of his premiership to emphasise the importance of the reforms. Michael Fullan, who was the architect of the strategy and an advisor to the premier, said of McGuinty during interviews for this report:

The Premier is key, obviously. If Premier McGuinty had left it would have been a different story. I said to him in the first term, when you get re-elected.... [don't] lose the plot, fail to keep the sustainability and focus on it. And the week after he got re-elected, he said to me, 'Not only am I not going to lose the plot, I'm going to intensify it, become even more committed and more confident and more impatient. (Interview conducted for this report)

In contrast to the kind of "spinning wheels" which often doom school reform efforts as systems lurch from leader to leader, or to situations where education falls off the leadership's agenda after an initial bout of enthusiasm, McGuinty has maintained an active, sustained, personal and consistent focus on education over the past seven years. Deputy Minister Costante, who took office in 2009, recalls receiving a call from Premier McGuinty on the day he took office with the following message:

Don't get distracted. There will be a lot of people asking you to do all sorts of nice things out there, some of which may be perfectly good but will not add to our student achievement agenda. I want you to keep focused on the student achievement agenda. (Interview conducted for this report)

And just in case the new deputy thought he might have an opportunity to coast on the achievements of the past several years, McGuinty has tasked Costante with developing and implementing a new full-day kindergarten programme for four and five-year-olds in 600 schools by September 2010.

From the beginning, Ontario's theory of change centred on the fact that school systems are easily distracted and drawn into many questions and controversies that have little or no relationship to improving student learning and educational attainment. They also believed that creating systemic change across several layers of government and 5 000 schools would require a very limited number of goals that would serve as a focus for coherent effort. McGuinty had made two central commitments that guided the work of the ministry: increasing literacy and numeracy in elementary schools, and increasing the high school graduation rate. They also set ambitious, but hopefully not unrealistic, long-term quantitative targets for each of these goals: to improve the provincial passing rate in literacy and numeracy from 55% to 75%, and to increase the high school graduation rate from 68% to 85%.

To achieve these goals, they had a seemingly simple, but actually quite complex theory of action. This work was informed by a careful analysis of the failings of previous initiatives. Most top-down initiatives, they concluded, were



unable to achieve deep and lasting changes in practice because: *i)* the reforms were focused on things that were too distant from the instructional core of teaching and learning; *ii)* the reforms assumed that teachers would know how to do things they actually didn't know how to do; *iii)* too many conflicting reforms asked teachers to do too many things simultaneously; and *iv)* teachers and schools did not buy in to the reform strategy. To achieve sustained change, then, would require:

- Strategies directly focused on improving the act of teaching.
- Careful and detailed attention to implementation, along with opportunities for teachers to practice new ideas and learn from their colleagues.
- A single integrated strategy and one set of expectations for both teachers and students.
- Support from teachers for the reforms.

Both province and district policies would need to be crafted with all of these goals in mind.

Of all of these points, the last one (gaining teacher support) was perhaps most important to the new strategy. To improve skills across 5 000 schools would require a continuous and sustained effort by hundreds of thousands of teachers to try to improve their practice. This, they thought, could only happen if teachers were “onside” (to use their word).

To this end, the ministry drew a sharp contrast between its capacity-building approach to reform and the more punitive versions of accountability used in the United States, and, to a lesser extent, in Britain.⁴ They chose to downplay the public reporting of results, and they emphasised that struggling schools would receive additional support and outside expertise rather than be punished or closed.

It is clear that the ministry acted extremely skilfully politically to win over teachers, schools, and unions to their vision of reform. A key move was the appointment of Gerard Kennedy as Deputy Minister. He was a vigorous critic of the previous administration and widely seen as someone who supported public education and was sensitive to the needs of teachers. He met quarterly with the major teachers' unions, superintendents' organisations, and principal associations to discuss ongoing reform strategies. The ministry also created the Ontario Education Partnership Table where a wider range of stakeholders could meet with ministry officials two to four times a year. This led to Working Tables, where smaller groups of stakeholders worked in more detail on particular issues.

Very important to these efforts was the signing of a four-year collective bargaining agreement with the four major teachers' unions in 2005, covering 2004 to 2008. In this agreement, the ministry was able to negotiate several items that were consistent both with their educational strategy and with the unions' interests. Specifically, McGuinty had pledged to reduce class size in elementary schools, which created 5 000 new jobs. The ministry and the union also both wanted 200 minutes of weekly preparation time for all elementary school teachers; this created 2 000 new positions in music, arts, physical education and languages. The agreement also provided money for the hiring of a student success position, full or part-time, in each school. This agreement thus both pushed forward the educational agenda and created a sustained period of labour peace which allowed for a continued focus on educational improvement. In 2008, a second four-year agreement was signed.

To achieve these results, the ministry created a well thought-out implementation strategy. To implement the literacy and numeracy initiatives, they created a new 100-person secretariat responsible for building the capacity and expertise to do the work. This was separate from the ministry, and thus was able to start fresh without the usual bureaucratic obstacles. They also required that teams be created in each district and each school in order to lead the work on literacy and numeracy. By so doing, they paired external expertise with sustained internal time and leadership to push the initiative. Avis Glaze, who was responsible for leading the Literacy and Numeracy Secretariat, said during interviews for this report that the effort succeed in part because of its field base:

We recruited a new team of people who had deep experience in the field – teachers, principals, subject matter specialists – people who were deeply respected by teachers and schools, and were not seen primarily as representatives of the department. This mini-organisation was largely based in the field – we had 6 regional teams plus one French language team, each of 6-8 people. This means that the majority of the people in the Secretariat were actively working in the field, building relationships with schools, principals and teachers, rather than in the home office back at the Ministry. (Interview conducted for this report)



They also tried to ensure that reform was really a two-way street, rather than simply something imposed from above. As Michael Fullan describes it, one of the lessons learned from the British model was to avoid mandating from the top:

Michael Barber in the English strategy eventually called their strategy “informed prescription”. So the idea of informed prescription was that you do your homework at the centre, you get informed and then you pretty much prescribe the curriculum and the instructional methods and use of time, including such things as the literacy hour. By contrast, when we set up our secretariat, we said to the field, to our 72 districts, don’t worry, we are not going to come up with informed prescription and start advocating particular usages. Rather, what we are going to do is join in partnership with you in the field, the sector, and identify good practices and consolidate those and spread them. They might eventually come to have a certain kind of status that comes close to being non-negotiable, but we are not in the business at the centre of telling you what to do. We are in the business of jointly co-discovering it, so that’s what we did and that’s how we did it. (Interview conducted for this report)

The government pursued a different strategy for the Student Success initiative in high schools. Rather than sending out a team from the ministry, they gave the districts money to hire a “Student Success leader” to co-ordinate efforts in their district. The ministry also gave money for the district leaders to meet and share strategies. Again each high school was given support to hire a provincially-funded Student Success teacher and was required to create a Student Success team to identify students showing early indicators of academic struggles and design appropriate interventions.

An important element in the development of the Student Success strategy was the creation of a new programme in high schools called the High Skills Major. This aimed to take high school students who were not engaged by the traditional academic curriculum and give them a different menu of courses. While earlier approaches in this vein have justifiably been accused of tracking working class students away from higher end jobs, by working with prospective employers, the High Skill Major programme created more hands-on courses to give students practical skills to lead to employment opportunities. More than 20 000 students are now enrolled in 740 High Skill Major programmes in 430 schools.

The ministry also had a clear theory of comparative advantage in terms of who should do what during the reforms. The role of the ministry was to set clear expectations and targets, to provide funding, to create a working collective bargaining agreement that would support improved teaching and learning, to provide external expertise, and to provide support for struggling schools. The role of the district was to align its personnel and hiring policies with the overall strategy, and to support the schools as they went through continuous processes of learning. However, much of the real action necessarily had to happen in the schools, where teachers worked in communities to think about practical problems and to learn from one another. While the mission and pressure came from the top, there was a clear recognition that it was at the school level in which change had to happen, and that the role of other actors in the system was to support the learning and change occurring in the schools.

Economic and sociological theories of action: Motivation, trust and respect versus punishment and competition

The Ontario strategy differs from a number of other reform efforts, particularly in the United States, in its lack of punitive accountability, performance pay, and competition among schools. Very broadly speaking, the architects of the reforms seem to take more of a “*homo sociologicus*” than a “*homo economicus*” view of reform. The architects of the reforms drew upon organisational theorists like Peter Drucker and Edwards Deming rather than economists. From this viewpoint, the problem was more to do with lack of knowledge than lack of will, and the key to motivation was not individual economic calculations but rather the chance to be part of successful and improving schools and organisations. This meant that the key ideas were less about “hard” concepts like accountability and incentives and more about “softer” ideas like culture, leadership and shared purpose. The key challenge was to create layers of organisations directed towards systemic improvement. There is also little emphasis in the Ontario strategy on “getting better people”; instead the idea is to work with what you have and upgrade their skills. In all of these respects, the Ontario model challenges more market-based theories of reform.

The Ontario strategy is perhaps the world’s leading example of professionally-driven system change. Through consistent application of centrally-driven pressure for higher results, combined with extensive capacity building, in a climate of relative trust and mutual respect, the Ontario system was able to achieve progress on key indicators, while maintaining labour peace and morale throughout the system.



LESSONS FROM ONTARIO

▪ Commitment to education and to children

The strong cultural commitment to education seems to be an important underlying national value that helps explain Canada's overall strong performance despite the absence of a national governmental role in education. The commitment to the welfare of children, as expressed in Canada's strong social safety net, helps explain why Canada's achievement gaps, while still worrisome, are nowhere near as profound as those in the United States.

▪ Cultural support for universal high achievement

The extraordinary performance of Canada's immigrant children is largely a reflection of the high expectations immigrant families have for their children, and of the fact that those high expectations seem by and large to be held by educators as well. Because Canada has historically seen its immigrants as crucial assets for the continuing development of the country, and because its immigration policies reflect those values, schools see it as their role to integrate children into the mainstream culture as rapidly as possible. If anything, the value placed on high achievement for immigrant children seems to have positive spill over effects for expectations for native-born children, rather than *vice versa*.

▪ System coherence and alignment

This is one of the big lessons from Ontario's reforms. Although some observers complained about the sheer number of initiatives launched by the McGuinty government over the years, it is apparent that the Ontario reform designers worked hard to develop and implement a systemic response to the problems and challenges they inherited. An important, often underestimated barrier to achieving system coherence is the lack of a shared understanding among key stakeholders about how key governmental leaders see the problems of the system and what lies behind the policies and programmes they have designed in response. The McGuinty government worked tirelessly to build a sense of shared understanding and common purpose among key stakeholder groups, and consequently their two major systemic initiatives – the Literacy and Numeracy Secretariat and the Student Success strategy – enjoyed broad public understanding and support.

