

【 Education Policy Studies Series 】

A Cross-national Perspective
on Some Characteristics
Shared by the Best-performing
Countries in PISA

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Education Policy Studies Series

Education embraces aspirations of individuals and society. It is a means of strengthening human resources, sustaining competitiveness of society, enhancing mobility of the underprivileged, and assimilating newcomers to the mainstream of society. It is also a means of creating a free, prosperous, and harmonious environment for the populace.

Education is an endeavor that has far-reaching influences, for it embodies development and justness. Its development needs enormous support from society as well as the guidance of policies that serve the imperatives of economic development and social justice. Policy-makers in education, as those in other public sectors, can neither rely on their own visions nor depend on the simple tabulation of financial cost and benefit to arrive at decisions that will affect the pursuit of the common good. Democratization warrants public discourse on vital matters that affect all of us. Democratization also dictates transparency in the policy-making process. Administrative orders disguised as policies have a very small audience indeed. The public expects well-informed policy decisions, which are based on in-depth analyses and careful deliberation. Like the policy-makers, the public and professionals in education require a wealth of easily accessible facts and views so that they can contribute constructively to the public discourse.

To facilitate rational discourse on important educational matters, the Hong Kong Institute of Educational Research of The Chinese University of Hong Kong organizes from time to time “Education Policy Seminars” to address critical issues in educational development of Hong Kong and other Chinese societies. These academic gatherings have been attended by

stakeholders, practitioners, researchers and parents. The bulk of this series of occasional papers are the fruit of labor of some of the speakers at the seminars. Others are written specifically as contributions to the series.

The aim of this *Education Policy Studies Series* is to present the views of selected persons who have new ideas to share and to engage all stakeholders in education in an on-going discussion on educational matters that will shape the future of our society.

International Assessment of Education Quality Series

Entering the era of globalization, Hong Kong is getting more and more related to other parts of the world. It is important for us to examine the quality of education and the effectiveness of educational reforms in Hong Kong from an international as well as a comparative perspective. How do the various reforms impact on students' cognitive ability, attitude, and style of learning? Have students acquire the knowledge and skills essential for meeting the challenges of the twenty-first century? Are students able to make rational decision and communicate their idea effectively? Are students prepared for life-long learning? Also, how will the family's cultural, social and economic resources impact on students' learning? At the organizational level, how do education policies and the various aspects of school life (e.g., school decentralization, school climate, teacher autonomy, and parental involvement, etc.) impact on the quality of education and school effectiveness? All these are important questions worthy of investigation.

International Assessment of Education Quality Series aims at extending our understanding of the quality and equality of educational systems from an international comparative perspective. This series will be of value to various stakeholders in the field of education: researchers can examine the current state of affair of education and the outcome of educational reforms; policy makers can formulate local policies that is responsive to global development; teachers and parents can regard education from a broader perspective to understand education in the context of Hong Kong, of the Chinese communities, or further in the international context. In sum, the series, by providing stakeholders of the education community with "reason" and "data," attempts to support them in their decision and action for a better future of our students.

International Assessment of Education Quality Series

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*Understanding the Quality and Equality of Hong Kong Education System
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*Can Basic Education System in Hong Kong
Be Equal and Excellent: Results from PISA2000+*

By Esther Sui-chu Ho

A Cross-national Perspective on Some Characteristics Shared by the Best-performing Countries in PISA

Abstract

The PISA 2000 assessments of performance by 15-year-olds revealed wide differences among countries, and between schools and students within countries. However, the results achieved by students in countries/regions such as Finland, Canada, Hong Kong, Korea, and Japan indicate that it is possible to combine high performance standards with an equitable distribution of learning outcomes. Quality and equity do not have to be seen as competing policy objectives.

Nevertheless, even the countries that performed well overall in the 2000 PISA assessments have areas for concern. In almost all countries, there is a significant minority of students who performed at reading literacy level 1 or below. Such students may not only struggle in school, but also find it difficult to make their way successfully in the world beyond school. A cross-sectional study such as PISA cannot establish the causal nature of relationships, but it can show countries their areas of relative strength and weakness, and stimulate debate about current policies and practices. Important pointers for policy that emerge from the results include building students' engagement with reading and school more generally, focusing on learning outcomes rather than educational inputs, providing schools with

the authority for organizing their own programs and holding them accountable for the results, and reducing the extent of social and educational differentiation among schools.

The PISA results also pose important questions for deeper investigation. For example, the strength of the findings on student engagement challenges school systems and researchers to delve more deeply into the motivational factors that make learning more effective, and how those factors can be developed. The strong association between student performance and structural differentiation in schooling challenges systems that stream students from a relatively early age to better understand the social and educational processes at work. Future developments in PISA will help to deepen our understanding of the ways in which system policies and school practices affect the performance of students from different social backgrounds.

Introduction

How well do school systems perform in providing young people with a solid foundation of knowledge and skills, and in preparing them for life and learning beyond school? Parents, students, the public, and those who run education systems need to know the answers to these questions.

Many education systems monitor student learning in order to provide some answers to these questions. Comparative international analyses can extend and enrich the national picture by providing a larger context within which to interpret national results. They can show countries their areas of relative strength

and weakness and help them to monitor progress and raise aspirations. They can also provide directions for national policy, for schools' curriculum and instructional efforts, and for students' learning. Such international comparisons of the outcomes of education systems have in the past been elusive and remain difficult. However, since 1997, governments of the Organisation for Economic Co-operation and Development (OECD) have been working on establishing a comparative framework to assess how well their education systems meet core objectives. The result has been the OECD Programme for International Student Assessment (PISA), the most comprehensive and rigorous international effort to date to assess learning outcomes within an international comparative perspective, to identify the policy levers that may help improving the performance of education systems, and to provide a new basis for policy dialogue and for collaboration in defining and operationalizing educational goals in ways that reflect judgments about the skills that are relevant to adult life (see Box 1).

This article seeks to explore factors that are associated with high-quality learning outcomes. The article begins by briefly summarizing the performance of countries in the PISA assessment, both in terms of the knowledge and skills which 15-year-olds display in key subject areas, and in terms of the extent to which education systems succeed in delivering equitable learning outcomes. The article then proceeds toward uncovering those characteristics of schools and education systems that PISA suggests are associated with strong and equitable performance.

Box 1. PISA 2000 — An Internationally Standardized Assessment of 15-year-olds

<i>Basics</i>	<ul style="list-style-type: none"> • An internationally standardized assessment that was jointly developed by participating countries and administered to 15-year-olds in schools. • A survey implemented in 43 countries/regions in the first assessment in 2000. • Tests typically administered to between 4,500 and 10,000 students in each country/region.
<i>Content</i>	<ul style="list-style-type: none"> • PISA 2000 covers the domains of reading, mathematical, and scientific literacy not merely in terms of mastery of the school curriculum, but in terms of important knowledge and skills needed in adult life. In 2003, the examination of cross-curriculum competencies would continue to be a part of PISA through the assessment of a new domain of problem solving. • Emphasis is on the mastery of processes, the understanding of concepts, and the ability to function in various situations within each domain.
<i>Methods</i>	<ul style="list-style-type: none"> • Pencil-and-paper tests are used, with assessments lasting a total of two hours for each student. • Test items are a mixture of multiple-choice items and questions requiring students to construct their own responses. The items are organized in groups based on a passage setting out a real-life situation. • A total of about seven hours of test items is covered, with different students taking different combinations of test items. • Students answer a background questionnaire, which takes 20–30 minutes to complete, providing information about themselves and their homes. School principals are given a 20-minute questionnaire about their schools.
<i>Assessment cycle</i>	<ul style="list-style-type: none"> • The assessment takes place every three years, with the first assessment completed in 2000, assessments for 2003 and 2006 are at an advanced planning stage and further assessments beyond the currently being explored. • Each of these cycles looks in depth at a “major” domain, to which two-thirds of testing time is devoted; the other domains provide a summary profile of skills. Major domains are reading literacy in 2000, mathematical literacy in 2003, and scientific literacy in 2006.
<i>Outcomes</i>	<ul style="list-style-type: none"> • A basic profile of knowledge and skills among 15-year-old students. • Contextual indicators relating results to student and school characteristics. • Trend indicators showing how results change over time. • A valuable knowledge base for policy analysis and research.

Source: OECD (2001).

Since a number of years, the OECD education indicators demonstrate consistently that education has become the key to success, for individuals but also for the economic and social progress of nations as a whole. The OECD indicators reveal not only clear relationships between education, opportunities on the job market and income, but also that growth in educational attainment is among the most powerful influences affecting economic growth.

In the past, one main role of education systems was to instill traditional skills. One of the characteristics of such skills is that they change very slowly. The Hong Kong Museum of History contains a large collection of tools used by skilled craftsmen centuries ago. Any craftsmen today will instantly recognize these, because they closely resemble the tools still in use. In the past, it was therefore reasonable to assume for skill training that whatever had been learned by the end of schooling would last for a lifetime. Education and training oriented toward preparation for direct entry into the labor market therefore had a strong justification.

The manufacturing sector of the economy is, however, rapidly shrinking in all OECD countries. Some forecasts suggest that by 2020, the time when any educational reform put in place today will show its effects in the labor market, manufacturing output in OECD will at least double, while manufacturing employment will shrink to 10–2 per cent of the total workforce. Manufacturing jobs will increasingly

be replaced by knowledge-intensive work, with knowledge becoming the key economic resource, and the only scarce one.

In contrast to traditional skills, knowledge rapidly becomes obsolete, and knowledge workers need to regularly upgrade their knowledge. This suggests the importance for education systems today to instill, beyond knowledge and skills in key subject areas, the capacity and the motivation of young adults to continue learning throughout life.

To achieve this, students need to be able to manage their own learning — to set goals, to persevere, to monitor their progress, and to adjust their learning strategies as necessary. Beyond instilling knowledge, education systems are therefore called upon to contribute to the development of competencies with which to analyze, compare, contrast, critique and evaluate as well as creative skills with which to imagine, hypothesize, discover and invent.

All of this is at the heart of the conceptual framework underlying PISA. PISA is based on a dynamic model of lifelong learning in which new knowledge and skills necessary for successful adaptation to a changing world are continuously acquired throughout life. PISA focuses on things that 15-year-olds will need in their future lives and seeks to assess what they can do with what they have learned. The assessment is informed — but not constrained — by the common denominator of national curricula. PISA does assess students' knowledge, but most importantly

examines their ability to reflect on the knowledge and experience, and to apply that knowledge and experience to real-world issues. The term “literacy” is used to encapsulate this broader conception of knowledge and skills. That is, the term “literacy” is not about being able to read and write, but in the broad sense of using technical and socio-cultural tools to interact with the world. It is about the capacity of accessing, managing, integrating, evaluating, and creating information to develop one’s knowledge and potential, and to participate in, and contribute to, society.

At the center of literacy skills is reading literacy, defined by PISA as the ability to use, interpret, and reflect on written material. However, being literate in today’s and tomorrow’s society must certainly also include the capacity to apply knowledge and skills in mathematics and science. In mathematics, emphasis is placed on mathematical knowledge put into functional use in a multitude of different situations in varied, reflective, and insight-based ways. And in science, it implies the capacity to use scientific knowledge and to draw evidence-based conclusions in order to understand and help make decisions about the natural world.

In all three areas, students in PISA had to demonstrate understanding of key concepts, mastery of important processes, and their ability to apply knowledge and skills in different situations. Sample tasks from the PISA 2000 assessment can be found in *Sample Tasks from the PISA 2000 Assessment — Reading, Mathematical and Scientific Literacy* (OECD, 2002c).

Where We Are Today — What PISA Shows Students Can and Cannot Do

Performance Levels Among 15-year-olds

First results from PISA were published in 2001, showing how well 15-year-olds across the OECD can apply knowledge and skills in key subject areas and what they are like as learners. In all subject areas assessed, the results revealed wide differences not just between countries, but also between schools and students within countries.

In mathematics and science, PISA shows that 15-year-olds in Hong-Kong are among the best-performing students in the world. When it comes to reading literacy, performance of students in Hong Kong is high too, but comparisons with the performance of other countries suggest that improvements are still possible in this area. As reading literacy is fundamental for the successful participation of individuals in modern societies, and because it was the focal point of the PISA 2000 assessment, the next part of this article will focus on reading literacy performance.