▪ Teacher and principal quality

Ontario's reforms rested heavily on the confidence the government had in the quality of the province's teaching force. The decision by the Literacy and Numeracy Secretariat not to follow England's "informed prescription" model, but instead to put seed money into the field to encourage local experimentation and innovation, sent a strong signal that teacher-generated solutions to weaknesses in reading and mathematics performance were likely to be more successful than solutions imposed from above. The fact that teaching has historically been a respected profession in Canada, and continues to draw its candidates from the top third of secondary school graduates, meant that the government had a solid basis for believing that its trust would pay off. Given the "teacher-bashing" engaged in by the previous government, this show of trust in the competence and professionalism of the teaching force was an essential ingredient in repairing the rupture that had developed between the profession and the government.

Ontario has paid special attention to leadership development, especially for school principals. In 2008 the government initiated the Ontario Leadership Strategy that spells out the skills, knowledge and attributes of effective leaders. Among the elements of the strategy are a strong mentoring programme that has now reached over 4 500 principals and vice-principals, and a new province-wide appraisal programme for school leaders.

▪ A single capable centre with authority and legitimacy to act

The Ontario story is very much one of strong central leadership coupled with a major investment in capacity-building and trust-building in the field. The combination of skilled, sustained political leadership from the Premier and a succession of capable ministers, and very strong professional leadership from the Deputy Education Minister account for a big part of Ontario's success. While the initial decision to create the Literacy and Numeracy Secretariat outside the bureaucracy suggests that the political leadership did not have confidence that the ministry could carry out such an ambitious, high-profile initiative, one of the Deputy Education Minister's key goals was to make the department more attentive and responsive to the field. By all accounts he and his successors have made progress in that regard.

▪ Professional accountability

Ontario has managed to balance administrative and professional accountability in an admirable fashion. The McGuinty government made no attempt to dismantle or weaken the assessment regime put in place by the previous



government, and it has consistently communicated the message to the field and the public that results matter, as defined by performance on the provincial assessments. However, its response to weak performance has consistently been intervention and support, not blame and punishment. One of its major successes in the early years was to reduce dramatically the number of low-performing schools, not by threatening to close them (as often happens in the US), but by flooding the schools with technical assistance and support. The underlying assumption of Ontario's leaders seems to be that teachers are professionals who are trying to do the right thing, and that performance problems are much more likely to be a product of lack of knowledge than lack of motivation. Consequently, teachers seem to take more responsibility for performance than is often the case in countries with a more punitive approach to external accountability.

WHERE IS CANADA ON THE EDUCATIONAL CONTINUUM?

Canada is an interesting case. It is more reliant than many advanced industrial countries on commodities and agricultural production. Yet it can certainly be counted among the most advanced of the industrial nations, especially its four most populous provinces. Though it has more natural resources than most industrial countries, it confounds predictions in its firm conviction that high education levels for everyone are essential to its economic future. In that sense it looks very like Finland and Singapore (Chapters 5 and 7), despite a very different economic profile.

Similarly, Canada fits the education profile of a country that is counting on its human resources for its prosperity. It recruits its teachers from the top third of the cohort. It seems, at least from the example of Ontario, to have struck a nice balance between a top-down and bottom-up approach to reform. It has clearly moved as far as any other nation towards trusting its teachers and treating them like professionals. While schools have a fair amount of discretion, they operate within a clear provincial framework of standards, assessments and accountability. In some ways the system is quite traditionally organised. Students are tracked by ability, and yet there seems to be a strong focus on students most at-risk of failure, as evidenced especially by the Student Success Initiative. In that sense, Canada has adopted the view that its future cannot be assured unless all students are performing at high levels and it has specific policies designed to assure that outcome. Canada's post-secondary enrolment rates are now among the highest in the OECD community (Annex 3.A), a clear reflection of the growing public realisation that education beyond high school will be increasingly essential in a knowledge-based economy.

FINAL OBSERVATIONS

Canada demonstrates, rather surprisingly, that success can be achieved without a national strategy. This observation runs counter to the instincts of many of those who sit in policy seats and seek to effect change, but the fact is that Canada has achieved success on PISA across its provinces despite a limited to non-existent federal role. The best explanation for this is that different jurisdictions will tend to blend in with one another. The power of ideas and the possibilities of diffusion can therefore be sufficient to generate good practice. Ironically, some Canadian leaders, including Gerard Kennedy, are now trying to mount a more national strategy, arguing that education is too important to be left entirely to the provinces.


A second observation is that too often in education policy discussions the choices are frequently framed as reform *versus* the *status quo*. The implicit idea is that there are two sides: external reformers who are pushing for progress; and existing forces – primarily teachers, administrators and unions – who are resistant. The Canadian experience suggests a more complex analysis, in which teachers are a crucial constituency who can be enlisted in a broad reform agenda. Ironically, the more they perceive the state as the hammer, the more likely they are to entrench themselves into a unionised rather than a professional association. The Ontario experience suggests instead that by treating teachers as professionals, and including them at the table, they were able to build considerable goodwill – a critical resource for long-term and sustainable change. This is not to imply that the government was naïve – it was quite aware of the standard discussion points of union negotiations, but the government was able to direct that energy towards win-win issues like providing more professional development time. Ultimately, the Ontario government created a sustainable strategy and a clear push for improved performance in a way that included teachers, rather than alienated them.



■ Figure 3.2 ■
Canada: Profile data

Language(s)	English and French ⁵
Population	32 934 166 (2007) ⁶ (12th largest in OECD) 13 210 667 (Ontario) ⁷
Youth population	16.7% ⁸ (OECD average 18.7%)
Elderly population	13.6% ⁹ (OECD average 14.4%)
Growth rate	1 ¹⁰ (OECD 0.68%) ¹¹
Foreign-born population	20% ¹² (OECD average 12.9%)
GDP per capita	USD 38 975 ¹³ (OECD average 33 732) ¹⁴
Economy-Origin of GDP	Other: 66.4%; Manufacturing: 15.8%; Construction: 6.3%; Public Administration: 5.6%; Mining and quarrying: 3.6%; Agriculture: 2.3% ¹⁵
Unemployment	6.1% (2008) ¹⁶ (OECD average 6.1%) ¹⁷
Youth unemployment	11.6% (2008) (OECD average 13.8%) ¹⁸
Expenditure on education	4.9% of GDP (OECD average 5.2%) 3.1% on primary, secondary and post-secondary non-tertiary 1.8% on tertiary ¹⁹ education ²⁰ (OECD average 3.5%; 1.2% respectively) 12.3% of total government expenditure (OECD average 13.3%) 7.8% on primary, secondary and post-secondary non-tertiary 4.5% on tertiary education ²¹ (OECD average 9%; 3.1% respectively)
Enrolment rate, early childhood education	70.5% ²² (OECD average 71.5%) ²³
Enrolment rate, primary education	106.2% ²⁴ (OECD average 98.8%) ²⁵
Enrolment rate, secondary education	80.2% ²⁶ (OECD average 81.5%) ²⁷
Enrolment rate, tertiary education	25.4%* ²⁸ (OECD average 24.9%) ²⁹
Students in primary education, by type of institution or mode of enrolment ³⁰	Public* (OECD average 89.6%) Government-dependent private* (OECD average 8.1%) Independent, private* (OECD average 2.9%)
Students in lower secondary education, by type of institution or mode of enrolment ³¹	Public 94.2% (OECD average 83.2%) Government-dependent private (included in "public" figure) (OECD average 10.9%) Independent, private (included in "public" figure) (OECD average 3.5%)
Students in upper secondary education, by type of institution or mode of enrolment ³²	Public: 94.2% (OECD average 82%) Government-dependent private (included in "public" figure) (OECD average 13.6%) Independent, private (included in "public" figure) (OECD average 5.5%)
Students in tertiary education, by type of institution or mode of enrolment ³³	Tertiary type B education: missing data ³⁴ (OECD average Public: 61.8% Government-dependent private: 19.2% Independent-private: 16.6%) Tertiary type A education: missing data ³⁵ (OECD average Public: 77.1% Government-dependent private: 9.6% Independent-private: 15%)
Teachers' salaries	Average annual starting salary in lower secondary education: missing data* (OECD average USD 30 750) ³⁶ Ratio of salary in lower secondary education after 15 years of experience to GDP per capita: missing data (OECD average: 1.22)
Upper secondary graduation rates	76% (OECD average 80%) ³⁷

*Data on institutional breakdown and Canadian teachers' salaries missing from *Education at a Glance 2010* (OECD, 2010).

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Notes

1. "Tight-loose" refers to a theory of management where the central unit is "tight" or specific and uncompromising on the ends it seeks, but "loose" or flexible on the means that those closer to the ground take to achieving those ends.
2. Statistics Canada, "Report on the Demographic Situation of Canada," Table A-4,1, accessed online at www.statcan.gc.ca/pub/91-209-x/2004000/part1/t/ta4-1-eng.htm.
3. Statistics Canada, "Facts and Figures 2008: Immigration Overview," accessed online at www.cic.gc.ca/english/resources/statistics/facts2008/permanent/01.asp.
4. For a comparative international look at accountability, see Supovitz, (2009).
5. OECD (2008), *OECD Economic Surveys: Canada*, OECD Publishing.
6. OECD (2008), *OECD Economic Surveys: Canada*, OECD Publishing.
7. www.statcan.gc.ca. Data from 2010.
8. *OECD Factbook 2010*, OECD Publishing. Ratio of population aged less than 15 to the total population (data from 2008).
9. *OECD Factbook 2010*, OECD Publishing. Ratio of population aged 65 and older to the total population (data from 2008).
10. OECD (2008), *Jobs for Youth Canada*, OECD Publishing. Ontario's population growth depends largely on immigration. Ontario, Alberta and British Columbia are the only provinces in which the projected average annual growth would exceed the growth rate for Canada as a whole.
11. *OECD Factbook 2010*, OECD Publishing. Annual population growth in percentage, OECD total (year of reference – 2007).
12. *OECD Factbook 2010*, OECD Publishing. Foreign-born population as percent of the total population (data from 2007).
13. *OECD Factbook 2010*, OECD Publishing. Current prices and PPPs (data from 2008).
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15. OECD (2008), *OECD Economic Surveys: Canada*, OECD Publishing. Origin of GDP, percent of total (data from 2006).
16. *OECD Factbook 2010*, OECD Publishing. Total unemployment rates as percentage of total labour force (data from 2008).
17. *OECD Factbook 2010*, OECD Publishing. Total unemployment rates as percentage of total labour force (data from 2008).
18. OECD (2010), *Employment Outlook*, OECD Publishing. Unemployed as a percentage of the labour force in the age group: youth aged 15-24.
19. The OECD follows standard international conventions in using the term "tertiary education" to refer to all post-secondary programmes at ISCED levels 5B, 5A and 6, regardless of the institutions in which they are offered. OECD (2008), *Tertiary Education for the Knowledge Society: Volume 1*, OECD Publishing.
20. OECD (2010), *Education at a Glance 2010*, OECD Publishing. Public expenditure presented in this table includes public subsidies to households for living costs (scholarships and grants to students/households and students loans), which are not spent on educational institutions (data from 2006).
21. OECD (2010), *Education at a Glance 2010*, OECD Publishing. Public expenditure presented in this table includes public subsidies to households for living costs (scholarships and grants to students/households and students loans), which are not spent on educational institutions (data from 2006).
22. UNESCO Institute for Statistics, <http://data.worldbank.org/country>, Gross enrolment ratio (data from 2006).
23. OECD (2010), *Education at a Glance 2010*, OECD Publishing. OECD average net enrolment rates of ages 4 and under as a percentage of the population aged 3 to 4 (year of reference – 2008).
24. <http://data.worldbank.org/country>, Gross enrolment ratio (data from 2007).
25. OECD (2010), *Education at a Glance 2010*, OECD Publishing. OECD average net enrolment rates of ages 5 to 14 as a percentage of the population aged 5 to 14 (year of reference – 2008).
26. OECD (2010), *Education at a Glance 2010*, OECD Publishing. Net enrolment rates of ages 15 to 19 as a percentage of the population aged 15 to 19 (data from 2007).
27. OECD (2010), *Education at a Glance 2010*, OECD Publishing. OECD average net enrolment rates of ages 15 to 19 as a percentage of the population aged 15 to 19 (year of reference – 2008).