In Australia, Canada, Finland, New Zealand, and the United Kingdom, more than 15% of students displayed the highest level of reading proficiency (Level 5), showing that they are capable of completing sophisticated reading tasks, such as managing information that is difficult to find in unfamiliar texts; having a detailed understanding of such texts and inferring which information in the text is relevant to the task; and being able to

evaluate critically and build hypotheses, to draw on specialized knowledge, and to accommodate concepts that may be contrary to expectations (see Box 2). By contrast, this proportion was 5% or less in Brazil, Greece, Latvia, Luxembourg, Mexico, Portugal, the Russian Federation, and Spain (see Table 1).

Box 2. Proficiency Levels and Their Descriptions

Proficiency level	Description
Level 5 (over 625 points)	Capable of completing sophisticated reading tasks, such as managing information that is difficult to find in unfamiliar texts; showing detailed understanding of such texts and inferring which information in the text is relevant to the task; and being able to evaluate critically and build hypotheses, draw on specialized knowledge, and accommodate concepts that may be contrary to expectations.
Level 4 (553–625 points)	Capable of difficult reading tasks, such as locating embedded information, construing meaning from nuances of language and critically evaluating a text.
Level 3 (481–552 points)	Capable of reading tasks of moderate complexity, such as locating multiple pieces of information, drawing links between different parts of the text, and relating it to familiar everyday knowledge.
Level 2 (408–480 points)	Capable of basic reading tasks, such as locating straightforward information, making low-level inferences of various types, deciding what a well-defined part of the text means, and using some outside knowledge to understand it.
Level 1 (335–407 points)	Capable of completing only the least complex reading tasks developed for PISA, such as locating a single piece of information, identifying the main theme of a text, or making a simple connection with everyday knowledge.
Below Level 1 (below 335 points)	Not able to show routinely the most basic type of knowledge and skills that PISA seeks to measure; may have serious difficulties in using reading literacy as an effective tool to advance and extend their knowledge and skills in other areas.

Source: OECD (2001).

Table 1. Percentage of Students at Each Level of Proficiency on the PISA Reading Literacy Scale 2000

Country	Below Level 1 *						Level 1 *			Level 2 *						Level 3 *			Level 4 *			Level 5 *						
	Females			Males			Mean	%	SE	Mean	%	SE	Females		Males		Mean	%	SE	Mean	%	SE	Mean	%	SE	Mean	%	SE
	%	SE	%	%	SE	%	%	%	%	%	%	%	%	%	%	%	%	%	%	%	%	%	%	%	%	%	%	%
OECD countries																												
Australia	1.7	0.4	4.7	0.7	3.3	0.5	9.1	0.8	16.5	1.2	21.3	1.8	19.0	1.1	25.7	1.1	25.3	0.9	17.6	1.2	25.3	0.9	17.6	1.2	25.3	0.9	17.6	1.2
Austria	2.8	0.5	5.9	0.8	4.4	0.4	10.2	0.6	20.2	1.3	23.3	1.4	21.7	0.9	29.9	1.2	24.9	1.0	8.8	0.8	24.9	1.0	8.8	0.8	24.9	1.0	8.8	0.8
Belgium	5.3	1.0	9.7	1.3	7.7	1.0	11.3	0.7	14.6	1.0	18.7	1.1	16.8	0.7	25.8	0.9	26.3	0.9	12.0	0.7	25.8	0.9	12.0	0.7	25.8	0.9	12.0	0.7
Canada	1.3	0.3	3.3	0.3	2.4	0.3	7.2	0.3	15.3	0.6	20.4	0.6	18.0	0.4	28.0	0.5	27.7	0.6	16.8	0.5	28.0	0.5	16.8	0.5	27.7	0.6	16.8	0.5
Czech Republic	3.2	0.4	9.0	1.2	6.1	0.6	11.4	0.7	22.9	1.3	26.9	1.5	24.8	1.2	30.9	1.1	19.8	0.8	7.0	0.6	30.9	1.1	7.0	0.6	19.8	0.8	7.0	0.6
Denmark	3.8	0.6	7.6	0.8	5.9	0.6	12.0	0.7	21.6	1.3	23.5	1.1	22.5	0.9	29.5	1.0	22.0	0.9	8.1	0.5	29.5	1.0	8.1	0.5	22.0	0.9	8.1	0.5
Finland	1.0	0.6	2.5	0.6	1.7	0.5	5.2	0.4	9.1	0.8	19.7	1.0	14.3	0.7	28.7	0.8	31.6	0.9	18.5	0.9	28.7	0.8	18.5	0.9	31.6	0.9	18.5	0.9
France	2.3	0.5	6.0	0.9	4.2	0.6	11.0	0.8	21.1	1.2	22.9	1.3	22.0	0.8	30.6	1.0	23.7	0.9	8.5	0.6	30.6	1.0	8.5	0.6	23.7	0.9	8.5	0.6
Germany	6.8	1.1	12.6	0.9	9.9	0.7	12.7	0.6	20.2	1.2	24.3	1.3	22.3	0.8	26.8	1.0	19.4	1.0	8.8	0.5	26.8	1.0	8.8	0.5	19.4	1.0	8.8	0.5
Greece	4.7	1.0	12.7	1.7	8.7	1.2	15.7	1.4	25.0	2.0	26.6	1.5	25.9	1.4	28.1	1.7	16.7	1.4	5.0	0.7	28.1	1.7	5.0	0.7	16.7	1.4	5.0	0.7
Hungary	4.5	0.7	9.4	1.2	6.9	0.7	15.8	1.2	22.7	1.8	27.2	1.7	25.0	1.1	28.8	1.3	18.5	1.1	5.1	0.8	28.8	1.3	5.1	0.8	18.5	1.1	5.1	0.8
Iceland	1.8	0.5	5.7	0.6	4.0	0.3	10.5	0.6	19.6	1.0	24.4	1.3	22.0	0.8	30.8	0.9	23.6	1.1	9.1	0.7	30.8	0.9	9.1	0.7	23.6	1.1	9.1	0.7
Ireland	2.0	0.5	4.0	0.6	3.1	0.5	7.9	0.8	14.3	1.0	21.4	1.5	17.9	0.9	29.7	1.1	27.1	1.1	14.2	0.8	29.7	1.1	14.2	0.8	27.1	1.1	14.2	0.8
Italy	2.5	0.6	8.0	1.4	5.4	0.9	13.5	0.9	22.9	1.3	28.3	1.7	25.6	1.0	30.6	1.0	19.5	1.1	5.3	0.5	30.6	1.0	5.3	0.5	19.5	1.1	5.3	0.5
Japan	1.1	0.4	4.4	1.1	2.7	0.6	7.3	1.1	15.8	1.6	20.2	1.5	18.0	1.3	33.3	1.3	28.8	1.7	9.9	1.1	33.3	1.3	28.8	1.7	28.8	1.7	9.9	1.1
Korea	0.5	0.2	1.3	0.4	0.9	0.2	4.8	0.6	17.6	1.6	19.4	1.4	18.6	0.9	38.8	1.1	31.1	1.2	5.7	0.6	38.8	1.1	5.7	0.6	31.1	1.2	5.7	0.6
Luxembourg	10.5	0.8	17.6	1.1	14.2	0.7	20.9	0.8	28.2	1.7	26.6	1.5	27.5	1.3	24.6	1.1	11.2	0.5	1.7	0.3	24.6	1.1	1.7	0.3	11.2	0.5	1.7	0.3

Mexico	12.5	1.4	20.0	1.6	16.1	1.2	28.1	1.4	32.4	1.6	27.8	1.4	30.3	1.1	18.8	1.2	6.0	0.7	0.9	0.2
New Zealand	2.0	0.4	7.3	0.9	4.8	0.5	8.9	0.5	15.3	1.1	19.1	1.5	17.2	0.9	24.6	1.1	25.8	1.1	18.7	1.0
Norway	3.1	0.6	8.8	1.0	6.3	0.6	11.2	0.8	18.0	1.0	21.0	1.4	19.5	0.8	28.1	0.8	23.7	0.9	11.2	0.7
Poland	5.0	1.2	12.2	1.5	8.7	1.0	14.6	1.0	24.8	2.0	23.4	1.7	24.1	1.4	28.2	1.3	18.6	1.3	5.9	1.0
Portugal	6.9	1.0	12.3	1.4	9.6	1.0	16.7	1.2	24.8	1.3	25.9	1.5	25.3	1.0	27.5	1.2	16.8	1.1	4.2	0.5
Spain	2.2	0.5	5.8	0.7	4.1	0.5	12.2	0.9	24.1	1.2	27.2	1.2	25.7	0.7	32.8	1.0	21.1	0.9	4.2	0.5
Sweden	1.8	0.4	4.6	0.6	3.3	0.4	9.3	0.6	17.1	1.1	23.3	1.0	20.3	0.7	30.4	1.0	25.6	1.0	11.2	0.7
Switzerland	5.5	0.8	8.3	0.9	7.0	0.7	13.3	0.9	19.0	1.2	23.7	1.4	21.4	1.0	28.0	1.0	21.0	1.0	9.2	1.0
United Kingdom	2.2	0.4	5.0	0.6	3.6	0.4	9.2	0.5	17.2	1.0	21.8	1.2	19.6	0.7	27.5	0.9	24.4	0.9	15.6	1.0
United States	3.7	0.8	9.3	1.8	6.4	1.2	11.5	1.2	20.2	1.9	21.8	1.2	21.0	1.2	27.4	1.3	21.5	1.4	12.2	1.4
OECD total	3.9	0.3	8.5	0.5	6.2	0.4	12.1	0.4	20.6	0.6	22.9	0.5	21.8	0.4	28.6	0.4	21.8	0.4	9.4	0.4
OECD average	3.7	0.1	8.0	0.2	6.0	0.1	11.9	0.2	20.0	0.2	23.3	0.3	21.7	0.2	28.7	0.2	22.3	0.2	9.5	0.1
Non-OECD countries/regions																				
Brazil	19.3	1.4	27.4	1.9	23.3	1.4	32.5	1.2	29.9	1.8	25.5	1.6	27.7	1.3	12.9	1.1	3.1	0.5	0.6	0.2
Hong Kong	1.9	0.3	3.7	0.7	2.6	0.5	6.5	0.7	4.8	0.7	18.2	1.3	17.1	0.9	33.1	1.1	31.3	1.1	9.5	0.8
Latvia	6.7	1.1	18.4	2.1	12.7	1.3	17.9	1.3	26.8	1.5	25.8	1.6	26.3	1.1	25.2	1.3	13.8	1.1	4.1	0.6
Liechtenstein	5.0	2.2	9.9	2.6	7.6	1.5	14.5	2.1	23.0	4.9	23.4	3.7	23.2	2.9	30.1	3.4	19.5	2.2	5.1	1.6
Russian Federation	5.0	0.7	12.9	1.6	9.0	1.0	18.5	1.1	28.6	1.2	29.9	1.0	29.2	0.8	26.9	1.1	13.3	1.0	3.2	0.5

* Below Level 1 = less than 335 score points; Level 1 = 335–407 score points; Level 2 = 408–480 score points; Level 3 = 481–552 score points;

Level 4 = 553–625 score points; Level 5 = above 625 score points.

Source: OECD PISA 2000 database (OECD, 2001, 2003b).

At the other end of the scale, PISA revealed that for most countries there remains a significant minority of students — an average of 6% across OECD countries but around 10% or more in Germany, Luxembourg, Mexico, and Portugal — who do not even reach the lowest level of proficiency defined for PISA. These students may still be able to read in a technical sense, but they show serious difficulties in applying reading literacy as a tool to advance and extend their knowledge and skills in other areas. Adding to this the proportion of students who perform only at Level 1 — i.e., those who are capable only of completing the most basic of reading tasks, such as locating a simple piece of information, identifying the main theme of a text, or making a simple connection with everyday knowledge — brings the proportion of low performers to an average of 18% across OECD countries.

Students with literacy skills at or below Level 1 may encounter not only difficulties in their initial transition from education to work but also failure to fully benefit from further education and learning opportunities throughout life. In Canada, Finland, Hong Kong, Japan, and Korea, 7% or less of students perform at Level 1, and less than 3% below it, but these countries/regions are exceptions. In all other OECD countries, between 11% and 44% of students perform at or below Level 1. The countries with 20% or more of students at Level 1 or below are, in order, Brazil, Mexico, Luxembourg, Latvia, the Russian Federation, Portugal, Greece, Poland, Hungary, Germany, Liechtenstein, and Switzerland. The existence of this significant minority of students who, near the end of compulsory schooling, lack the foundation of literacy skills

needed for further learning, must be of concern to policy-makers seeking to make lifelong learning a reality for all. This is so, in particular, in the face of mounting evidence that continuing education and training beyond school tend to reinforce rather than to mitigate skill differences resulting from unequal success in initial education.