28. OECD (2010), *Education at a Glance 2010*, OECD Publishing. Net enrolment rates of ages 20 to 29 as a percentage of the population aged 20 to 29 (data from 2007). This figure includes includes all 20-29 year olds, including those in employment, etc. The Gross Enrolment Ratio (GER), measured by the UN as the number of actual students enrolled / number of potential students enrolled, is generally higher. The GER for tertiary education in Canada in 2002 is 60%, compared to the regional avg of 70% (UIS 2010).

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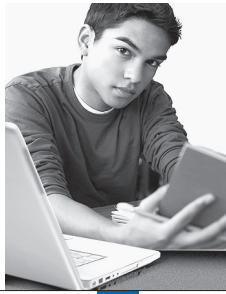
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34. Data missing from *Education at a Glance 2010* (OECD, 2010)

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36. OECD (2010), *Education at a Glance 2010*, OECD Publishing. Starting salary/minimum training in USD adjusted for PPP (data from 2008).

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4

Shanghai and Hong Kong: Two Distinct Examples of Education Reform in China

China has made huge strides in educating its population. During the Cultural Revolution, educated people, including teachers, were sent to rural areas to work in the fields. The teaching force was effectively destroyed. But, not three decades later, parts of the country – notably Shanghai – are among the contenders for top spots on the world's education league tables. Hong Kong reverted back to China in 1997 and has also made significant reforms to its education system.

This chapter looks at how China has made rapid progress, taking Shanghai and Hong Kong as examples of innovation. The main lessons include the government's abandonment of a system built around "key schools" for a small elite and its development of a more inclusive system in which all students are expected to perform at high levels; greatly raising teacher pay and upgrading teacher standards and teacher education; reducing the emphasis on rote learning and increasing the emphasis on deep understanding, the ability to apply knowledge to solving new problems and the ability to think creatively. All of these are reflected in deep reforms to the curriculum and examinations. These changes have been accompanied by greater curricular choice for students and more latitude for local authorities to decide on examination content, which in turn is loosening the constraints on curriculum and instruction.



INTRODUCTION

Despite China's emergence as one of the world's most influential economies, relatively little is known in other countries about China's educational system and how its students learn. People might have gained some insights either through the achievements of its students in universities abroad, or from their high scores in all kinds of tests. Otherwise, the prevailing impression is that students in China learn by rote, and that much in the schools is about memorising and cramming for examinations.

This chapter seeks to provide a more nuanced and accurate picture of education in China, using Shanghai and Hong Kong as examples. Shanghai is one of China's most developed urban areas, while Hong Kong, despite having the same cultural background, is a rather different society under the "one country, two systems" political arrangement. However, as China encompasses such a diverse spectrum of economies, societies and cultures, Shanghai and Hong Kong can provide a very powerful window into education into China, but may not be representative of all parts of the country.

Nevertheless, in both cases, student learning is the focus, with other dimensions – such as teaching and teachers, school facilities and systemic strategies – providing the context and supporting various aspects of student learning.

CHINA'S EDUCATION SYSTEM: THE CULTURAL CONTEXT¹

China has a long tradition of valuing education highly. This began with the Civil Examination system, established in 603 AD, which was also exported to Japan and Korea later in the 7th century. It was a very competitive yet efficient system for selecting officials, and was known for its rigor and fairness. These examinations evolved over many dynasties before their abolition in 1905.

The system had three tiers of examinations, at county, provincial and national levels. There were variations, but the general mode was basically an essay test, where the candidates were confined for days in an examination cell, fed with good food, and required to write essays of political relevance. To do this, they had to be familiar with the classics, basically the *Four Books* and *Five Classics*, and refer all arguments to these works – hence the requirement for "rote-learning". Good calligraphy and writing styles were also part of the basic requirements. The final level of selection was usually held in the Examinations Department, which was often part of the imperial organisation. Whoever gained the appreciation of the Emperor, who was virtually the chief examiner, would be the champion, followed by a few runners-up. These winners were appointed to various official posts according to their examination results.²

A few "beauties" of this system made it sustainable for almost two centuries. First, it was simple, requiring only performance in the examinations. Teachers were only affordable by wealthy families, so no formal institutions such as schools existed. It was basically a self-study system, or a "self-motivated distance learning system", in contemporary jargon. It was low-cost for both the government and the household because it involved only an examination, and the textbooks (the standard classics) were common in household collections. Apart from the exclusion of women (Elman, 2000), which was part of the broader ideology at the time, there were no entrance requirements, so it was thought that family background would not matter. Indeed, Chinese folklore over hundreds of years, reflected in novels, operas, dramas and all art forms, includes stories about scholars from poor families who endured years of hardship and poverty, became champions in the Civil Examination, were appointed ministers, married princesses and enjoyed glorious home-coming ceremonies. The Civil Examination drove almost all families, regardless of socio-economic status, to have high hopes for their children's future (*i.e.*, the boys), and such hopes translated into hard work and adaptability to difficult learning environments. This cultural tradition exists throughout the entire Chinese population. However, it has also led to the emphasis (almost the exclusive emphasis) on examination results for validating genuine learning or knowledge. In a way, for more than 16 centuries, generation after generation of young people were trained only to face the challenges of examinations.

This cultural respect for "education" hence carries a special meaning for China: education (basically examination preparation) is viewed as the sole route for upwards social mobility, the only hope for an individual's future. This is translated into a zest for credentials and the predominance of examinations to win them.

What are the consequences of this historic cultural emphasis on exams and credentials?

- Education was seen as the major path to climb the social ladder and change one's social status. This was intertwined with the supreme status given to civil servants (officials). And because of the Civil Examination, only scholars could become officials. A circular causality is at work here, where social status, officialdom, scholarship, and education became synonymous in people's minds.



- Despite the meagre odds of moving to the top, the chances of success mobilised the entire population to take examinations. This was strongly augmented by the assumption that working hard pays off. While other factors, such as family background and innate ability, are not controllable, working hard was something anyone could do. Some corollary observations may help explain the culture of education in contemporary China and to a large extent in other East Asian cultures.³
- Success in examinations is therefore still seen as the only respectable success, unlike in other societies where military capacity (such as with the *samurai* in Japan), or economic wealth can also attract social respect.⁴
- As a result of this history, reading, learning and education are often taken as synonyms in Chinese. Reading is regarded as the only effective means of learning, and for that matter of memorisation. “All are low but reading” is the saying; hence the tradition of “rote learning” as perceived by outside observers.
- The reality, however, was that achievements in education were decided by the subjective favour of the emperor or the chief examiner. Therefore successful essays conveyed ideas that would appeal to authority. This tradition may help explain the cultural aspect that favours political correctness over scientific objectivity.
- The importance attached to examination results also underpins the prevailing mentality among teachers, students and parents, in which the direct relevance of the curriculum is less important than achieving high scores.
- As most research results concur, motivation in education in China (and also in Japan and Korea) is basically extrinsic, prompted by family or social expectations (Chapter 6). In most cases, intrinsic motivation or genuine interest in the subject matter *per se*, are not the driving factors.
- This also underpins the fundamental source of examination pressure. In all these East Asian societies, frequent and intense examinations and tests in schools and high-stakes public examinations prevail throughout the entire education system, leading to all kinds of private tuition and tutorial schools to prepare students for examinations.
- The Civil Examinations tradition also explains the culture of hard work and tolerance of hardship. “Only those who could tolerate the bitterest among the bitter would come out as a man above men,” as the saying goes.
- This tradition also underpins the belief that effort is more important than innate ability. “Diligence can compensate for stupidity” is a common Chinese belief, a view not shared by many other cultures.

The social emphasis on education has always made it easy for Chinese-based societies (such as mainland China, Hong Kong, Chinese Taipei and Macao) to develop their education systems, as there is popular support for expanding education to reach more people. However, at the same time, genuine attention to quality learning is often a challenge for education reformers in these societies.

CHINA'S EDUCATION SYSTEM: THE HISTORICAL CONTEXT

This system has undergone several stages of development: the rather rigid Russian model of the 1950s, the period of “renaissance” in the early 1960s, disastrous damage during the Cultural Revolution (1966-1976), rapid expansion during the 1980s and 1990s, and the move towards massive⁵ higher education in the 21st century. With perhaps the exception of the Cultural Revolution, education in general has trended upwards, both in scale and quality.

The Cultural Revolution: 1966 to 1976

It is essential to understand the context in which China's education reform started in the early 1980s. The death of Mao Zedong in 1976 marked the end of the Cultural Revolution. Formally the Proletariat Cultural Revolution, it was started by Mao in 1966 as a national-scale political campaign to eliminate all bourgeois influences in the country's “superstructure” (as opposed to the economic infrastructure). Violent activities sought to remove and destroy all symbols of bourgeois culture, such as music, drama, opera and novels, and to make sure their replacements were rooted in proletariat ideology. Activities in all these art forms had to start again from scratch, using a few “model” prototypes created from pure proletariat ideology. It became a social campaign and intellectuals were the most vulnerable.

Among the revolution's consequences was the closing down of conventional schools. They were replaced with schools led by political teams of workers, peasants and soldiers, and the curriculum was totally revamped to reflect the essence of “class struggle.” There were several attempts to resume schooling, but with little effect. Higher education institutions were suspended, replaced by new institutions admitting only workers, peasants and soldiers regardless of their academic merits. Professors and intellectuals were sent to factories, villages and remote places to be “re-educated.” The concept reflected a utopian ideal of egalitarianism, where everybody produces for the state



and the state distributes its wealth equally among its citizens. But the reality was total stagnation of the economy, a society of “equal poverty”, as economists recognised in hindsight. It is no exaggeration to say that China had to rebuild the entire education system in the late 1970s and early 1980s from the ruins left by the Cultural Revolution.