It is possible to summarize the performance of students in each country by computing a mean score across all student groups and then to assess the relative standing of countries in the international comparison on this measure. The mean score¹ for student performance in reading literacy is shown in Table 2.

For most countries, the performance in reading literacy is highly predictive for performance in other subject areas but there are some exceptions: Denmark, Hong Kong, Hungary, Japan, Korea, and Switzerland show somewhat better performance in mathematical literacy than in reading literacy while the reverse is true for Canada, Finland, Greece, Ireland, Italy, Norway, Spain, Sweden, and the United States. Similarly, Austria, the Czech Republic, Hungary, Japan, Korea, and the United Kingdom show better performance in scientific literacy than in reading literacy while Belgium, Canada, Denmark, Finland, Iceland, Ireland, and Italy perform better in reading literacy than in scientific literacy. However, even where these differences in patterns exist, they tend to be small.

For some countries, the results displayed in Tables 1 and 2 were deeply disappointing, showing that their students' average performance lags considerably behind that of their counterparts,

Table 2. Student Performance on the Reading, Mathematical, and Scientific Literacy Scales and National Income

Country	Performance on the reading literacy scale		Performance on the mathematical literacy scale		Performance on the scientific literacy scale		Gross Domestic Product (GDP) per capita (2000) (U.S. dollars #)	Cumulative expenditure on educational institutions per student from primary education to 15 years of age (1999) (U.S. dollars #)	Accumulated instruction hours over 9 years from primary education to 15 years of age (2000)
	Mean score	SE	Mean score	SE	Mean score	SE			
OECD countries									
Australia	528	3.5	533	3.5	528	3.5	26,300	55,987	8,978
Austria	507	2.4	515	2.5	519	2.6	27,000	77,027	m
Belgium	507	3.6	520	3.9	496	4.3	26,200	43,045	m
Canada	534	1.6	533	1.4	529	1.6	28,130	59,808	m
Czech Republic	492	2.4	498	2.8	511	2.4	14,300	22,606	7,113
Denmark	497	2.4	514	2.4	481	2.8	29,100	65,244	7,410
Finland	546	2.6	536	2.2	538	2.5	25,200	47,854	6,384
France	505	2.7	517	2.7	500	3.2	24,200	55,086	8,008
Germany	484	2.5	490	2.5	487	2.4	25,900	44,800	7,484
Greece	474	5.0	447	5.6	461	4.9	16,800	21,767	8,760
Hungary	480	4.0	488	4.0	496	4.2	12,400	21,997	7,778
Iceland	507	1.5	514	2.3	496	2.2	28,143	m	m
Ireland	527	3.2	503	2.7	513	3.2	29,200	34,329	8,316
Italy	487	2.9	457	2.9	478	3.1	25,200	58,868	m

Japan	522	5.2	557	5.5	550	5.5	26,100	54,737	m
Korea	525	2.4	547	2.8	552	2.7	15,100	30,246	m
Mexico	422	3.3	387	3.4	422	3.2	9,200	12,189	8,300
Norway	505	2.8	499	2.8	500	2.8	30,200	63,599	m
Poland	479	4.5	470	5.5	483	5.1	9,600	14,051	m
Portugal	470	4.5	454	4.1	459	4.0	18,000	41,166	7,525
Spain	493	2.7	476	3.1	491	3.0	20,100	41,267	7,302
Sweden	516	2.2	510	2.5	512	2.5	24,800	54,845	6,665
Switzerland	494	4.3	529	4.4	496	4.4	30,100	66,214	m
United Kingdom	523	2.6	529	2.5	532	2.7	24,500	34,959	m
United States	504	7.1	493	7.6	499	7.3	35,600	63,962	m
OECD total	499	2.0	498	2.1	502	2.0			
OECD average	500	0.6	500	0.7	500	0.7	22,830	44,602	7,694
Non-OECD Countries/regions									
Brazil	396	3.1	334	3.7	375	3.3	11,600	10,018	m
Hong Kong	525	2.9	560	3.3	541	3.0	25,153	m	m
Latvia	458	5.3	463	4.5	460	5.6	6,400	m	m
Liechtenstein	483	4.1	514	7.0	476	7.1	m	m	m
Russian Federation	462	4.2	478	5.5	460	4.7	m	m	m

* "m" indicates no data available.

U.S. dollars is converted using purchasing power parities.

Source: OECD PISA 2000 database (OECD, 2001, 2003b) and OECD (2002a).

sometimes by the equivalent of several school years,² and sometimes despite high investments in education, both in terms of spending on education and student learning time.

Overall, however, the results provide encouraging insights: the performance of countries such as Finland, Japan, and Korea reveals that excellence in education is an attainable goal, and at reasonable cost (no data on expenditure were available for Hong Kong). Table 2 compares the money that countries spend per student, on average, from the beginning of primary education up to the age of 15, with average student performance across the three assessment domains.³ As expenditure per student on schools increases, so also, on average, does a country's mean performance.⁴ However, deviations from the trend line suggest that moderate spending per student is not necessarily associated with poor student performance. For example, Ireland and Korea are among the best-performing countries, but spend less than US\$35,000 per student up to the age of 15 years, well below the OECD average of US\$45,000. Conversely, Italy spends almost US\$60,000 per student but performs significantly below the OECD average. Table 2 therefore suggests that, as much as spending on schools is necessary for the provision of high-quality schooling, spending alone does not guarantee better outcomes. The remainder of this article therefore seeks to look beyond spending patterns.

Social Distribution of Learning Outcomes

Students come from a variety of social and cultural backgrounds. As a result, schools need to provide appropriate and equitable

opportunities for a diverse student body. The relative success with which they do so is another important criterion for judging performance. Identifying the characteristics of the students who perform poorly can also help educators and policy-makers determine priorities for policy intervention. Similarly, identifying the characteristics of students who perform well can assist policy-makers to promote high levels of performance across the board.

PISA shows that poor performance in school does not automatically follow from a disadvantaged home background. However, home background remains one of the most powerful factors influencing performance. PISA shows, in particular, that:

- Parental occupational status, which is often closely interrelated with other attributes of socio-economic status, has a strong association with student performance. The average performance gap between students in the top quarter of PISA's index of occupational status (whose parents have occupations like medicine, university teaching, and law) and those in the bottom quarter (whose parents have occupations such as small-scale farming, truck-driving, and serving in restaurants), amounts to more than an entire proficiency level in reading literacy. In Germany, the difference is particularly striking. Students whose parents have the highest-status jobs score on average about as well as the average student in Finland, the best-performing country in PISA 2000; German students whose parents have the lowest-status jobs score about the same,

on average, as students in Mexico, the OECD country with the lowest average performance in PISA.

- Possessions and activities related to “classical” culture also tend to be closely related to performance.⁵ The possession of the kind of cultural capital on which school curricula often tend to build, and which examinations and tests assess, appears closely related to students’ reading scores. The results of PISA 2000 also suggest that educational success may be related to patterns of communication between parents and children.
- Family wealth is also associated with higher levels of performance, although the relationship appears to be weaker than that of the other home background factors examined here.⁶
- Students who were born outside the country, as well as those who were born inside the country but have foreign-born parents tend, in most countries, to score much lower than other students, even after accounting for their other characteristics. The same is true for students whose language is different from the language of instruction. In both cases, however, the performance gap varies widely across countries.

Nevertheless, the PISA 2000 results show that while social background is a powerful influence on learning outcomes, it plays a lesser role in some countries than in others. The policy goal must be to provide opportunities for all students to achieve their full potential. PISA 2000 suggests that this goal can be achieved.

Where We Can Be — What the Best-performing Countries Suggest Can Be Achieved

Achieving an equitable distribution of learning outcomes without losing high performance standards represents a significant challenge. Analyses at the national level have often been discouraging: schools have appeared to make little difference in overcoming the effects of disadvantaged home backgrounds. As well, it has sometimes been argued that if school systems become more inclusive — for example, by increasing the proportion of young people who complete secondary school — then quality is bound to suffer. The international evidence from PISA 2000 is more encouraging. First of all, it is evident that wide disparities in student performance are not a necessary condition for a country to attain a high level of overall performance. Furthermore, while all countries show that students with more advantaged home backgrounds tend to have higher PISA scores, some countries demonstrate that high average quality and equality of outcomes among students from different backgrounds can go together. Table 3 contrasts average performance in PISA 2000 in reading literacy with the impact of family background on student performance.⁷

Canada, Finland, Hong Kong, Iceland, Ireland, Japan, Korea, and Sweden all display above-average levels of student performance in reading literacy and, at the same time, a below-average impact of economic, social and cultural status (ESCS) on student performance. Conversely, average performance in reading literacy in the OECD countries Czech Republic,

Table 3. Variation in Student Performance and Impact of Socio-economic Background (2000)

Country	Performance on the PISA reading literacy scale				PISA socio-economic index of occupational status ¹ on reading				Mean Score if index of students' socio-economic status is equal to the OECD average		Score point difference associated with one unit on the index of economic, cultural and social status (ECS) ^{1,2}	
	Mean score	SE	SD	SE	Bottom quarter	SE	Top quarter	SE	Mean	SE	Difference	SE
OECD countries												
Australia	528	3.5	102	1.6	31.1	0.2	73.2	0.3	513	3.10	46	2.36
Austria	507	2.4	93	1.6	32.9	0.2	69.1	0.3	507	2.62	41	2.26
Belgium	507	3.6	107	2.4	28.4	0.1	71.8	0.2	520	2.84	48	2.35
Canada	534	1.6	95	1.1	31.3	0.1	72.9	0.1	527	1.52	37	1.31
Czech Republic	492	2.4	96	1.9	31.2	0.2	66.1	0.3	500	2.42	50	2.22
Denmark	497	2.4	98	1.8	29.0	0.2	71.1	0.3	498	2.32	42	2.07
Finland	546	2.6	89	2.6	29.7	0.2	71.8	0.2	546	2.22	30	2.40
France	505	2.7	92	1.7	27.7	0.2	71.2	0.3	512	2.48	47	2.17
Germany	484	2.5	111	1.9	30.0	0.2	70.2	0.2	476	3.80	60	3.44
Greece	474	5.0	97	2.7	25.6	0.3	72.3	0.4	484	4.12	38	3.05
Hungary	480	4.0	94	2.1	30.4	0.2	71.5	0.2	488	3.46	53	2.89
Iceland	507	1.5	92	1.4	31.4	0.2	73.8	0.2	492	2.13	24	2.05
Ireland	527	3.2	94	1.7	28.5	0.2	69.4	0.2	526	2.89	38	2.22
Italy	487	2.9	91	2.7	28.5	0.1	68.9	0.4	487	3.11	32	2.35

Japan	522	5.2	86	3.0	m	m	m	m	533	4.62	21	2.87
Korea	525	2.4	70	1.6	26.5	0.1	62.9	0.5	534	2.22	21	2.37
Luxembourg	441	1.6	100	1.5	25.1	0.1	66.1	0.4	447	2.10	46	1.69
Mexico	422	3.3	86	2.1	24.4	0.1	66.5	0.5	459	3.04	35	2.47
New Zealand	529	2.8	108	2.0	30.5	0.3	73.6	0.2	524	2.52	45	2.27
Norway	505	2.8	104	1.7	35.6	0.2	73.9	0.2	487	3.03	41	1.83
Poland	479	4.5	100	3.1	27.3	0.2	67.0	0.4	496	4.36	36	3.40
Portugal	470	4.5	97	1.8	26.8	0.2	65.7	0.5	488	3.76	40	2.09
Spain	493	2.7	85	1.2	26.8	0.1	67.3	0.5	504	2.23	32	1.52
Sweden	516	2.2	92	1.2	30.4	0.2	72.1	0.2	504	1.97	36	1.86
Switzerland	494	4.3	102	2.0	29.3	0.2	71.9	0.3	499	3.55	49	2.24
United Kingdom	523	2.6	100	1.5	30.7	0.2	71.8	0.2	519	2.31	49	1.87
United States	504	7.1	105	2.7	30.3	0.2	72.5	0.3	497	4.79	48	2.75
OECD average	500	0.6	100	0.4	29.3	0.0	70.2	0.1	505	1.31	41	0.97
Non-OECD countries/regions												
Brazil	396	3.1	86	1.9	24.6	0.2	67.1	0.4	434	3.28	38	2.60
Hong Kong	525	2.9	84	2.4	28.1	0.2	58.2	0.4	546	3.14	28	2.60
Latvia	458	5.3	102	2.3	27.7	0.1	74.1	0.3	471	2.72	m	m
Liechtenstein	483	4.1	96	3.9	28.0	0.6	68.2	0.9	478	5.31	49	6.30
Russian Federation	462	4.2	92	1.8	30.0	0.2	73.9	0.2	480	3.20	31	2.79

* "m" indicates no data available.