The reconstruction of education: Late 1970s through the 1980s

The end of the Cultural Revolution brought about unprecedented changes in China. In 1978, Deng Xiaoping started an economic reform in which peasants were given land and allowed to keep their crop surpluses. Commercial activities began to take place. Schools resumed normal activities. A milestone in education development at that time was the resumption of university admissions in 1977 (which doubled the intake) and 1978, when most of those enrolled were mature students who had been deprived of learning opportunities during the Cultural Revolution.

At the same time, peasants were eager to build their own schools in the villages. This led to a decision in 1980 to allow local non-government financing of schools as a way of mobilising community resources. This paved the way for a major reform and decentralisation of education in 1985. There was an immediate mushrooming of schools and the target of universal primary education was achieved in just a few years. The same reform also called for universal nine-year education as a national target, with benchmarks every year towards its accomplishment.

In 1986, China enacted the *Law of Compulsory Education*, which required every child to complete nine years of formal schooling – six years of primary school and three years of junior secondary school.⁶ By the mid-1990s, China had basically achieved this goal.

At about the same time, in 1980, cities like Shanghai, with a large non-state enterprises sector, started pioneering new types of vocational schools that did not guarantee or assign jobs. This was a significant step away from the strict manpower planning that had been an integral part of the planned economy. By 1997, formal assignment of jobs to graduates disappeared from all levels of the education system. It was also in 1982 that China for the first time established its degree system for higher education, following the Western model.

It was not until 1988, however, that China moved away from uniform national textbooks to experiment with diversity in textbooks; until that point cultural tradition stated that these textbooks were the most essential instrument for student learning and were provided by the state almost free. (This was very different from practices in other developing countries of similar economic status). Textbook diversification allowed for diverse interpretations of the centralised syllabuses, and there were attempts, for example in Shanghai (see next section), to create new syllabi within the centralised framework.

Quantitative expansion: 1990 to the present day

China has now passed the stage of quantitative expansion in basic education. Official statistics (for 2009) show a net enrolment of 99.4% at the primary school level, the envy of many countries. The gross enrolment ratio for junior secondary school was 99%.⁷ In the same year, gross enrolment at senior secondary level, both general and vocational, was 79.2%. The general (*i.e.* academic) senior secondary schools enrol 52.5% of students at this level, putting about half of senior high school students in the academic stream (Figure 3.1). However, the figures may conceal regional disparities. In most urban areas, gross enrolment at the senior secondary level is 100% or above, which means that the number of students enrolled exceeds the number in the appropriate age group.

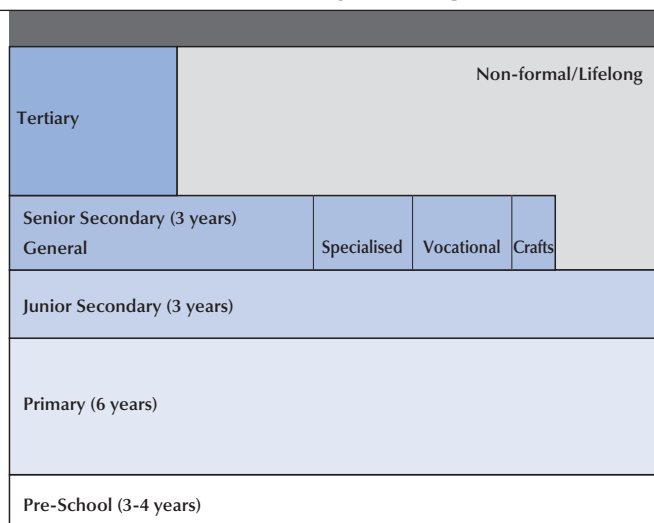
The 1985 reform, as mentioned earlier, established the framework for decentralised local school finance and governance. Almost as a textbook example, decentralisation led immediately to huge regional disparities because of the differences in local economies. After several back-and-forth debates and adjustments about degrees of decentralisation, the *Revised Law of Compulsory Education*, enacted in 2006, established differential subsidies from the central government to different regions of varied economic capacities.⁸ This marked the government’s determination to sustain universal basic education, and hence paved the way for more energetic reforms in educational quality.

The 21st century: Focus on higher education

If the highlight of the 1980s and 1990s was expansion of basic education to the entire population, then the emphasis of the first decade of the 21st century has been the expansion of higher education. Starting in 1998, China broke away from its long-standing policy of restricting higher education to a small percentage of the population and launched a spectacular expansion. In 1999, all institutions across the nation were required to increase intake by 50%. This was followed by jumps of 25% in 2000 and 22% in 2001.⁹



■ Figure 4.1 ■

China's education system organisation

Despite government intentions to pause this expansion, higher education has now gained its own momentum, and all kinds of non-government initiatives, such as private institutions and self-financing programmes, are flourishing at their own pace. The net result is that the higher education student population grew from less than 6 million in 1998 (before the expansion) to 29.8 million in 2009. Although the enrolment ratio still stood at a low 24.2% in 2009 (Ministry of Education, 2010a), China nonetheless has the largest number of higher education students in the world, much higher than the United States (around 18 million in 2007), which was the second largest, and above India (around 13 million in 2007) (UNESCO Institute of Statistics, 2009).

The expansion of higher education has immense implications for the entire education system. On the one hand, there is visible graduate unemployment, particularly in the major metropolitan areas, including Shanghai. Analysts often argue that this is mainly due to the unwillingness of graduates to take jobs with less satisfactory incomes or in less developed regions, and hence this should not deter further development of higher education.¹⁰ And indeed the job situation does not appear to hamper parents' and young people's aspiration for more higher education. On the other hand, the rapid expansion of higher education has created a new level of desire for academic studies, inducing remarkably high enrolment in general (academic) senior secondary schools and lowering enrolment in vocational schools.

In all these expansions, private institutions emerge in great numbers, although in terms of percentage and student populations they are still the minority. However, the trend is irreversible. It is also noticeable that private institutions in mainland China are formally called *minban* schools, which means "community" schools, or more accurately, "non-government schools". The nomenclature is justifiable, because in China, public and private distinctions are rather blurred. For example, many private schools are headed by former government officials, or government departments may run private schools for income.

The quantitative picture would not be complete without including China's complex structure of lifelong learning, which includes full-time sabbatical study, evening spare-time programmes, distance learning programmes and self-study examinations. Such learning opportunities often lead to formal credentials such as certificates and diplomas, and sometimes to degrees. Operators range from major institutions of higher education (as their extension programmes), to individual professionals and private for-profit enterprises.

TEACHERS AND TEACHING

Teachers have always been a major issue in China. Educational expansion in the 1980s immediately led to an enormous shortage of teachers. In the Cultural Revolution, many young people with some education (such as primary or junior secondary) were branded intellectuals and sent to rural villages. They were seen as the most educated in the villages, and became teachers. Most of them were untrained, under-qualified and paid little.



They were generally called *minban* (community) teachers, but many were very competent and popular nonetheless. A policy in the 1980s aimed to retrain these teachers and put them on the public payroll. The success of this policy, however, has caused an exodus of teachers fleeing back to cities in search of better living and working conditions. Village schools now often resort to hiring even less qualified teachers using the “supply teachers” category that is meant for temporary substitutes. This is a structural problem that has yet to be solved. The disparity in competence among the vast number of China’s teachers is perhaps a driving reason for the development of a comprehensive and effective system of organising teaching, as will be discussed below.

The situation in cities is more definite and positive. Since 1997, when universities began to charge fees, a state policy has given early admission to student teacher candidates. Hence, “normal” (teacher training) universities enjoy priority admissions and attract better students. In major cities, such as Beijing and Shanghai, where the economy is more open and incomes fluctuate more, teaching stands out as a preferred occupation attracting a more stable income. Over the years, because of the improvement in teachers’ salary scales, teaching has risen up the ladder of preferred occupations.

It has to be added that while teachers in mainland China do not receive very high salaries, they often have other significant income on top of their salaries. This may come from additional assignments beyond normal responsibilities, income generated outside school (from private tutorials or invited talks), or school “bonuses” (e.g. sponsoring fees collected from students who come from other neighbourhoods or whose test scores are below the official admissions cut-off).

Class sizes in mainland China are generally large: the national norm is 50 students. However, in rural areas where good schools are sparse, it is not unusual to see classes of over 80 or in the extreme case, over 100. Parents often indicate their preference for better schools and better teachers over smaller classes. However, in major cities (and Shanghai is typical), recent drastic declines in population have forced local governments to adopt small classes so as to minimise teacher layoffs. This has significantly reduced teachers’ workload and created room for student activities during lessons that would be impossible in large classes.

China has also developed a rather rigorous framework and system of teaching. At the grassroots level, subject-based “teaching-study groups” engage in study and improvement of teaching on a daily basis. For example, a physics teacher of Senior Secondary 2 (SS2) involved in a teaching-study group typically teaches 12-15 classes per week, teaching only one programme (e.g. SS2 Physics) and nothing else. There are timetabled sessions when the study group will meet, often with related personnel such as laboratory assistants, to draw up very detailed lesson schemes for a particular topic the following week. Teachers are expected to teach according to the scheme, which is then translated into more detailed lesson plans by and for individual teachers.

The lesson plan serves not only as a guide for the teacher during the lesson, but also as documentation of the teacher’s professional performance. In many cases, teachers are observed by the school principal or by district education officers when they are being considered for promotions or awards. In short, a Chinese teacher sees a lesson more as a show or a performance, and puts in many hours of preparation to cover the standard 40-minute period.¹¹

The “teaching-study group” is supervised for each of its subject areas by the “teaching-study office” in the Education Bureau (in a rural country or city district), which is in turn supervised by the relevant “teaching-study office” in the Education Department in the provincial or municipal government. Professionally, all these “teaching-study” setups work under the Basic Education Department II within the central government’s Ministry of Education. The Basic Education Department II is charged with all matters related to curriculum development, textbook production, pedagogy enhancement and school management for the whole nation. In a way, teaching in China is much more centrally organised than in many other systems.

During actual teaching, teachers may observe each other or may be observed by peers (in the case of a new teaching topic because of curriculum change, for example), by new teachers (so they can learn from more experienced teachers), by senior teachers (for mentoring), or by the school principal (for monitoring or for constructive development purposes). Sometimes, teachers are expected to teach demonstration lessons (called public lessons) for a large number of other teachers to observe and comment upon. This structured organisation of teaching in China is thus not only a means for administration; it is also a major platform for professional enhancement.



Such teaching protocols are present throughout China, from remote villages to prosperous cities. These practices are taken for granted as the basic protocol for teaching. Observers may see this as a matter of quality assurance, but it serves also the fundamental purposes of professional development and pedagogical advancement. The steps are built into teachers' career ladders.