Notes: 1. For the definition of these indices, see OECD (2001).

2. Slopes marked in bold are statistically significantly different from the OECD average slope.

Source: OECD PISA 2000 database (OECD, 2001, 2003b).

Denmark, Germany, Hungary, Luxembourg, and Switzerland is below the OECD average while, at the same time, these countries display above-average disparities between students from advantaged and disadvantaged family backgrounds.⁸

An important finding of PISA 2000 is thus that countries differ not just in their overall performance, but also in the extent to which they are able to close the performance gap between students from different social backgrounds. PISA 2000 suggests that maximizing overall performance and securing similar levels of performance among students from different social backgrounds can be achieved simultaneously. The results suggest that quality and equity need not be considered as competing policy objectives.

How We Might Get There — Pointers for Policy

The high and equitable performance standards achieved by some countries set ambitious goals for others. The question is what they can learn from the results to help students to achieve more, teachers to teach better, and schools to be more effective. PISA 2000 does not show which policies or practices *cause* success, but it does allow us to observe some common characteristics of high-performing students, schools, and systems. PISA cannot, on its own, provide clear-cut answers as to why the countries performed so differently, or definitive guidance to the policy directions that countries should take. However, analyses of the wide range of student and school background data collected by PISA 2000 can provide pointers to stimulate and inform national debate, as well as guide future work.

Strengthening Student Dispositions to Learning

Most children come to school ready and willing to learn. How can schools foster and strengthen this predisposition and ensure that young adults leave school with the motivation and capacity to continue learning throughout life?

Student Interest and Self-concept in Reading and Mathematics

Students who leave school with the autonomy to set their own learning goals and with a sense that they can reach those goals are potential learners throughout life. Motivation and engagement can also affect students' quality of life during their adolescence and can influence whether they will successfully pursue further educational or labor market opportunities. There are many intrinsic and extrinsic factors — student's level of self-confidence in learning; support and interest of parents, teachers and peer group; school policy and practice; promise of good grades; employment prospects — associated with students' motivation to learn and with their behavior and attitudes toward school.

Interest in particular subjects affects both the degree and continuity of engagement in learning and the depth of understanding reached. This effect is largely independent of students' general motivation to learn. For example, a student who is interested in mathematics and therefore tends to study diligently may or may not show a high level of general learning motivation, and vice versa. Hence, an analysis of the pattern of students' interest in various subjects is of importance. Such

an analysis can reveal significant strengths and weaknesses in attempts by education systems to promote motivation to learn in various subjects among differing sub-groups of students.

Table 4 shows the distribution of mean percentages of students in non-OECD countries for six questions relating to students' interest and confidence in reading, relative to the OECD average.⁹ An index of interest in reading was constructed using students' reported responses about the extent to which they agree that reading is fun and would not want to give it up, that they read in their spare time, and that they sometimes become totally absorbed in reading. The index has an average score across OECD countries set at 0 and a standard deviation set at 1. A positive value on the indices means that students' reported interest and confidence in reading are higher than the OECD average, while a negative value indicates that interest and confidence in reading are lower than the OECD average.

Students were also asked about their interest in mathematics. An index of interest in mathematics was constructed using students' reported responses about the extent to which they agree that when they do mathematics, they sometimes become completely absorbed; that because mathematics is fun, they would not want to give it up; and that mathematics is important to them personally.¹⁰ A positive value on the index indicates that students' reported interest in mathematics is higher than the OECD average, while a negative value means that interest in mathematics is lower than the OECD average.

But do students with high levels of interest and confidence in reading and mathematics perform better than their peers? What the results do show is that, within countries, students with greater interest and self-concept in reading and mathematics tend to perform significantly better than students who report less interest and self-concept in reading and mathematics.

Student Engagement in Reading and With School

Reading activities and engagement in reading are decisive factors in the maintenance and further development of reading skills. The International Adult Literacy Survey findings that reading skills can deteriorate after the completion of initial education if they are not used (OECD & Statistics Canada, 1995) points to the importance of the maintenance of literacy skills. Positive reading activities and engagement in reading are, therefore, important outcomes of initial education as well as predictors of learning success throughout life. Similarly, students' reports on the frequency with which, for example, they read for pleasure, enjoy talking about books or visit bookstores and libraries, and the general importance they attach to reading, can indicate the degree to which they will read in the future.

Previous research conducted on student engagement in reading in PISA suggests not only that students who express positive attitudes to reading, who read a variety of materials, and who spend time reading are on average much better readers, but also that reading engagement can compensate for disadvantage in students' social background (see OECD, 2002b).

Table 4. PISA Index of Interest in Reading and Mathematics

Country	Performance on the PISA reading literacy scale		PISA index of interest in reading		Performance on the PISA mathematics literacy scale		PISA index of interest in mathematics	
	Mean score	SE	Mean index	SE	Mean score	SE	Mean index	SE
OECD countries								
Australia	528	3.5	-0.02	0.02	533	3.5	0.04	0.02
Austria	507	2.4	-0.09	0.03	515	2.5	-0.23	0.03
Belgium	507	3.6	-0.32	0.02	520	3.9	-0.11	0.03
Czech Republic	492	2.4	0.11	0.02	498	2.8	-0.07	0.02
Denmark	497	2.4	0.19	0.02	514	2.4	0.47	0.03
Finland	546	2.6	0.19	0.02	536	2.2	-0.07	0.02
Germany	484	2.5	-0.06	0.02	490	2.5	-0.07	0.03
Hungary	480	4.0	-0.06	0.02	488	4.0	-0.04	0.03
Iceland	507	1.5	-0.06	0.02	514	2.3	0.11	0.02
Ireland	527	3.2	0.04	0.03	503	2.7	-0.01	0.02
Italy	487	2.9	-0.11	0.03	457	2.9	0.00	0.03
Korea	525	2.4	-0.31	0.02	547	2.8	-0.27	0.03

Luxembourg	441	1.6	-0.07	0.02	446	2.0	-0.18	0.03
Mexico	422	3.3	0.15	0.01	387	3.4	0.39	0.02
New Zealand	529	2.8	0.07	0.02	537	3.1	0.09	0.03
Norway	505	2.8	0.01	0.02	499	2.8	-0.28	0.03
Portugal	470	4.5	0.23	0.02	454	4.1	0.26	0.02
Sweden	516	2.2	0.09	0.01	510	2.5	-0.21	0.02
Switzerland	494	4.3	0.04	0.02	529	4.4	-0.03	0.03
United States	504	7.1	0.02	0.03	493	7.6	0.08	0.03
OECD average	500	0.6	0.00	0.00	500	0.7	0.00	0.00
Non-OECD countries/regions								
Brazil	396	3.1	0.31	0.02	334	3.7	0.69	0.02
Hong Kong	525	2.9	0.33	0.01	560	3.3	0.59	0.03
Latvia	458	5.3	0.23	0.02	463	4.5	0.40	0.04
Liechtenstein	483	4.1	-0.07	0.05	514	7.0	-0.03	0.07
Russian Federation	462	4.2	0.15	0.02	478	5.5	0.13	0.03

Source: OECD PISA 2000 database (OECD, 2001, 2003b).

Students in PISA were asked not only whether they enjoyed reading but also how much time they spent reading for enjoyment and the frequency with which they read certain materials. This allowed the construction of reader profiles based on the types of materials that 15-year-olds reported reading as well as a single composite index of reading engagement, which is described below.¹¹ A comparison of countries on this index shows that students' engagement in reading is clearly linked with reading proficiency, although the data do not allow one to discern in which direction this relationship operates and to what extent other, non-measured factors are at play. In all countries, students who are more engaged in reading score, on average, better.¹²

Table 5 shows, not surprisingly, that the country with the highest level of engagement in reading is the one with the highest average reading scores, Finland, in which students' average score on the index of engagement is 0.46. Other countries/regions where the level of engagement in reading is high are Denmark (0.26), Hong Kong (0.39), Iceland (0.27), Japan (0.20), and Korea (0.21). By comparison, countries where the level of engagement is relatively low are Belgium (-0.28), Germany (-0.26), Ireland (-0.20), Luxembourg (-0.19), and Spain (-0.23). To some extent the differences among country means on the index may represent cultural differences in student responses to the questions through which engagement was captured. Ireland is an example of a high-performing country in which there is a strong within-country relationship between student engagement and reading performance, but where there is a relatively low country average on the engagement index.

In addition to the strong association between student performance in reading literacy and engagement in reading within countries, the analysis also suggests that student engagement in reading may be an important factor that can offset social disadvantage. In order to examine this issue, students were classified in terms of whether they reported low, medium, or high engagement in reading, and whether their parents had low, medium, or high occupational status. For this purpose, “medium” refers in each case to the middle half of students, and “low” and “high” refer to the top and bottom quarters respectively.

Students who are less engaged readers tend to be more numerous among the group of students whose parents have the lowest occupational status. Highly engaged students are more numerous among the group of students whose parents have the highest occupational status. However, PISA also shows that there are students from disadvantaged family backgrounds who are highly engaged in reading, as well as students from more privileged backgrounds who are among the least engaged readers.

Not surprisingly, students who have parents with the highest occupational status and who are highly engaged in reading obtain the best average scores on the reading literacy scale. Students who have parents with the lowest occupational status and who are the least engaged in reading achieved the lowest average score. However, perhaps most importantly, students who are highly engaged readers and whose parents have the lowest occupational status achieved significantly higher average reading

Table 5. PISA Index of Engagement in Reading, by Gender

Country	Performance on the PISA reading literacy scale		PISA index of engagement in reading ¹						Correlation between the PISA index of engagement in reading and proficiency on the PISA reading literacy scale		
	Mean score	SE	Mean index	SE	Females		Males			Difference (females – males)	
					Mean index	SE	Mean index	SE			
OECD countries											
Australia	528	3.5	-0.04	0.03	0.11	0.03	-0.18	0.04	0.28	0.42	-0.02
Austria	507	2.4	-0.08	0.03	0.17	0.03	-0.35	0.03	0.52	0.41	-0.02
Belgium	507	3.6	-0.28	0.02	-0.07	0.02	-0.48	0.03	0.41	0.36	-0.02
Canada	534	1.6	0.01	0.01	0.24	0.01	-0.23	0.02	0.47	0.40	-0.01
Czech Republic	492	2.4	0.02	0.02	0.29	0.02	-0.29	0.03	0.57	0.42	-0.01
Denmark	497	2.4	0.26	0.02	0.50	0.03	0.02	0.02	0.48	0.43	-0.02
Finland	546	2.6	0.46	0.02	0.82	0.02	0.08	0.03	0.74	0.48	-0.01
France	505	2.7	-0.18	0.02	-0.03	0.02	-0.33	0.03	0.30	0.35	-0.01
Germany	484	2.5	-0.26	0.02	0.01	0.02	-0.53	0.03	0.55	0.41	-0.02
Greece	474	5.0	-0.09	0.02	0.00	0.02	-0.17	0.02	0.17	0.25	-0.02
Hungary	480	4.0	0.03	0.02	0.21	0.02	-0.15	0.03	0.36	0.41	-0.02
Iceland	507	1.5	0.27	0.01	0.46	0.02	0.08	0.02	0.39	0.45	-0.02
Ireland	527	3.2	-0.20	0.02	0.03	0.03	-0.43	0.03	0.46	0.39	-0.02
Italy	487	2.9	-0.08	0.02	0.10	0.02	-0.27	0.03	0.37	0.30	-0.02