Teachers in China are classified into four grades as an indication of their professional status. Promotion from one grade to the next often requires the capacity to give demonstration lessons, contributions to induction of new teachers, publications in journals or magazines about education or teaching, and so forth. Of course, many other aspects of education are unique to China, but the teaching protocols are perhaps among the most relevant to this chapter.

This picture of teaching in China would not be complete without mentioning that almost all the officers in the government education authorities, both at municipal and district levels, started as school teachers. Most of them distinguished themselves as teachers or school principals with strong track records. This perhaps explains their devoted professional attention to teaching and learning amidst all the administrative chores and political issues they normally contend with. They manage, however, to maintain this teaching focus while at the same time relying on a strategic vision that enables them to navigate a policy arena which goes well beyond education.

CONTINUOUS CURRICULUM REFORM

Ongoing reform is another dimension in the larger context of China's education system that merits attention. China has launched a series of reforms since the early 1980s; indeed, reform is a sustained concept in education. As noted earlier, major milestones include the nationwide reform in 1985 that decentralised finance and administration; a 1988 move to encourage local production of textbooks (rather than requiring a uniform set of textbooks across the nation); a spectacular expansion in higher education in 1999, together with a major re-design of higher education entrance examination in the same year; legislation in 2002 to encourage private schools; and a major policy move in 2006 to alleviate disparity in financial support for education.

The latest initiative is a major national comprehensive campaign to improve education in the next decade – the Outline for Medium and Long-term Development and Reform of Education (announced in July 2010). This prescribes education developments up to 2020. One of its ambitions is to introduce universal pre-school education. This is likely to pose new challenges given the nation's diverse conditions and concepts about early childhood development. The strategy also highlights the need to overcome educational disparity and the importance of respect for diversity and individual needs. It is generally regarded as a strategic plan for moving into an era of quality, equity and individuality in planning education.

Examinations have long been a focus of attention in China in any attempt to reform education. Teaching and learning, in secondary schools in particular, are predominantly determined by the examination syllabi, and school activities at that level are very much oriented towards exam preparation. Subjects such as music and art, and in some cases even physical education, are removed from the timetable because they are not covered in the public examinations. Schools work their students for long hours every day, and the work weeks extend into the weekends, mainly for additional exam preparation classes. As noted earlier, private tutorials, most of them profit-making, are widespread and have become almost a household necessity. In the past two decades, the national policy agenda has sought to move the system away from examination orientation, but the call has seldom met with significant success. The most recent appeal along this line is the move to reduce students' workload, which is regarded as a major task in the coming decade of education development.

Examination pressure remains a major concern to educators, parents and policy makers. Some provinces forbid the holding of formal classes over the weekends. There is a general belief that emphasis on examinations jeopardises the genuine development of young people and is detrimental to the entire national population, but few effective solutions have emerged to reduce or minimise examination pressures. Educators jokingly describe the situation as follows: "High-sounding appeals to promote quality education, down-to-earth preparation for examinations."

Nevertheless, committed reformers continue to make great efforts to reform the curriculum at the national level. A major document issued in 2001 calls for the following changes (Ministry of Education, 2001):

- To move away from pure knowledge transmission towards fostering learning attitudes and values.
- To move away from discipline-based knowledge, towards more comprehensive and balanced learning experiences.



- To move away from pure “bookish” knowledge and to improve relevance and interest in the content of a curriculum.
- To move away from repetitive and mechanistic rote-learning towards increased student participation, real-life experience, capacity in communications and teamwork, and ability to acquire new knowledge and to analyse and solve problems.
- To de-emphasise the screening and selective functions of assessments and instead to emphasise their formative and constructive functions.
- To move away from centralisation, so as to leave room for adaptation to local relevance and local needs.

Concrete changes include dilution of the disciplined structure of “subjects” so as to re-organise content according to life-relevance and progression in learning; the introduction of new integrated contents at the cross-over between natural sciences and humanities; the creation of elective arts modules as a compulsory part of the curriculum; to change examination formats from fact regurgitation to analyses and solutions for stated problems; and so forth.

It is clear that the reform discourse is one of “student learning”; a discourse that is shared by other similar reforms in Singapore and Hong Kong at almost the same time. The reform is strongly underpinned by the concepts of constructive learning. It is not just an improvement of the existing conventional curriculum, but an overhaul of the fundamental concept of curriculum, and hence it challenges basic assumptions about education and curriculum. It means not doing what has traditionally been done, but doing more, better and differently. Hence, it is curriculum reform in the genuine sense.

Understandably, this approach has received strong opposition from leading scientists in the academic establishment. They argued that such a curriculum would damage the integrity of the disciplines and would hinder the nation in producing new scientists. The constructive interpretation of learning has also led to debates among education researchers and policy advisors. Some interpret constructive learning as pure empirical experience, which deprives students of learning from earlier learning outcomes. Others regard constructive learning as the only effective approach to human learning, and insist that it should be the core tenet of curriculum reform.

The net result is progress in curriculum reform, but its momentum is very much hampered by academics’ conceptual opposition, as well as by front-line teachers who have found the new curriculum difficult to handle when preparing their students to do well in public examinations. Nonetheless, the reform is gradually gaining ground.

The following discussion focuses on education and learning in two major Chinese cities: Shanghai and Hong Kong. Both are vibrant economies and have undertaken major comprehensive education reforms in the past two decades. While they have both inherited the same cultural traditions about education, the two cities work under different political and ideological frameworks. Nevertheless, their reform efforts share a similar discourse of making student learning central, but their different assumptions about the role of government have led them to adopt rather different approaches.

■ SHANGHAI: A LEADER IN REFORM

Shanghai is the largest city in China, with a population of 20.7 million, of whom 13.8 million are permanent residents, and 5.4 million are temporary. In addition, there are around 1.5 million who are mobile (without a Shanghai home; Shanghai Municipal Statistics Bureau, 2010). The city is one of four municipalities with the status of a province (the others are Beijing, Tianjin and Chongqing). In 2009, Shanghai’s GDP was USD 11 563 per capita. While its population and land account for 1% and 0.06% of the nation respectively, it contributes one-eighth of China’s income (Information Office of Shanghai Municipality and Shanghai Municipal Statistics Bureau, 2010). In 2009, the contribution of the service sector to economic growth in Shanghai was around 60%, the highest in mainland China.

While Beijing is China’s political centre, Shanghai is its undeniable business centre. Shanghai is also the country’s most international and open city. This is attributable to its prosperous and colonial past before the change of government in 1949. It was among the first ports forced open by international powers in the mid-19th century.¹² After 1978, as China opened up to trade and began the transition to a market economy (the “socialist market economy”), Shanghai took on a new role in almost all fronts, including education.



Ahead of the pack in universal education

Shanghai is among the most internationalised cities of mainland China, but cultural traditions about education still prevail. Popular support for education means the city has had little difficulty in launching universal education. However, Shanghai also struggles with undue examination pressure, which is still a major item on the reform agenda.

Shanghai was among the first cities to achieve universal primary and junior secondary education and was also among the first to achieve almost universal senior secondary education. According to the *Shanghai Yearbook 2009* (Shanghai Municipal Government, 2010), enrolment at the age of compulsory education was above 99.9%, and 97% of the age cohort attended senior secondary school (general and vocational). It is notable that enrolment for preschool programmes was 98%, which already surpasses the new national preschool education goal for 2020.

Statistics also show that over 80% of the city's higher education age cohort are admitted into higher education in one way or another (compared to the national figure of 24%; Ding, 2010). In other words, all those who would like to attend higher education are able to do so. There were 61 higher education institutions in Shanghai in 2009, plus quite a few private institutions yet to be officially recognised. There would be higher education over-supply if only residents of Shanghai were counted,¹³ but Shanghai institutes also admit students from all over the nation.¹⁴ Indeed, Shanghai has always been a preferred place to pursue higher education, perhaps second only to Beijing, and has attracted the best students from the national pool of elite candidates.

If it were not for the admission quota put aside for Shanghai high school graduates, the city could have attracted more and better candidates from the entire nation. Graduates from Shanghai's institutions are allowed to stay and work in Shanghai, regardless of their places of origin. For that reason, many "education migrants" now move to Shanghai mainly for to educate their children.¹⁵ Of course, many Shanghai students attend higher education in other cities, usually Beijing.

Nevertheless, Shanghai is indeed an education hub in China, and is very high on the aspiration ladder for potential candidates. This situation has greatly strengthened the competitiveness of the city's higher education institutions. What is remarkable, however, is that even with the very generous admissions quota for local students, this sense of competition is still very keen. Reformers had thought that when the system became less selective, undue competition would also be reduced. This does not seem to have happened.

There are varied interpretations of this phenomenon, which is common to many Asian societies. One is that the Chinese perceive society as a vertical hierarchy¹⁶ and always seek to enter the best institution despite broader access to higher education in general. Indeed, institutions are ranked in parents' minds. By the same token, parents would like to see their children ranked highest in their classes, and anything less than 100% is perceived as undesirable.¹⁷ Another interpretation is that the cultural tradition cherishes hard work, and that to "study" (or "reading books" in the ancient tradition) is their "responsibility". Parents and teachers like to keep students busy studying and do not feel comfortable if students spend less time studying. Hence, despite the increase in higher education opportunities, examination pressure persists in Shanghai as in other parts of China.

The cultural heritage also works in positive directions. Shanghai is home to quite a few experimental programmes that are seen as pioneers in developing quality education as opposed to examination pressure. One such example is "success education" (Box 4.1).

Box 4.1 Success education

Shanghai's Zhabei district is characterized by high crime and poor educational performance. In 1994, Liu Jinghai became the principal of the Zhabei District School No. 8, a school that had been among the poorest-performing in the district. Mr. Liu applied a strategy called "success education" that he developed through years of research. The strategy encourages teachers to instill low-performing pupils with greater confidence in their abilities to become potential achievers. This program has transformed School No. 8, placing it in rank 15 out of 30 schools in the district. Around 80% of School No. 8 secondary graduates go on to university, compared with a municipal average of 56%. In 2005 the Shanghai Education Authority asked Mr. Liu to help turn around 10 other low-performing schools in Shanghai through "commissioned administration" whereby teachers from School No. 8 work with partner schools applying administrative and pedagogical practices of success education.



Reforming exams in Shanghai

Shanghai has opted to modify the mode and contents of examinations so they serve the purpose of curriculum and pedagogy reform. In Chinese phraseology, public examinations are the baton that conducts the entire orchestra – rather than removing the baton, the alternative is to modify the baton so that it conducts good music.

In 1985, Shanghai was given the privilege of organising the higher education entrance examination for universities under its jurisdictions. Since then, a lot of effort has gone into reforming assessments and examinations. Generally, exam changes match reform expectations in curriculum and pedagogy. As an example, integrated papers are required that cross disciplinary boundaries and test students' capacity to apply their knowledge to real-life problems. As another example, examination questions provide students with information not covered in the syllabuses and so test their abilities in applying what they know to new problems. Multiple-choice questions have disappeared from the city's public examinations.

Student engagement

One of the most essential influences of China's cultural heritage is the intensity of students' engagement in learning. Typically in a Shanghai classroom, students are fully occupied and fully engaged. Non-attentive students are not tolerated. In one mathematics lesson observed for this research, a lesson which was by no means unique, students at Junior Secondary II were learning about parabolas. Students covered 15 problems at their desks, plus selected students gave blackboard demonstrations. This is rather different from classrooms in other cultures, where students may not be required to be fully engaged or attentive throughout the entire lesson. Such intense concentration is considered a student's responsibility in Chinese culture.

Student engagement in learning is not limited to lessons. Homework is an essential part of their learning activities and in a way governs their lives at home after school. Parents expect students to do homework every evening and are prepared to devote their family lives to student study, again as part of ancient tradition. Homework is such a burden to students that many local authorities in China have stipulated a maximum amount of homework (measured in hours) that schools are allowed to assign. Shanghai was among the first areas to impose such limits as a municipal policy.

The intensity of students' engagement goes well beyond the schools. A rather comprehensive "remedial system" of tutorial schools caters to the demands of exam preparation.¹⁸ In the absence of formal statistics, it is estimated that over 80% of parents send their children to tutorial school. Such schools are mostly for-profit, operate after school hours or at weekends, and tend to use small groups to focus on particular subjects. Parents see such tutorial schools as essential for enabling students to pass the public examinations with flying colours. Teachers are not totally against such schools either, because they also think that passing examinations is the prime aim of student study. Even parents who are against examination cramming often send their children to tutorial schools, almost as a matter of insurance. Those who go to such classes are not all weak students: even very strong students like to reinforce their strengths to achieve higher scores in the examinations.

Apart from the "remedial system", there is also the "supplementary system"¹⁹ of institutions or programmes outside schools, where young people can learn music, fine arts, sports, martial arts (*gungfu*) and all kinds of subjects not offered by schools. The most popular are piano, flute, ballet, Chinese calligraphy and Chinese painting. Parents are very prepared to invest in these expensive learning activities.

Students' engagement in learning does not stop at academic study. They are obliged to take part in all kinds of other activities (e.g. see Box 4.2). In Shanghai schools, for example, there is a municipal requirement that every student should engage in at least one hour per day of physical education. They start with a morning exercise before class; there is an "intermission exercise" in the middle of the morning, and other physical activities are held after school. Some schools practise "eye exercises" where student massage essential acupuncture points in order to prevent eyesight deterioration. Students also engage in all kinds of extracurricular activities in sports and the arts, where they are expected to learn organisation and leadership. Students take turns at "daily duties" in cleaning the classrooms and nearby corridors, for example. Students are also assigned teamwork in keeping the campus tidy. They are also organised to visit rural villages or deprived social groups as a matter of social or service learning. All these activities are co-ordinated by the municipal education authority.

Students are often overwhelmed by all these learning activities, both within and outside schools. This is why the national 2020 planning document calls for a "reduction of student workload." Shanghai is already much more aware of this issue than many other places in China, and good schools often refrain from holding classes during evenings and weekends, and parents do not normally press for heavier workloads.



Box 4.2 **Oriental Green Ark**

A spectacular facility established by the Shanghai municipal Education Department is an education base known as the Oriental Green Ark. This huge education park occupies more than 60 000 acres and includes activity centres, physical challenge centres, military training, museums, villas and hotels, as well as a convention centre. The villas and hotels follow the concept of a global village, with each block in the style of a particular nation. Every student in Shanghai primary and secondary schools experiences the Oriental Green Ark at least once as an organised school visit. It is interesting that many parents also send their children to the Ark through individual bookings at their own cost. Children see it as an alternative amusement park.

Compared with other societies, young people in Shanghai may be much more immersed in learning in the broadest sense of the term. The logical conclusion is that they learn more, even though what they learn and how they learn are subjects of constant debate. Critics see young people as being “fed” learning because they are seldom left on their own to learn in a way of their choice. They have little direct encounters with nature, for example, and little experience with society either. While they have learned a lot, they may not have learned how to learn. The Shanghai government is developing new policy interventions to reduce student workload and to refocus the quality of student learning experiences over quantity. Challenges from a changed and changing society maintain tension between such intense engagement and genuine learning in the broader sense.

Curriculum reforms

Shanghai has always been seen as a pioneer in education reform, with reform of the curriculum taking centre stage. Curriculum reform in Shanghai follows the general framework of national reform, described earlier. But Shanghai is often given the privilege of experimenting with reforms before they are endorsed for other parts of the nation. Since 1989, Shanghai has launched two waves of curriculum reform. Their essence has been to overcome “examination orientation” practices in schools in order to build quality education (Ding, 2010).²⁰

The first phase of curriculum reform started in 1988, with an attempt to allow students to select courses of personal interest. A curriculum comprising three blocks was established: compulsory courses, elective courses and extra-curricular activities. Accordingly, textbooks and teaching materials were produced and phased in.

Curriculum reform moved into its second phase in 1998, to integrate natural science with the humanities, the national curriculum with school-based curriculum, and knowledge acquisition with active inquiry. The purpose was to transform students from passive receivers of knowledge to active participants in learning, so as to improve their capacity for creativity and self-development and to fully achieve their potential. Traditional subjects were re-organised into eight “learning domains”: language and literature, mathematics, natural science, social sciences, technology, arts, physical education, and a practicum. Schools were encouraged to develop their own curricula specific to their individual conditions. Museums and other “youth education bases” (such as the Oriental Green Ark, Box 4.2) have now become crucial places in which the new curriculum is also implemented.

The new curriculum has three components: the *basic curriculum*, to be experienced by all students, mainly implemented through compulsory courses; the *enriched curriculum*, which aims to develop students’ potential and is realised mainly through elective courses, and *inquiry-based curriculum*, which is mainly implemented through extra-curricular activities. The inquiry-based curriculum asks students, backed up by support and guidance from teachers, to identify research topics based on their experiences. It is hoped that through independent learning and exploration, students can learn to learn, to think creatively and critically, to participate in social life and to promote social welfare. Since 2008, the new curriculum has been implemented throughout the city.

Overall, the curriculum reform involves broadening students’ learning experiences, enhancing the relevance of subjects by relating them to broader human and social issues, and concentrating on the development of “capability” rather than accumulation of information and knowledge. These are reflected in the reform of examinations as well as reform in pedagogy.

The overhaul of curriculum is supported by changes in teacher education and professional development. Over the years, teachers’ threshold qualifications have been significantly elevated. Twenty years ago, primary school teachers



were trained in teacher-training schools at the level of senior secondary schools. Junior secondary teachers received diplomas from sub-degree programmes. Less than 20 years later, all primary school teachers now must have a sub-degree diploma, and all teachers in secondary schools are degree-holders with professional certification. Many teachers have master's degrees. Shanghai was the first district in China to require CPD (continuous professional development) for teachers. Every teacher is expected to engage in 240 hours of professional development within five years.

In order to facilitate the sharing of good practices of curriculum design, development and implementation, a web-based platform²¹ was constructed and put into use in 2008. Included on the website are resources for curriculum development and learning, success stories of curriculum implementation, and research papers on teaching and learning. The draft version of Shanghai's plan for educational reform and development for 2020, which has been put out for public consultation, calls for school-based curricula and proposes a credit system at the senior secondary level to make learning more individualised and flexible.

In parallel to the curriculum reforms are changes to teaching practice. These reforms aim to change classroom reality to better facilitate student learning. One very significant change has been implemented in recent years through the slogan "return class time to students". This calls for an increase in time allocated to student activities in classes relative to teachers' lecturing. This has caused a fundamental change in the perception of a good class, which was once typified by good teaching, with well-designed presentations by the teachers. Videos of model teaching concentrated on teachers' activities. Now, model classes are filmed with two cameras, one of which records student activities. Teachers' performances are now also evaluated by the time given to student participation and how well student activities are organised. A similar slogan is "to every question there should be more than a single answer." This poses a challenge to the orthodoxy and authority of teachers over the information they teach.

These changes add up to a sea change in classroom pedagogy. The use of slogans is a Chinese tradition, and proposed changes become a campaign. The slogans are carefully crafted to capture the very essence of the proposed change and to be easily understood and followed by grassroots teachers. This is particularly powerful in the rural schools, where most theories are still foreign ideas. The use of slogans in pedagogy reform is also based on the culture of what could be called "constructive conformity" in China. That is, teachers do not mind imitating other teachers' good practices, and indeed creative practices are meant to be copied. This is very different from the meaning of creativity in, say, the United States, where practices are called creative when they are different from others.

Redesigning examinations is another crucial element of Shanghai reform. In 1985, as noted earlier, Shanghai received permission to start an independent higher education entrance examination. This was a big step forward in two senses. First, admissions to higher education are a complex annual exercise on a national scale, and setting up a separate local examination was a deviation from the uniform system. Shanghai's experiment indeed heralded a trend in exam decentralisation, which is key to localised curricula. Second, Shanghai saw public examinations (in this case the higher education entrance exam) as key in the design of any new curriculum. Moving away from the central national entrance examination allowed Shanghai to have a comprehensive platform in reforming its curriculum.

Since 2001, the entrance examination has taken the form of "3+X": the three core subjects of Chinese language, English language and mathematics, plus the "X" of any other subject(s) as required by individual institutions or faculties. The "X" component may take the form of a paper-and-pencil examination, an oral examination, a test of practical skills and so on. The content may cover one discipline, one kind of ability, or several disciplines or abilities. Individual institutions decide on the weighting of the three core subjects and the "X" component. For example, at Shanghai University for Science and Technology, the three core subjects contribute to 40% of the candidate's overall scores and the "X" component is 60%.

In 2006, Fudan University, Shanghai Jiaotong University and six vocational higher education institutions started to organise their own entrance examinations and to set their own admission requirements. The two universities admitted 578 new students through self-organised examination. In 2007, another three institutions set their own entrance examinations (Shanghai Municipal Education Commission, 2008). The overall trend and intention is to diversify higher education entrance examinations so as to reduce the pressure from a single uniform exam. To lower exam pressures further, Shanghai has moved to allow admissions based on school recommendations at both senior secondary and university entrance levels. Other selected institutions, presumably the stronger, have also been given the autonomy to set their own admission criteria and entrance examinations. More recently, students are allowed to do self-recommendation for admissions at higher levels of education.



Overcoming disparity and inequality

China has in recent years joined the international community in realising the importance of overcoming disparity and inequality in education (and indeed in society at large). This is of particular significance since success in the overall reform has been based on a break from the extreme egalitarianism that prevailed during the Cultural Revolution. The breakthrough brought about by Deng Xiaoping, architect of the reform, was partly due to the concept of “let a few become rich first.” Disparity was at that time seen as an incentive to the growth of national wealth and a cure to national poverty.