Japan	522	5.2	0.20	0.03	0.28	0.03	0.11	0.03	0.17	0.32	-0.01
Korea	525	2.4	0.21	0.02	0.23	0.03	0.19	0.03	0.04	0.35	-0.01
Luxembourg	441	1.6	-0.19	0.02	0.01	0.02	-0.39	0.03	0.40	0.25	-0.02
Mexico	422	3.3	0.07	0.01	0.17	0.02	-0.03	0.02	0.20	0.24	-0.02
New Zealand	529	2.8	0.05	0.02	0.20	0.02	-0.09	0.02	0.29	0.35	-0.02
Norway	505	2.8	0.09	0.02	0.35	0.02	-0.16	0.03	0.51	0.45	-0.02
Poland	479	4.5	-0.10	0.02	0.09	0.02	-0.28	0.03	0.36	0.28	-0.02
Portugal	470	4.5	0.13	0.02	0.36	0.02	-0.11	0.03	0.47	0.32	-0.02
Spain	493	2.7	-0.23	0.02	-0.09	0.03	-0.38	0.03	0.29	0.38	-0.01
Sweden	516	2.2	0.14	0.02	0.37	0.02	-0.08	0.03	0.45	0.45	-0.02
Switzerland	494	4.3	0.00	0.01	0.31	0.03	-0.31	0.04	0.62	0.46	-0.02
United Kingdom	523	2.6	-0.10	0.02	0.03	0.03	-0.24	0.02	0.26	0.37	-0.02
United States	504	7.1	-0.14	0.03	0.04	0.04	-0.32	0.04	0.36	0.31	-0.02
OECD average	500	0.6	0.00	0.01	0.19	0.01	-0.19	0.01	0.38	0.38	—
Non-OECD countries/regions											
Brazil	396	3.1	0.11	0.02	0.36	0.02	-0.17	0.02	0.53	0.26	-0.02
Hong Kong	525	2.9	0.39	0.02	0.49	0.02	0.30	0.02	0.19	m	m
Latvia	458	5.3	-0.04	0.02	0.17	0.02	-0.27	0.04	0.44	0.29	-0.03
Liechtenstein	483	4.1	-0.13	0.05	0.13	0.09	-0.36	0.07	0.49	0.45	-0.04
Russian Federation	462	4.2	0.17	0.02	0.37	0.02	-0.02	0.02	0.39	0.23	-0.02

* For the definition of this index, see OECD (2003b). It differs slightly from the index used in *Knowledge and Skills for Life: First Results from PISA 2000* (OECD, 2001).

Source: OECD PISA 2000 database (OECD, 2003b).

scores than students whose parents have the highest occupational status but who are poorly engaged in reading. Furthermore, these highly engaged students whose parents have low occupational status performed as well, on average, as those students who are in the middle engagement group but whose parents have high-status occupations. That is to say, coming from a higher-status home background is less of an advantage, on its own, than being more highly engaged in reading.

Students who are highly engaged in reading achieve reading literacy scores which, on average, are significantly above the international mean (500), whatever their family background. Conversely, students who are poorly engaged in reading obtained scores below the international mean, regardless of their parents' occupational status. Within each grouping of occupational status, students who are in the group of least engaged readers attain average reading literacy scores 85–117 points lower than those who are in the highly engaged reading group. The largest difference is seen among students whose parents have the lowest-status occupations.

These findings are of paramount importance from an educational perspective. Although the data do not show in which direction the relationship operates, one interpretation is that building student engagement with reading can play an important role in reducing the gap between the reading performance of students coming from different family backgrounds. Achieving this objective will also serve other important educational goals since reading is a fundamental skill required across the curriculum.

The patterns shown for engagement in reading are largely mirrored in students' broader engagement with school, although the relationship differs across countries. This aspect is analyzed in detail in the PISA thematic report *Student Engagement at School: A Sense of Belonging and Participation* (Willms, 2003). The evidence from this report suggests that those students who are engaged in school also perform better than those who are not. In almost all countries, students who report that school is a place where they want to go perform better than those who do not. Across the OECD, an average of 87% of students report that school is a place where they make friends easily, and three-quarters say that school is a place where they feel they belong, the proportion ranging from around 50% or less in France and Spain to 88% in Hungary and Mexico. By contrast, there is a small but significant group of students for whom school is a difficult social environment. On average, across the OECD, 13% of students report that school is a place where they feel awkward and out of place.

Also the data on engagement at school do not establish a causal relationship with student performance. There are other factors that influence both performance and attitudes toward school. In addition, doing well at school might cause students to like it more, rather than vice versa. However, it is unsatisfactory that a significant minority of students — and in some cases even a majority — display a lack of engagement, and negative attitudes toward school. It is hard to imagine that schools can achieve good results unless students are positively engaged. Furthermore, students who are disaffected with school may also be less likely to engage in learning activities in later life.

Schools and education systems need to aim at lifting *both* performance and engagement, in order to increase average performance and to ensure an equitable distribution of learning outcomes. For example, teachers need to provide each student with the skills to be a good reader, as well as interesting the student in being a good reader. If these mutually reinforcing goals can be achieved, a more secure foundation for lifelong learning will have been established for students from all backgrounds.

Student Learning Strategies and Preferences

In order for students to be able to manage their own learning effectively, they must be able to set realistic goals, overcome obstacles, and understand how to use appropriate learning strategies to achieve these goals. They must learn how to learn. The ability to regulate one's own learning behavior can be seen as an important outcome of schooling because it equips students for lifelong learning and adult life. The use of self-regulated learning strategies by students is the subject of the PISA report *Learners for Life: Student Approaches to Learning* (OECD, 2003a).

Students were asked to report on how they used learning strategies to monitor and control the learning process, to evaluate the relevance of material learned, and to memorize information. Students were also asked about their learning preferences, or, more precisely, if they preferred to compete against or work together with their peers. The results are examined in the following parts of the article.

Students do not passively receive and process information. They are active participants in the learning process, constructing meaning in ways shaped by their own prior knowledge and new experiences. Students with a well-developed ability to manage their own learning are able to choose appropriate learning goals, to use their existing knowledge and skills to direct their learning, and to select learning strategies appropriate to the task in hand. While the development of these skills and attitudes has not always been an explicit focus of teaching in schools, they are increasingly being identified explicitly as major goals of schooling and should, therefore, also be regarded as significant outcomes of the learning process.

An effective learner processes information efficiently. This requires more than the capacity to memorize new information. It calls for the ability to relate new material to existing knowledge and to determine how knowledge can be applied in the real world. A good understanding of learning strategies strengthens students' capacity to organize their own learning. Good learners can apply a variety of learning strategies in a suitably flexible manner. On the other hand, students who have problems learning on their own often have no access to effective strategies to facilitate and monitor their learning, or fail to select a strategy appropriate to the task in hand.

Students who can selectively process, monitor and organize information as they learn will be able to use this learning strategy to support their learning in school and throughout life. An index of control strategies was constructed from students' responses to questions about the frequency with which they figure out

exactly what they need to learn, check to see if they have remembered what they have learned, figure out the concepts that they have not really understood, make sure they remember the important things, and look for additional information to clarify areas where they have not understood something. The index was constructed with the average score across OECD countries set at 0 and the standard deviation set at 1.

Table 6 compares countries' mean scores on the index of control strategies and their performance on the combined reading literacy scale by quarters of the index of control strategies. The use of control strategies is positively related to performance in all countries, although a causal relationship cannot be established. Within each country, students who use control strategies more frequently tend to perform statistically significantly better on the combined reading literacy scale than those who do not. The difference in student performance on the combined reading literacy scale between the top and bottom quarters of the index is 52 points on average for OECD countries, and range from 11 points in Israel to 64 points in Hong Kong, reaching 78 points in New Zealand and 96 points in Portugal.

Memorization strategies (e.g., reading material aloud several times and learning key terms) are important in many tasks, but they commonly lead only to verbatim representations of knowledge or new information being stored in the memory with little further processing. Where the learner's goal is to be able to retrieve the information as presented, memorization is an appropriate strategy, but such "learning by rote" rarely leads

to deep understanding. In order to achieve understanding, new information must be integrated into a learner's prior knowledge base. Elaboration strategies (e.g., exploring how the material relates to things one has learned in other contexts, or asking how the information might be applied in other contexts) can be used to reach this goal.

In PISA, students were also asked about their use of elaboration and memorization strategies. On the basis of their responses, an index was created for each of these learning strategies. The index of memorization strategies was derived from students' responses to questions about the frequency with which they try to memorize everything that might be covered, memorize as much as possible, memorize all material so that they can recite it, and practice by reciting the material over and over again. The index of elaboration strategies was derived from students' responses to questions about the frequency with which they try to relate new material to things learned in other subjects, discern the information that may be useful in the real world, try to understand new material by relating it to that already known, and figure out how material fits with what has already been learned. The indices were constructed with the average score across OECD countries set at 0 and the standard deviation set at 1.

Table 6 shows the mean scores on the indices of elaboration and memorization strategies for participating countries. In both OECD and non-OECD countries, that data suggest that elaboration strategies are strongly related to student performance. As with control strategies, schools need to help

Table 6. PISA Index of Control, Memorization, and Elaboration Strategies in Reading, by National Quarters of the Index

Country	Control strategies				Memorization strategies				Elaboration strategies									
	Index of control strategies		Performance on the PISA reading literacy scale by national quarters of the index of control strategies ¹		Index of memorization strategies		Performance on the PISA reading literacy scale by national quarters of the index of memorization strategies ¹		Index of elaboration strategies		Performance on the PISA reading literacy scale by national quarters of the index of elaboration strategies ¹							
	Mean index	SE	Bottom quarter	Top quarter	Mean index	SE	Bottom quarter	Top quarter	Mean index	SE	Bottom quarter	Top quarter						
OECD countries																		
Australia	0.02	0.02	494	4.5	564	5.8	0.14	0.02	515	4.7	545	4.9	0.07	0.02	517	4.4	551	5.3
Austria	0.40	0.02	485	4.3	531	3.5	-0.03	0.02	529	3.8	494	2.9	0.16	0.02	501	3.6	526	2.7
Belgium	0.14	0.02	512	7.2	545	5.0	0.06	0.02	547	7.1	519	5.3	-0.16	0.02	532	6.6	534	6.1
Czech Republic	0.27	0.02	464	3.1	532	2.9	-0.06	0.02	522	3.8	492	3.1	0.10	0.02	485	3.4	529	3.2
Denmark	-0.23	0.01	481	3.8	514	3.3	0.05	0.01	488	3.8	502	3.3	-0.12	0.02	482	3.9	514	3.3
Finland	-0.47	0.02	527	3.8	562	3.6	-0.10	0.01	539	3.7	554	4.0	-0.15	0.02	535	3.9	566	4.6
Germany	0.24	0.02	459	4.3	519	3.3	0.03	0.02	496	4.0	492	3.3	0.05	0.02	474	4.4	525	3.1
Hungary	0.21	0.02	456	5.8	496	5.6	0.89	0.02	460	6.1	490	4.9	0.15	0.02	466	5.7	490	5.0
Iceland	-0.35	0.02	490	3.2	526	3.6	-0.27	0.02	516	3.5	502	3.1	-0.24	0.02	498	3.5	533	3.6
Ireland	0.07	0.02	499	4.3	553	3.8	0.27	0.02	524	5.0	535	3.8	-0.09	0.02	521	4.5	539	4.1
Italy	0.23	0.02	461	5.1	505	3.2	-0.69	0.02	505	4.2	466	4.2	-0.11	0.02	483	4.1	501	3.6