There has long been the concept of “key schools” in China. Key schools are selected by education authorities to be given additional resources and assigned better teachers. National key schools are very rare now, but provincial/municipal key schools and county/city district key schools persist. There are also key universities with privileged resources, although the term is no longer used to describe them. The key schools admit better students who then do better in terms of selection into higher-level key schools or universities. A senior secondary key school may have 100% of its graduates entering good universities, while a school at the bottom of the non-key category might not send any students to such institutions. This notion is taken for granted in a society conceived as a hierarchy, as noted earlier. Parents do not question the existence of such a system; they only think how their own children might win the competition to get into key schools.

In 1982, a national policy shift sought to remove the label of key schools at the primary level, but they still exist at junior-secondary and senior-secondary levels. Even at primary levels, “experimental” schools or schools under other labels, while lacking the title of key school, are privileged with better resources and better teachers.

Because of high demand under the key school system, it became necessary to have a highly selective public examination at the end of primary schooling to allocate students to junior secondary schools of different categories, and another public examination at the end of junior secondary schooling to allocate students to senior secondary schools. This explains the examination pressure that prevails over all sectors and all levels of the education system.

Neighbourhood attendance

In 1994, Shanghai was the first jurisdiction in China to introduce neighbourhood attendance at primary and junior secondary levels, requiring students to attend their local schools and in effect eliminating the notion of key schools at these levels. This was a challenge to society and caused some uneasiness among parents, who were bewildered that their children could no longer compete for admission to the better schools. The social pressure was so great that eventually a compromise was reached: students could choose schools in other neighbourhoods by paying a sponsorship fee. This is often known as the Chinese version of “school choice,” which was a hot issue in America. Parents see the additional fees as fair, because otherwise preferential admissions could go to parents with political power or personal connections.

Neighbourhood attendance also caused concern among teachers who were not used to teaching classes of mixed abilities. Now, however, teachers seem to be proud of being able to handle children of diverse backgrounds and different abilities, realising that diversity and disparity within schools are common features in contemporary societies. Neighbourhood attendance has allowed public examinations to be removed at the end of primary schooling, releasing primary teaching from examination pressure. As an immediate result, innovations and creativity now flourish in primary schools. Policy makers often see this as an essential factor in making Shanghai a champion of curriculum and pedagogy reforms.

Migrant children

Neighbourhood attendance also prepared the school system to face the challenges of migrant children, who became a major national problem in the late 1990s. In the 1980s, migrant workers flooded in from rural villages to work in urban areas. Most are low-wage labourers in factories, while others are contract workers on construction sites. Still others created small businesses to tap the urban market. Migrant workers have contributed immensely to China’s economic growth, but their children and their education have become a national problem.

To date, around 30 million children of school age belong to migrant families all over China. This is 20% of the entire student population at the basic education level. In other words, one in every five school children comes from a migrant family. About 20 million are with their parents in cities, but the other 10 million have been left behind in villages without parental care. Both categories pose serious educational as well as social problems and have become a major issue on the government’s agenda. They are also one of the major issues China pledged to tackle in its 2020 education plan.



Shanghai is one of the principal recipients of migrant workers because of its active industrial and commercial economies. Statistics in 2006 indicated that 80% of migrant children were of school age, and those who studied in Shanghai schools were 21.4% of the entire student population at the basic education level (Ding, 2010). Since 2002, national policy has been based on two statements (known as the policy of “Two Mainly”):²² “Education of migrant children is mainly the responsibility of the recipient city”, and “Migrant children should be educated mainly in public schools”. These policies became necessary at a time when recipient cities did not want to spend local taxpayers’ money on migrant children and when parents in public schools did not want to their own children to be mixed with migrant children. The national policy is interpreted differently in different cities.

Shanghai is among the cities that have dealt with migrant children with reason and sympathy. The city’s spectacular economic growth can be very much attributed to the contribution of migrant workers, and it followed that their children should be well treated. Interviewees in this study also gave this reason for Shanghai’s policies on migrant children’s education:

Shanghai has historically always been a city of migrants. Children of the migrants today will stay on and become *bona fide* citizens of Shanghai. How they are treated today will determine how they feel towards and contribute to the future of Shanghai.²³

An article in a recent issue of *Shanghai Education*, a very popular teachers’ magazine, argued that migrant children from rural villages would have positive effects on urban children. The migrant children brought in characteristics such as frugality and perseverance, while urban children from one-child families may be quick in mind and broad in knowledge but spoilt in their personalities. Hence the article argues for “bilateral integration” so that children of all origins can benefit from each other’s company.

In a way, Shanghai has established the notion that migrant children are “our children” and works constructively to include them in its educational development. Meanwhile, at the system level, the admission of migrant children to public schools helps solve the problem caused by the acute decline of school-age children among the permanent residents.

Strengthening weak schools

Another major undertaking in Shanghai has been to improve the school system by converting “weaker schools” to stronger schools. Since the 1980s, several rounds of school renovation attempted to ensure that schools were in sound physical condition. In the mid-1990s, the demographic decline began to show, which gave the government a good opportunity to further improve the schools (Jin, 2003). In 1999, Shanghai started a second wave of school renovation, upgrading school buildings and facilities according to a “standard programme.” A total of 1 569 schools were either re-organised or closed, accounting for three-quarters of all schools in Shanghai. A third wave of school renovation started in 2002, and one-third of junior secondary schools in Shanghai benefited. The second and third rounds included other reform measures, such as strengthening the team of teachers or selecting a strong principal.

With the improved economy, the Shanghai municipal government has been keen to improve households’ capacity to support children’s education. Since 2006, all students receiving compulsory education have been exempted from tuition and miscellaneous fees. Since 2007, all students in compulsory education have been provided with free textbooks and exercise books (Shanghai Municipal Education Commission, 2009). Although basic education is free and compulsory, the quality of schools varies, and that affects the quality of education children receive. Indeed, public schools in Shanghai have long been criticised for the disparity among them.

In order to reduce this disparity, the Shanghai government has adopted several strategies.²⁴ The first, as mentioned earlier, is *school renovation*. The government evaluates schools in terms of their infrastructure and educational quality, and then classifies them into Levels A, B, C and D. Level A schools meet the government’s standards for both infrastructure and quality, while Level D schools meet neither standard. With the decrease in the number of school-age children, quite a few Level C and D schools were closed. Others were merged into Level A or B schools or reorganised in the second and third waves of renovation. When the third renovation wave ended in 2005, Level C and D schools disappeared and all public schools became Level A or B. In junior secondary education, 64% of public schools are Level A.

The second strategy is known as *financial transfer payment*, which is the mobilisation of public funding with positive discrimination. Statistics showed that per-student expenditure in rural areas was only 50% to 60% of that in the city.



Rural schools also had far lower capital spending than downtown schools on average (Shanghai Municipal Education Commission, 2004). The strategy was then to set a minimum standard for per-student public expenditure at different levels, and to transfer public funds to the deprived areas. Between 2004 and 2008, over USD 500 million was transferred to rural schools to help them build new facilities and laboratories, update older ones, purchase books and audiovisual materials, and increase teacher salaries.

The third strategy is to *transfer teachers* from urban to rural areas and *vice versa*. It was often difficult for rural schools to recruit teachers, and they also suffered from high teacher turnover. For example, it was reported that in Qingpu District, a rural area, 160 experienced teachers in relatively poor junior secondary schools resigned between 1997 and 2002.²⁵ To reverse the situation, the government transferred a considerable number of teachers from urban public schools to rural schools, along with some outstanding urban principals (Shanghai Municipal Education Commission, 2008). Meanwhile, young and middle-aged principals and teachers from rural schools were transferred to urban schools. They are expected to return to the rural schools to enrich them with their new urban experiences.

The fourth strategy is to *pair off* urban districts with rural districts. In 2005, the educational authorities of nine urban districts signed three-year agreements with educational authorities of nine rural districts. The authorities exchange and discuss their educational development plans and join hands to deal with problems such as teachers' capacity building. Teachers' Professional Development Institutes affiliated to both authorities share their curricula, teaching materials and good practices. Moreover, some 91 schools paired up as sister schools, and a substantial number of teachers undertook exchange programmes among the sister schools (Shanghai Municipal Education Commission, 2009). The first round of the three-year "pairing off" programme ended in 2008, and the second round is under way.

The fifth strategy is relatively new but has gained increasing attention. It is called *commissioned administration*, a kind of school custody programme in which the government commissions "good" public schools to take over the administration of "weak" ones. Under this scheme, the "good" public school appoints its experienced leader (such as the deputy principal) to be the principal of the "weak" school and sends a team of experienced teachers to lead in teaching. It is believed that the ethos, management style and teaching methods of the good schools can in this way be transferred to the poorer school.

In 2007, the Shanghai municipal government asked 10 good schools in downtown and other educational intermediary agencies to take charge of 20 schools providing compulsory education in 10 rural districts and counties. The good schools/agencies and the rural schools signed a two-year contract that required the former to send senior administrators and experienced teachers to the latter. The city government bears the cost of the partnership (Shanghai Municipal Education Commission, 2008); Shanghai Municipal Education Commission, 2009). Such an arrangement not only benefits the poor schools; it also gives the good schools more room to promote their teachers.²⁶

The sixth strategy is to establish a *consortium* of schools, where strong and weak schools, old and new, public and private are grouped into a consortium or cluster, with one strong school at the core (Box 4.3).

Box 4.3 The Qibao Education Group

Qibao is a suburb of Shanghai. Its secondary school, established in 1947, has become known for the humanist values that permeate all aspects of school life. It is also known for the percentage of its graduates admitted to good universities. Some graduates from Qibao have been directly admitted to Harvard University. Since the 1960s, Qibao Secondary School has been identified as an "experimental school" or a "demonstration school" because of its effective leadership, and it has been famous in the realms of science education, sports, arts and music, and technology. Under the leadership of Principal Qiu Zhonghai, the Qibao Education Group was established in 2005 with Qibao Secondary School as the core. To date it hosts six schools. Three other public schools were renamed and "adopted" by Qibao, while two private secondary schools, one junior and one senior, were newly established by the group. All six schools have demonstrated continuous improvement since becoming members of the Qibao Group.

Source: A focus group discussion with administrators of the group, 2010.




Achievements and challenges in Shanghai's education system

External observers might see the development and practice of education in Shanghai as very effective. Shanghai participated in PISA 2009 and achieved very high average results overall (Table 4.1, OECD, 2010). Although these results were not yet available at the time of this study, there was consensus among all those interviewed (see list at end of chapter) on some positive developments including some improvements on local measurements of student learning. Local experts believe that this is evidence of successful reforms, whereby students are now exposed to a much broader knowledge base and are trained to integrate their knowledge and tackle real-life problems. Students have also become used to identifying questions of interest to themselves, and to make open-ended explorations. All these changes are markedly different from the traditional Chinese pattern in which students learn subjects by heart and regurgitate such knowledge in examinations.

Table 4.1 Shanghai-China's mean scores on reading, mathematics and science scales in PISA

	PISA 2000	PISA 2003	PISA 2006	PISA 2009
	Mean score	Mean score	Mean score	Mean score
Reading				556
Mathematics				600
Science				575

Source: OECD (2010), *PISA 2009 Results: What Students Know and Can Do: Student Performance in Reading, Mathematics and Science (Volume I)*, OECD Publishing.
 StatLink  <http://dx.doi.org/10.1787/888932366674>

However, none of the interviewees was satisfied with the quality of Shanghai's education system. As one experienced educator insightfully expressed it, the changes in student learning were brought about chiefly by organised and structured top-down reforms, implemented either through examinations or policy shifts.²⁷ Such measures may be well designed, but students are still not given much autonomy in their study. Schools with outstanding characteristics are still rare, and examination pressure still prevails.

There is little expectation of any fundamental change in the near future, given that in comparison to injustice from abuses of power or payments of money, examination scores are seen to be "scientific," "reliable" and hence "fair." However, the dictates of the examinations have left students with little time and room for learning on their own. "There is an opportunity cost in terms of time and space," said the interviewee. "Students grow within narrow margins" and are not fully prepared for their lives and work in the future. This is seen as a deep crisis, exacerbated by the reality of single-child families.

HONG KONG'S EDUCATION SYSTEM: ONE COUNTRY, TWO SYSTEMS

Hong Kong was originally a small fishing island that was ceded to the British government in 1842 after China's defeat in the Sino-British War ("The Opium War"). In further treaties in the late 19th century, China also lost the Kowloon Peninsula and the New Territories to Britain on a 99-year lease. Hong Kong maintained its colonial status at the end of the Second World War when all other "unequal treaties" with China were terminated. In 1997 the 99-year lease ended. Following a surprise suggestion from Deng Xiaoping to British Prime Minister Margaret Thatcher, Hong Kong's sovereignty was returned to China under the "one country, two systems" notion.

Under this arrangement, China resumed its sovereignty over Hong Kong, but Hong Kong remained a separate jurisdiction, governed by a "Basic Law" and enjoying autonomy in all areas except military defence and diplomatic relations. As a Special Administrative Region of China (SAR), Hong Kong maintains an independent legislature, with a distinct currency and policies of its own, independent from the national government in Beijing. In the realm of education, for example, Hong Kong maintains its own system of education under an Education Bureau (EDB) which reports only to the Hong Kong government and Hong Kong taxpayers, without direct relations with the Ministry of Education in Beijing. Meanwhile, Hong Kong is free to engage in bilateral relations with other jurisdictions and assume membership in other international organisations for finance, commercial, education, culture and so forth. Hong Kong's education system has been and remains quite distinct from that of the rest of China, with a unique history, structure and reform trajectory.

Hong Kong has a population of around 7 million living in a small area of 1 000 square kilometres. Its average GDP per capita is often above USD 42 000, bringing it within the world's top ten richest nations on most lists.²⁸ The service sector of the economy accounts for 92% of Hong Kong's economic growth. Across the border on the Chinese mainland, an estimated 80 million people work for Hong Kong investors.



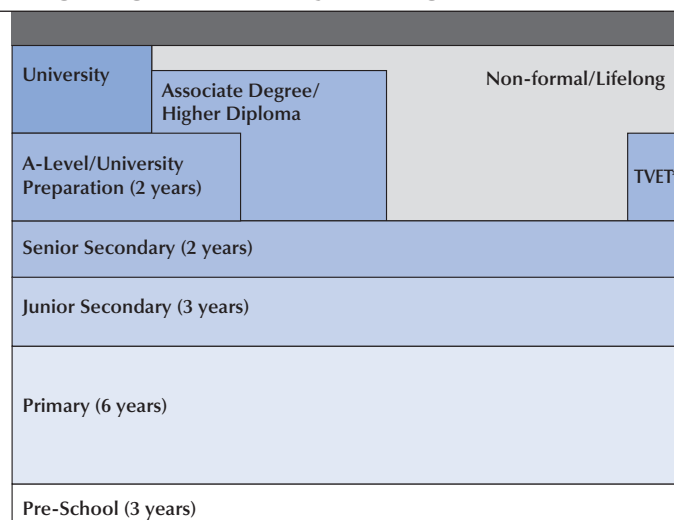
The population is predominantly ethnic Chinese. Caucasians from Western countries living in Hong Kong are small in number but mostly work for influential multinationals. The ethnic Chinese derive from immigrations at different periods of history. Increasingly, they come from mainland China, either as immigrants who stay on or as tourists or migrants who reside in Hong Kong temporarily. Small but significant portions of the population are from Indonesia and the Philippines, most with temporary permits to work as domestic helpers. Traditionally, residents of South Asian origin include businessmen from India, manual or service workers from Pakistan and former Gurkhas from Nepal. Hong Kong residents, both men and women, have life expectancies that are among the longest in the world.

Hong Kong hosts an education system comprising around 1 100 schools. However, the number is shrinking because of dramatic declines in population. Each age cohort has declined from around 9 000 members in the early 1980s to around 4 000 in recent years. The fertility rate is around 0.9 children per woman, far less than the “replacement” level of 2.1 children per woman.

Hong Kong’s education system is very much part of the British colonial legacy. The school system still maintains the British approach of five-year secondary schooling (Forms 1-5), which ends with a Certificate of Education Examination, the crucial certification for a student’s future. The certificate is a gateway for all young people, either to work or further study. It is followed by a two-year matriculation education (known as Forms 6 and 7) in preparation for the A-Level examinations, which aim at admissions to higher education (Figure 4.2a). However, this system is facing an overhaul, as we will discuss below.

■ Figure 4.2a ■

Hong Kong’s education system organisation until 2012



* Technical and Vocational Education and Training.

The post-war years: The foundations of an elitist system

Whilst the school system on the Chinese mainland only began after 1905 with the abolition of the Civil Examinations, Hong Kong already had schools in place long before that and they were not influenced by changes on the mainland. The leading elite Hong Kong schools followed the model of the British “public” (*i.e.*, private) schools. Nonetheless, the Hong Kong population has always been predominantly Chinese, and the schools have largely been adapted to the Chinese culture. This was also aided by British colonial localisation policies, particularly after the Second World War. Hence, it is fair to say that the Hong Kong education system is very much a hybrid of Chinese culture and British traditions and schools enjoy the best of both worlds.

Hong Kong’s education remained rather elitist even after the Second World War and until the 1960s. There was only one university, the University of Hong Kong, which took in only 100 to 200 students each year. A rather stringent primary school examination later evolved into the Secondary Schools Entrance Examination, so that the traditional examination pressure prevailed at the primary level, even though primary schooling was already widespread. The post-war baby boom caused school attendance to soar, but secondary schools remained very selective.



There have never been many government schools in Hong Kong. However, since the 1950s, the government has been subsidising non-government school-sponsoring bodies (mainly churches, charitable organisations and other associations or agencies) and with them formed a public school system. Many such schools once operated under marginal conditions (such as on the rooftops of public housing), but were given land and buildings in the 1970s and 1980s. Now they enjoy state-of-the-art facilities. In brief, the Hong Kong government provides most of the capital cost and almost the full recurrent cost of public schools, but expects the non-government sponsoring bodies to run them. The sponsoring bodies abide by a Code of Aid, a kind of contractual agreement with the government. In a way, the “aided schools” are near to the US concept of charter schools, except that the Code of Aid governs operational procedures rather than performance.

Hong Kong still has quite a few elite schools whose graduates are favoured candidates for admission to the best universities in the world. It is notable that such students are not necessarily from wealthy families. Hong Kong strongly exemplifies the Chinese belief that young people achieve because of hard work, regardless of family background. However, its schools are not only strong in academic achievements; often they are also champions in sports and music, and most graduates have become leaders in higher education, mainly because of their vibrant and autonomous student organisations. The Hong Kong schools breed leaders.

Private schools, many of them for-profit, mushroomed in the 1970s to respond to the shortage of school places. Such schools tended to offer low-quality education and as a result gradually disappeared during the 1980s because of expansion in the public sector. Since the turn of the century, however, a new breed of elite private schools has been established as international schools, though admitting mainly local students.

The push for universal education: 1960s onwards

In 1965, new legislation introduced compulsory six-year primary education. Actual primary enrolment was already near 100%.²⁹ This was followed by heated debate about whether to offer three years of free schooling after the primary level. There was tension between government expansion plans and escalating social aspirations for more education. The tug-of-war was about the speed of expansion. Government plans, bold as they were, attempted to maintain a pyramidal structure in response to the manpower needs of the manufacturing industrial economy, the main thrust of Hong Kong’s economic “miracle” in the 1970s and 1980s. That is, the government maintained a very small percentage in the enrolment of higher education, while steadily expanding senior secondary education and providing universal education for primary and junior secondary. Meanwhile, social equity goals emerged in the 1970s, leading to calls for universal secondary education. Due to international pressures, mainly from the General Agreement on Tariffs and Trade (GATT), Hong Kong introduced nine-year compulsory education in 1978.³⁰

The next step was to abolish the Secondary Schools Entrance Examination. This could be regarded as an historic first step to release the schools from formal public examinations, at least at the primary level. However, schools remain different in their standards. The replacement for exams as placement mechanisms was a “scientific” approach that combined school internal assessments, an aptitude test to scale the internal assessments across schools, a classification of students into five capacity bands, and parental choice after random picks by computers. In the end, however, the best students were still admitted to the best schools. The public examination was gone, but schools still managed to create all kinds of tests as a tangible yardstick for performance. Drilling survived, and the situation did not change until the comprehensive reform discussed below.

The aspiration for education did not stop at the introduction of nine-year compulsory schooling. It was a textbook example of how increased supply led to increased demand. Without much intervention from the government, enrolment in secondary education was again near universal by the end of the 1980s. This was augmented by a rather sophisticated system of vocational education (programmes for apprenticeship, craftsmen and technicians) with the milestone establishment of the Vocational Training Council in 1982.

The next battle was for higher education expansion. Until the early 1980s, Hong Kong maintained a small gross enrolment ratio of 1-2%, with a 3% increment in the intake each year. Local enrolments were limited to two universities, and those who could afford it would go abroad to study in overseas institutions. There were several attempts to expand access to higher education, but government determination to do so came only in 1988. That year saw an exodus of emigrants because of the forthcoming handover in sovereignty to China, as well as other political change. This situation prompted the Hong Kong government to expand its formal higher education intake to 18% of the eligible population. Another tug-of-war ensued between government policies and social aspirations, now focused on this tertiary education level. By the early 1990s, however, the 18% target was achieved.