Korea	-0.44	0.02	496	3.4	548	3.0	-0.15	0.02	512	3.5	530	2.6	-0.03	0.03	492	3.1	552	3.1	
Luxembourg	0.05	0.02	424	3.3	475	3.3	-0.09	0.02	456	3.1	448	3.3	-0.12	0.02	441	3.2	467	3.2	
Mexico	0.16	0.02	394	3.4	449	4.7	0.06	0.02	428	5.0	427	4.7	0.33	0.02	414	3.8	439	4.8	
New Zealand	0.07	0.03	494	4.2	572	5.0	0.24	0.02	516	4.5	549	4.3	0.10	0.02	525	4.7	544	5.3	
Netherlands ²	-0.07	0.02	511	5.6	536	4.9	-0.03	0.02	535	5.0	518	5.4	-0.19	0.02	531	4.3	533	5.3	
Norway	-0.58	0.02	494	5.2	518	4.1	-0.60	0.02	515	4.0	501	4.5	-0.22	0.02	490	4.6	529	4.3	
Portugal	0.19	0.02	419	5.6	515	4.4	0.03	0.02	475	6.4	476	4.8	0.17	0.02	441	5.5	502	5.1	
Sweden	0.03	0.02	491	3.2	539	3.0	0.17	0.02	505	3.4	526	3.2	0.01	0.02	504	3.0	536	3.1	
Switzerland	0.11	0.02	469	4.9	522	6.1	-0.02	0.02	496	5.9	501	4.9	0.09	0.02	477	4.7	513	6.1	
United States	-0.08	0.03	477	7.4	534	8.3	0.09	0.02	503	9.2	510	7.2	0.01	0.03	500	7.6	521	8.1	
OECD average	0.00	0.01	474	1.0	526	1.0	0.00	0.00	501	1.1	503	1.0	0.00	0.00	488	1.1	521	1.1	
Non-OECD countries/regions																			
Brazil	0.22	0.03	368	4.4	425	4.3	0.22	0.02	380	3.8	414	4.2	0.47	0.02	382	4.3	418	3.9	
Hong Kong	-0.28	0.02	490	4.2	554	3.6	0.07	0.02	503	4.8	549	3.0	-0.21	0.02	509	4.4	544	4.1	
Israel	0.30	0.04	460	9.7	471	7.1	0.13	0.05	491	8.8	456	8.3	-0.03	0.04	474	8.2	467	8.1	
Latvia	-0.12	0.02	430	6.4	482	5.6	0.17	0.01	443	7.5	466	5.7	0.04	0.02	447	6.3	473	6.0	
Liechtenstein	0.15	0.05	462	9.9	520	9.7	-0.08	0.05	490	10.6	481	10.8	0.00	0.06	473	9.6	505	10.3	
Russian Federation	0.08	0.02	431	5.0	485	4.7	0.36	0.02	442	5.6	472	4.5	0.14	0.02	450	4.7	478	4.3	

Notes: 1. Where bottom and top quarters are marked in bold, this indicates that their difference is statistically significant.

2. Response rate is too low to ensure comparability.

Source: OECD PISA 2000 database (OECD, 2001, 2003b).

students to develop the strategies that best enhance their learning. However, further consideration needs to be given to the cultural and educational context of the country concerned before any firm conclusions can be drawn from these data.

Learning in adult life occurs most frequently in circumstances in which people work together and depend on one another. In formal education, particularly at the secondary and tertiary levels, learning often occurs in isolation and in a context of preparation for competitive assessment. Although co-operative learning and competitive learning can be in conflict, both can lead to high performance. The results of PISA suggest that, if acquired in tandem, both types of learning may add to learning efficiency.

Separate PISA indices for co-operative and competitive learning were created from students' reports. The co-operative learning index is derived from responses to questions about whether students like working with others, like helping others do well in a group, learn most when working with others, and perform best when working with others. The competitive learning index is derived from responses to questions about whether students like trying to do better than others, like being the best at something, work well when trying to be better than others, and learn faster when trying to be better than others. Note that it was possible for students to provide positive or negative answers independently of either set of questions. The indices are constructed with the average score across countries set at 0 and the standard deviation set at 1.

Table 7 shows the mean scores on the indices of co-operative and competitive learning for participating countries. In general, students in non-OECD countries reported strong preferences for more competitive learning compared with students in OECD countries. However, many students, especially those in Latvia and Thailand, reported using both strategies. The preference for co-operative learning was particularly clear in Chile, Denmark, and Portugal with average index scores of more than half of one standard deviation higher than the OECD average while in Korea, the opposite occurred. In Albania, Chile, Hong Kong, FYR Macedonia, and Mexico, the average index score for competitive learning was as high as half a standard deviation higher than the OECD average.

Both competitive and co-operative learning tends to be positively related to performance in most countries, although this relationship is stronger in non-OECD countries for co-operative learning and in OECD countries for competitive learning. In non-OECD countries, the differences in performance on the combined reading literacy scale between the top and bottom quarters of the index of competitive learning are not statistically significant in eight countries, including Albania, Brazil, Israel, Liechtenstein, and FYR Macedonia. However, this difference is between 48 and 66 score points in Hong Kong, Latvia, and the Russian Federation.

While students who like competitive learning perform better than those who do not, and while those who like co-operative learning perform better than those who do not, many students demonstrate a positive disposition toward both learning styles.

Table 7. PISA Index of Co-operative and Competitive Learning in Reading, by National Quarters of the Index

Country	Co-operative learning						Competitive learning					
	Index of co-operative learning			Performance on the PISA reading literacy scale by national quarters of the index of co-operative learning ¹			Index of competitive learning			Performance on the PISA reading literacy scale by national quarters of the index of competitive learning ¹		
	Mean index	SE	Bottom quarter	SE	Top quarter	SE	Mean index	SE	Bottom quarter	SE	Top quarter	SE
OECD countries												
Australia	0.04	0.01	527	5.5	543	4.3	0.10	0.02	515	4.8	559	5.6
Austria	-0.10	0.02	486	4.5	521	3.5	-0.19	0.02	502	3.5	522	3.0
Belgium	-0.15	0.02	524	5.9	538	6.1	-0.38	0.02	537	6.0	526	6.7
Czech Republic	-0.06	0.02	482	3.7	517	3.3	0.14	0.02	483	3.2	521	3.2
Denmark	0.50	0.02	488	5.0	501	3.5	0.19	0.02	481	3.5	527	4.1
Finland	0.04	0.02	531	3.2	561	4.7	-0.25	0.02	530	4.4	574	3.0
Germany	-0.21	0.02	477	3.9	508	3.5	-0.07	0.02	476	3.9	514	3.3
Hungary	-0.34	0.02	475	4.6	481	5.1	0.10	0.02	460	5.1	498	4.5
Iceland	-0.29	0.02	493	3.3	521	2.6	0.01	0.02	489	2.9	538	3.5
Ireland	0.22	0.02	521	5.1	525	4.1	0.15	0.02	511	4.7	547	4.3
Italy	0.20	0.03	478	5.9	492	3.3	-0.01	0.02	485	4.5	497	3.7
Korea	-0.85	0.01	509	3.4	532	2.5	-0.14	0.02	495	3.6	547	2.6
Luxembourg	-0.40	0.02	445	3.3	456	3.6	-0.18	0.02	448	3.3	461	3.4

Mexico	0.22	0.02	410	4.4	431	4.8	0.54	0.02	409	4.5	437	4.7
New Zealand	0.29	0.02	522	4.5	538	4.8	0.29	0.02	512	4.2	560	5.1
Netherlands ²	-0.14	0.03	516	6.6	541	3.8	-0.25	0.03	538	5.5	534	4.6
Norway	0.17	0.03	479	5.3	527	3.5	-0.03	0.02	477	4.6	551	3.7
Portugal	0.59	0.03	447	6.9	480	4.7	-0.22	0.02	481	5.0	467	5.3
Sweden	-0.21	0.01	515	3.1	517	3.4	-0.01	0.02	507	3.6	535	3.4
Switzerland	-0.01	0.02	473	5.7	506	4.4	-0.26	0.02	503	5.4	496	5.1
United States	0.35	0.03	483	9.6	528	6.1	0.27	0.03	478	9.4	547	6.2
OECD average	0.00	0.00	488	1.1	511	1.0	0.00	0.00	488	1.0	521	1.0
Non-OECD countries/regions												
Albania	0.24	0.02	349	5.1	354	4.9	0.47	0.02	342	5.0	353	6.1
Brazil	0.47	0.02	390	4.6	406	4.3	-0.03	0.02	405	4.5	405	4.6
Chile	0.54	0.02	398	4.8	423	4.9	0.49	0.02	409	5.6	424	4.2
Hong Kong	0.05	0.02	509	4.5	535	3.6	0.67	0.02	497	4.9	547	3.1
Israel	-0.05	0.04	470	10.6	466	6.5	0.18	0.03	453	8.1	461	8.7
Latvia	0.24	0.04	432	6.3	483	6.4	0.22	0.02	429	6.7	495	5.7
Liechtenstein	-0.01	0.05	478	10.9	492	9.9	-0.20	0.05	485	9.3	478	11.4
FYR Macedonia	-0.04	0.02	380	3.3	358	3.8	0.60	0.02	371	3.2	378	3.3
Russian Federation	-0.23	0.02	447	4.4	479	5.1	0.13	0.02	442	4.7	490	4.6

Notes: 1. Where bottom and top quarters are marked in bold, this indicates that their difference is statistically significant.

2. Response rate is too low to ensure comparability.

Source: OECD PISA 2000 database (OECD, 2001, 2003b).

Thus, students as active learners are not limiting themselves to a single learning strategy that may not be the most appropriate in a given situation. Further research is needed to explore these aspects in detail.

Shifting the Focus to Learning Outcomes

The PISA 2000 results confirm a range of other research which suggests that students perform best in a positive learning environment that is oriented toward results. PISA 2000 indicates that students and schools perform better in a climate characterized by high expectations and the readiness to invest effort, the enjoyment of learning, a strong disciplinary climate, and good teacher-student relations. Among these aspects, students' perception of teacher-student relations and classroom disciplinary climate have the strongest relationships with student performance, across countries.¹³ Performance orientation, which was measured by students' perceptions of the extent to which teachers emphasize academic performance and place high demands on students, is also positively related to performance, but less strongly so. Students also perform better where principals report a more positive school climate, higher teacher morale, and a greater degree of school autonomy.¹⁴

Many of the countries that performed well in PISA 2000 have been progressively shifting education policy and practice away from a focus on inputs — the resources, structures, and content of schooling — and toward a focus on learning outcomes. Perhaps not surprisingly therefore, PISA 2000 shows that schools in such countries often have greater freedom to organize their learning environment and the range of subjects

that they offer, and to administer the resources allocated to them.

Devolving more decision-making authority to schools has been a key strategy in many countries since the early 1980s. School-based management is intended to increase creativity and responsiveness to local needs. This involves enhancing the decision-making responsibility and accountability of principals and, in some cases, the management responsibilities of teachers or department heads.

In order to gauge the extent to which school staff have a say in decisions relating to school policy and management, principals in PISA 2000 were asked to report whether teachers, department heads, the principal, an appointed or elected board, or education authorities had the main responsibility for a wide range of aspects of schooling. The results are shown in Table 8.

According to school principals, schools in most countries appear to have little say in the establishment of teachers' starting salaries and in determining teachers' salary increases. In all countries other than the Czech Republic, Greece, the Netherlands, the United Kingdom, and the United States, two-thirds or more of 15-year-olds are enrolled in schools whose principals report that schools have no responsibility for the establishment of teachers' starting salaries. The scope to reward teachers financially, once they have been hired, is also limited. Only in the Czech Republic, Greece, Sweden, the United Kingdom, and the United States are more than two-thirds of the students enrolled in schools which have some responsibility for determining teachers' salary increases.

Table 8. Percentage of Students Enrolled in Schools Which Have at Least Some Responsibility for the Following Aspects of School Policy and Management (2000)

Country	Performance on the PISA reading literacy scale		Appoint teachers		Dismiss teachers		Establish teachers' starting salaries		Determine teachers' salary increases		Formulate the school budget		Decide on budget allocations within the school		Establish student disciplinary policies		Establish student assessment policies		Approve students for admittance to school		Choose which textbooks are used		Determine course content		Decide which courses are offered		
	Mean score	SE	%	SE	%	SE	%	SE	%	SE	%	SE	%	SE	%	SE	%	SE	%	SE	%	SE	%	SE	%	SE	
OECD countries																											
Australia	528	3.5	60	2.2	47	3.1	18	2.2	19	2.6	96	1.5	100	0.2	100	0.2	99	0.6	94	1.6	100	0.2	84	3.2	96	1.8	
Austria	507	2.4	15	2.9	5	1.7	1	0.5	1	0.5	14	2.7	93	2.0	96	1.6	69	3.5	75	2.9	99	0.7	54	3.6	57	3.7	
Belgium	507	3.6	96	1.3	95	1.4	7	1.7	7	1.8	98	1.0	99	0.6	99	0.9	100	0.4	95	1.7	99	0.6	59	3.7	61	3.6	
Canada	534	1.6	82	1.2	61	1.7	34	1.8	34	1.7	77	1.4	99	0.3	98	0.5	94	1.0	89	1.0	89	0.9	49	1.8	90	1.1	
Czech Republic	492	2.4	96	1.2	95	1.3	70	3.1	73	3.1	83	2.6	99	0.6	100	0.5	100	0.3	89	1.7	100	0.0	82	2.9	82	2.8	
Denmark	497	2.4	97	1.3	57	3.2	13	2.5	15	2.7	89	2.2	98	1.0	99	0.8	87	2.4	87	2.6	100	0.0	90	1.9	77	2.6	
Finland	546	2.6	35	3.8	21	3.3	1	0.8	2	1.0	56	3.9	99	0.9	96	1.9	89	2.6	54	4.0	100	0.0	91	2.3	95	2.0	
France	505	2.7	m	m	m	m	m	m	m	m	m	m	m	m	m	m	m	m	m	m	m	m	m	m	m	m	m
Germany	484	2.5	10	2.3	4	1.3	2	0.9	11	2.2	13	2.0	96	1.3	95	1.4	79	2.8	79	3.0	96	1.7	35	3.3	35	3.4	
Greece	474	5.0	65	4.7	70	4.4	73	4.3	77	3.9	87	3.4	95	2.1	97	1.5	94	2.2	90	2.5	90	2.9	92	2.6	89	2.9	
Hungary	480	4.0	100	0.0	99	1.0	41	4.3	50	4.3	61	4.1	92	2.3	100	0.0	98	1.0	99	0.7	100	0.4	97	1.3	98	1.0	
Iceland	507	1.5	99	0.0	99	0.1	4	0.1	7	0.1	76	0.2	87	0.1	99	0.0	98	0.1	74	0.1	99	0.0	79	0.2	62	0.2	
Ireland	527	3.2	88	2.5	73	3.0	4	1.7	5	2.2	79	3.1	100	0.0	99	0.6	99	0.9	95	2.0	100	0.0	37	4.1	97	1.3	
Italy	487	2.9	10	2.1	11	2.6	1	0.8	1	0.8	94	2.4	57	5.0	100	0.0	100	0.0	63	5.1	100	0.0	93	2.9	22	4.0	
Japan	522	5.2	33	1.9	32	2.0	32	2.0	32	2.0	50	3.3	91	2.9	100	0.4	100	0.0	100	0.0	100	0.0	99	0.7	99	0.7	
Korea	525	2.4	32	4.1	22	4.0	15	3.1	7	2.4	88	2.5	95	1.7	100	0.0	99	0.1	97	1.4	99	0.6	99	0.6	93	2.3	
Luxembourg	441	1.6	m	m	m	m	m	m	m	m	100	0.0	100	0.0	m	m	m	m	100	0.0	m	m	m	m	m	m	m

Mexico	422	3.3	57	3.4	48	3.8	26	3.1	28	3.1	68	4.2	77	3.7	99	0.7	92	2.5	86	2.3	81	3.0	59	4.1	58	3.4	
Netherlands ¹		100	0.0	100	0.0	71	5.0	45	5.6	100	0.0	100	0.0	100	0.0	100	0.0	100	0.0	100	0.0	100	0.0	92	3.2	95	2.4
New Zealand	529	2.8	100	0.0	99	0.8	17	2.4	41	3.3	98	1.1	100	0.0	100	0.0	100	0.0	94	1.2	100	0.0	87	2.7	100	0.1	
Norway	505	2.8	m	m	m	m	m	m	m	m	m	m	m	m	m	m	m	m	m	m	m	m	m	m	m	m	
Poland	479	4.5	m	m	m	m	m	m	m	m	m	m	m	m	m	m	m	m	m	m	m	m	m	m	m	m	
Portugal	470	4.5	13	2.1	9	1.2	1	0.7	1	0.7	89	2.9	95	2.0	92	2.2	88	2.6	85	3.1	100	0.0	20	3.4	54	4.5	
Spain	493	2.7	38	2.5	39	2.6	9	2.2	9	2.2	90	2.5	98	1.3	99	0.8	97	1.5	89	2.4	100	0.4	86	2.9	54	3.8	
Sweden	516	2.2	99	0.8	83	3.2	62	3.6	74	3.6	85	3.1	99	0.6	100	0.0	97	1.5	54	4.0	100	0.0	88	2.8	76	3.7	
Switzerland	494	4.3	93	1.7	82	2.3	13	2.7	15	3.0	54	3.3	87	2.9	98	1.2	75	3.6	82	3.0	51	4.1	29	3.5	34	3.4	
United Kingdom	523	2.6	99	0.3	89	1.3	72	3.0	70	3.1	92	0.8	100	0.1	99	0.5	100	0.2	66	3.6	100	0.0	94	1.5	100	0.1	
United States	504	7.1	97	0.9	98	1.2	76	4.9	74	5.1	96	1.9	99	1.0	99	0.9	93	2.2	89	2.6	92	3.0	84	4.3	97	1.3	
OECD average	500	0.6	61	0.4	54	0.5	23	0.5	26	0.5	76	0.6	94	0.3	95	0.2	89	0.4	84	0.5	92	0.2	69	0.6	71	0.6	
Non-OECD countries																											
Brazil	396	3.1	39	2.7	33	2.9	10	1.7	10	1.7	55	3.4	75	2.8	98	0.7	91	1.8	79	3.3	100	0.3	90	2.2	57	3.4	
Latvia	458	5.3	100	0.0	99	0.9	25	4.2	35	5.2	33	4.5	89	3.8	100	0.1	77	4.6	98	1.3	99	0.6	76	4.9	90	3.5	
Liechtenstein	483	4.1	m	m	m	m	m	m	m	m	m	m	m	m	m	m	m	m	m	m	m	m	m	m	m	m	
Russian Federation	462	4.2	100	0.4	98	0.7	41	3.2	47	3.3	47	4.0	70	3.8	100	0.0	100	0.4	99	0.6	97	1.0	95	1.4	96	1.3	
<i>Cross-country correlation between country's average achievement on the reading literacy scale and the percentage indicated by the respective column header.²</i>																											
			0.16		0.10		-0.05		-0.06		0.00		0.37		0.21		0.20		-0.21		0.30		0.25		0.51		

* "m" indicates no data available.

Notes: 1. Response rate is too low to ensure comparability.

2. Correlation values indicated in bold are statistically significant.

Source: OECD PISA 2000 database (OECD, 2001).

There appears to be greater flexibility for schools with regard to the appointment and dismissal of teachers. Germany and Italy are the only countries in which about 90% or more of 15-year-olds are enrolled in schools whose principals report that the school has no responsibility in these matters. Conversely, in Belgium, the Czech Republic, Denmark, Hungary, Iceland, Sweden, Switzerland, the United Kingdom, and the United States, at least 93% of students attend schools that have some responsibility for the appointment of teachers (the OECD average is 61%). In the majority of countries, principals tend to report a more prominent role for the school in appointing teachers than in dismissing them, the largest differences being found in Canada and Denmark (21% and 40% respectively). In Belgium, the Czech Republic, Hungary, Iceland, the Netherlands, New Zealand, and the United States, more than 95% of the students are enrolled in schools whose principals report having some say in the dismissal of teachers (the OECD average is 54%).

There is variation also with regard to the roles that schools play in the formulation of budgets, with Austria and Germany reporting the least involvement of schools with this task. Schools in Australia, Belgium, Italy, Luxembourg, the Netherlands, New Zealand, the United Kingdom, and the United States have a comparatively high degree of school autonomy with regard to budget formulation. In most countries, principals generally report a high degree of school involvement in decisions on how money is spent within schools (the OECD average is 94%).

In all OECD countries, the majority of 15-year-olds are enrolled in schools which have some responsibility for student admissions (the OECD average is 84%). With the exception of Germany, Italy, and Switzerland, the majority of 15-year-olds are also enrolled in schools that play a role in deciding on the courses offered (the OECD average is 71%). Finally, most principals report that disciplinary policies, assessment policies, and choice of textbooks are school responsibilities (the OECD average is around 90%).

Does the distribution of decision-making responsibilities affect student performance? In some countries, most notably Australia, Austria, Canada, Ireland, Spain, and Switzerland, the relationship between school autonomy and student performance is strong and significant, even when other school characteristics are held constant.¹⁵ In other countries, the association between the different aspects of school autonomy and student performance *within* the country tends to be weaker, often because legislation specifies the distribution of decision-making responsibilities so that there is little variation among schools. When looking *across* countries, however, PISA 2000 suggests that in those countries in which principals report, on average, a higher degree of school autonomy with regard to choice of courses, the average performance in reading literacy tends to be higher than in other countries. The cross-country relationship is summarized by the country-level correlations shown in Table 8.¹⁶ The picture is similar, though less pronounced, for other aspects of school autonomy, including the relationship between mean performance and the degree of school autonomy in budget allocation. This finding cannot, of

course, be interpreted in a causal sense as, for example, school autonomy and performance could well be mutually reinforcing or influenced by other factors.

While countries with greater levels of school autonomy in particular areas tend to perform better, a concern is that greater independence of schools might lead to greater inequalities in the performance of schools. One way to examine this is by relating the PISA measures of school autonomy to the proportion of student performance differences that lies between schools.¹⁷ This comparison does not reveal a consistent relationship, and therefore suggests that greater school autonomy is not necessarily associated with greater disparities in school performance. For example, Finland and Sweden, among the countries with the highest degree of school autonomy on many of the measures used in PISA 2000, display, together with Iceland, the smallest performance differences among schools.

As a counterpart to more autonomy, schools in the better-performing countries also tend to be responsible for addressing the needs of a diverse student population. They rarely have the option to transfer students to educational streams or school types with lower performance requirements, options that often exist in lower-performing countries. These aspects are examined more closely in the next section.

Securing Consistent Standards for Schools

Some countries have non-selective school systems in which all schools provide similar opportunities for learning and need

to cater for the full range of student performance. Other countries respond to diversity by forming groups of students of similar levels of performance through selection either within or between schools, with the aim of serving students according to their respective ability levels and needs. How do such policies and practices affect actual student performance and the ways in which family background influences student success?

Table 9 shows considerable differences in the extent to which the reading literacy skills of 15-year-olds vary within each country. For each country, a distinction is made between how much of this variation can be accounted for by the different results of each school and how much is to do with a range of student results within each school.

Substantial variation between schools and less variation among students within schools (e.g., in Hungary and Poland) indicates that students are typically attending schools where other students perform at levels similar to their own. This selectivity may reflect family choice of school or residential location, policies on school enrollment, or allocation of students. On average across OECD countries, 36% of the total variation in student performance in reading literacy is attributable to variation between schools.

In Austria, Belgium, the Czech Republic, Germany, Greece, Hungary, Italy, Mexico, and Poland, there is more variation between, than within, schools. In Korea, most of the variation is within schools but, more importantly, both within- and between-school variation are only around half of the OECD

Table 9. Between-school and Within-school Variation in Student Performance on the Reading Literacy Scale (2000)

Country	Variation expressed as a percentage of the average variation in student performance across the OECD countries				Percentage of between-school variance that is explained by socio-economic background factors	Percentage of within-school variance that is explained by socio-economic background factors
	Total variation in student performance ¹	Total variation in student performance expressed as a percentage of the average variation in student performance across OECD countries	Proportion of average variation in student performance that lies between schools	Proportion of average variation in student performance that lies within schools		
			Percentage of between-school variance that is explained by socio-economic background factors	Percentage of within-school variance that is explained by socio-economic background factors		
OECD countries						
Australia	10,357	111.6	20.9	90.6	64	16
Austria	8,649	93.2	68.6	45.7	28	5
Belgium	11,455	123.5	76.0	50.9	31	9
Canada	8,955	96.5	17.1	80.1	42	14
Czech Republic	9,278	100.0	51.9	45.3	43	11
Denmark	9,614	103.6	19.6	85.9	58	18
Finland	7,994	86.2	10.7	76.5	18	20
France	m	m	m	m	m	m
Germany	12,368	133.3	74.8	50.2	27	12
Greece	9,436	101.7	53.8	52.9	25	8
Hungary	8,810	95.0	71.2	34.8	25	4
Iceland	8,529	91.9	7.0	85.0	31	12
Ireland	8,755	94.4	17.1	79.2	59	12
Italy	8,356	90.1	50.9	43.4	19	3

Japan ²	7,358	79.3	36.5	43.9	11	3
Korea	4,833	52.1	19.7	33.0	17	3
Luxembourg	10,088	108.7	33.4	74.9	54	21
Mexico	7,370	79.4	42.9	37.4	31	4
New Zealand	11,701	126.1	20.1	103.9	70	19
Norway	10,743	115.8	12.6	102.4	48	20
Poland	9,958	107.3	67.0	38.9	10	2
Portugal	9,436	101.7	37.5	64.3	43	14
Spain	7,181	77.4	15.9	60.9	59	12
Sweden	8,495	91.6	8.9	83.0	73	17
Switzerland	10,408	112.2	48.7	63.7	35	18
United Kingdom	10,098	108.9	22.4	82.3	61	18
United States	10,979	118.3	35.1	83.6	61	17
OECD average	9,277	100.0	36.2	65.1	34	14
Non-OECD countries						
Brazil	7,427.0	80.1	35.8	47.1	35	6
Latvia	10,434.6	112.5	35.1	77.5	20	15
Liechtenstein	m	m	m	m	27	10
Russian Federation	8,465.8	91.3	33.6	57.1		

* "m" indicates no data available.

Notes: 1. Total variation in student performance is obtained as the square of the standard deviation. The statistical variance and not the standard deviation is used for this comparison to allow for the decomposition of the components of variation in student performance.

2. Due to the sampling methods used in Japan, the between-school variance in Japan includes variation between classes within schools.

Source: OECD PISA 2000 database (OECD, 2001).

average. Korea thus not only achieves high average performance in reading and low overall disparity between students, but also does so with relatively little variation in performance between schools. Spain also shows low overall variation (around three-quarters of the OECD average) and low between-school variation (16% of the OECD average for all variation) but, unlike Korea, has a mean score well below the OECD average. The smallest variation in reading performance between schools occurs in Finland, Iceland, and Sweden, where it accounts for only between 7% and 11% of the average total student variation in OECD countries.

Overall, it is striking to see that in each of the seven countries with the highest mean scores in reading literacy (Australia, Canada, Finland, Ireland, Korea, New Zealand, and the United Kingdom), differences between schools account for variations in performance that are less than a quarter of overall student variation in the average OECD country. These countries therefore succeed in securing high average performance levels relatively consistently across schools. Conversely, there is a clear tendency for larger disparities among schools to be associated with lower overall performance.¹⁸ This suggests that securing similar performance standards among schools, perhaps most importantly through identifying and reforming poorly performing schools, not only is an important policy goal in itself, but also may contribute to high overall performance.

Mitigating the Impact of Family Background

The proportion of the variation in student performance within and between schools that is attributable to students' family

background is indicated in Table 9. For example, in Sweden, 17% of the within-school variation and 73% of the between-school variation are attributable to the family background factors measured by PISA. These percentages differ markedly from, say, those of Poland, where students' family background accounts for 2% of the within-school variation and 10% of the between-school variation.

In comparing the extent to which the between-school differences are attributable to students' family backgrounds, it is important to take account of the size of the differences between schools. For example, family background factors account for more of the between-school differences in Sweden than in any other country, but Sweden (9%) has less variation in performance between schools than all other countries except Iceland (7%). Family background factors account for less of the between-school variation in Poland (10%) than in any other country, but Poland has more variation in performance between schools than in all but four other countries (Austria, Belgium, Germany, and Hungary). In general, the greater the differences between schools, the smaller the proportion that can be attributed to students' family backgrounds.

The analysis shows that, in many countries, a substantial portion of the between-school variation in performance in reading literacy is associated with differences in students' socio-economic backgrounds. This effect can operate in two ways. First, students' individual backgrounds may influence their performance. But in addition, the aggregate impact of the backgrounds of all the students enrolled in a school can also

influence individual students. Understanding this collective impact is of key importance for policy-makers wishing to provide all students with equal opportunities.

Schools whose intakes have a higher average level of socio-economic status tend to have several advantages. They are likely to have greater support from parents, fewer disciplinary problems, better-qualified teachers and higher teacher morale, better teacher-student relations, and generally a school climate that is oriented toward higher performance. There is often also a faster-paced curriculum in such schools. Some of the “contextual effect” associated with high socio-economic status may also stem from peer interactions as talented students work with each other. Peer pressure, peer competition, and the focus in some schools on entry into tertiary education may also play a role.

Table 10 estimates the strength of the relationship between reading literacy performance and socio-economic status, on the one hand of the individual student and on the other of all the students at a given school.¹⁹ The lengths of the bars indicate the differences in scores in reading literacy associated with a given difference in the socio-economic status of different students, and the average socio-economic status of those enrolled in schools.²⁰

In almost all countries, there appears to be a clear advantage in attending a school whose students are, on average, from more advantaged family backgrounds. On average across OECD countries, this contextual effect is over three times as large as the direct effect associated with individual student

Table 10. Effects of the Students' and Schools' Socio-economic Background on Performance on the Reading Literacy Scale

Country	Interquartile range of school mean index of ESCS	Effect of the students' ESCS on performance	Effect of the schools' mean ESCS on performance
OECD countries			
Australia	0.73	17	21
Austria	0.83	4	59
Belgium	0.97	7	56
Canada	0.60	14	22
Czech Republic	0.52	10	52
Denmark	0.54	17	22
Finland	0.44	13	8
France	m	m	m
Germany	0.63	8	66
Greece	0.75	7	39
Hungary	0.86	4	47
Iceland	0.50	11	5
Ireland	0.55	13	23
Italy	1.04	3	44
Japan ¹	m	m	m
Korea	0.85	3	30
Luxembourg	0.96	12	40
Mexico	1.20	3	22
Netherlands ²	0.66	7	57
New Zealand	0.64	16	22
Norway	0.57	17	12
Poland	0.92	2	49
Portugal	0.66	11	29
Spain	0.77	10	16
Sweden	0.50	14	16
Switzerland	0.50	12	32
United Kingdom	0.93	15	29
United States	0.61	13	28
OECD average	0.72	10	32
Non-OECD countries			
Brazil	1.16	6	22
Liechtenstein	0.49	5	64
Russian Federation	0.79	8	27

* "m" indicates no data available.

- Notes: 1. Data for Japan are not included in this table due to a high percentage of missing data on parental education and parental occupation.
 2. Response rate is too low to ensure comparability.

Source: OECD PISA 2000 database (OECD, 2001).

background.²¹ The socio-economic intake of the school thus has a strong association with student reading performance.²²

Some of the observed contextual effect might be due to aspects of school quality. For example, to the extent that schools differentiated by academic tracking are also differentiated by socio-economic status, the school-level effect of socio-economic status would be reinforced by systematic curriculum differences. Some of the contextual effect might also be due to peer effects. But some of it might be due to other factors which are not accounted for in PISA, such as parental attitudes. Also, in many education systems, students are allocated to different types of school or program on the basis of factors which include their academic ability. Therefore, the findings should not lead to the conclusion that transferring a group of students from a school with a low socio-economic intake to a school with a high socio-economic intake would result automatically in the gains suggested by Table 10.

In order to develop education policy in the light of these findings, there needs to be an understanding of the nature of the formal and informal mechanisms that contribute to between-school socio-economic differentiation, and its effect on students' performance. In some countries, students are highly differentiated along socio-economic lines, in part because of residential location and economic factors, but also because of features of the education system. Education policy in such countries might attempt to moderate the impact of socio-economic background on student performance by reducing the extent of differentiation along socio-economic lines, or by

allocating resources to schools differentially. In these countries, it may be necessary to examine how the allocation of school resources relates to the socio-economic intake of schools.

In other countries, structural features of the education system stream or track students into programs with different curricula and teaching practices (this aspect is examined in more detail below). To the extent that the allocation of students to programs in such systems is inter-linked with students' socio-economic background, those from disadvantaged backgrounds may not achieve their full potential. And in yet other countries, there is relatively little socio-economic differentiation; that is, schools tend to be similar in their socio-economic intake. Education policy in these countries might aim at moderating the impact of socio-economic background through measures aimed at improving school resources and reducing within-school differentiation according to students' ESCS.

Table 11 shows that the combined influence of school-level factors, including those examined in the preceding section, explains about 31% of the variation between schools within countries, and 21% of the variation between countries. Students' individual family backgrounds, together with the mean socio-economic status of the school, explain about 12% of the differences between students within schools. On the other hand, they account for 66% of the differences in performance between schools and for 34% of the performance differences between countries. Together, family background and school factors explain most differences in performance between schools. On average, 72% of observed variation between

Table 11. Effects of Student-level and School-level Factors on Performance on the Reading, Mathematical, and Scientific Literacy Scales, for All OECD Countries Combined

	Increase	Reading literacy scale					
		Model 1 ^{1,2}		Model 2 ¹		Model 3 ¹	
		Effect ³	SE	Effect ²	SE	Effect ³	SE
Family background and student characteristics							
Student-level index of economic, social and cultural status	one unit			20.1	2.07	20.1	2.07
Student-level index of economic, social and cultural status squared				-1.7	0.34	-1.7	0.35
School mean index of economic, social and cultural status	one student-level unit			67.5	6.48	56.6	5.41
Student is female				25.5	1.97	25.0	2.03
Student is foreign-born				-23.2	2.87	-23.1	2.88
Percentage of variance explained							
Students within schools		0.0		12.4		12.4	
Schools within countries		31.0		66.1		71.9	
Between countries		20.8		34.3		43.4	
Mathematical literacy scale							
	Increase	Mathematical literacy scale					
		Model 1 ^{1,2}		Model 2 ¹		Model 3 ¹	
		Effect ³	SE	Effect ²	SE	Effect ³	SE
Family background and student characteristics							
Student-level index of economic, social and cultural status	one unit			19.3	1.76	19.3	1.76
Student-level index of economic, social and cultural status squared				-1.2	0.45	-1.2	0.44
School mean index of economic, social and cultural status	one student-level unit			62.8	6.97	52.7	5.76
Student is female				-16.2	1.56	-16.8	1.60
Student is foreign-born				-21.1	3.78	-21.5	3.85
Percentage of variance explained							
Students within schools		0.0		11.0		11.2	
Schools within countries		28.3		62.0		67.8	
Between countries		21.8		26.0		32.2	

	Increase	Scientific literacy scale					
		Model 1 ^{1,2}		Model 2 ¹		Model 3 ¹	
		Effect ³	SE	Effect ²	SE	Effect ³	SE
Family background and student characteristics							
Student-level index of economic, social and cultural status	one unit			19.3	1.94	19.3	1.95
Student-level index of economic, social and cultural status squared				-0.8	0.42	-0.8	0.42
School mean index of economic, social and cultural status	one student-level unit			65.4	6.78	54.9	5.62
Student is female				-5.2	1.67	-6.0	1.76
Student is foreign-born				-25.6	3.87	-25.9	3.90
Percentage of variance explained							
Students within schools		0.0		10.7		10.7	
Schools within countries		29.4		62.6		69.0	
Between countries		20.2		8.3		15.6	

Notes: 1. Model 1 tests the impact of school factors; model 2 tests the impact of family background; model 3 tests the joint impact of school factors and family background. For an explanation of these models, see OECD (2001).

2. Model 1 also includes school resources, school policy and practice, and classroom practice. For details for their effect sizes, please see OECD (2001), Table 8.5.

3. Effects marked in bold are statistically significant.

Source: OECD PISA2000 database (OECD, 2001).

schools within countries is accounted for by the combination of the school-level and student background factors identified through PISA.

The combined influence of school and background factors on differences in school performance is not simply the sum of the influence of school factors and that of background factors. This is because many characteristics of schools are closely associated with the characteristics of the families of their students. This means that some of the effect of family background on school results is *mediated* by the school characteristics.

The result is that the student's own home background is only part of the story of socio-economic disparities in education — and in most countries the smaller part. The net result is that in countries where there is a high degree of differentiation between schools along socio-economic lines, students from disadvantaged socio-economic backgrounds do worse. This, in turn, means that some of the *inequality of outcomes* is associated with *inequality of opportunity*. In such circumstances, talent remains unused and human resources are wasted. To the extent that the allocation of students to programs in such systems is inter-linked with students' socio-economic background, those from disadvantaged backgrounds may not achieve their full potential.

Containing the Impact of Institutional Differentiation

A much debated policy question is to what extent structural characteristics of educational systems moderate, or perhaps reinforce, socio-economic disparities.

One device to differentiate among students is the use of different institutions or programs that seek to group students by their level of performance. Students of similar performance levels are sorted into the same type of institution or program on the assumption that their talents will develop best in a learning environment in which they can stimulate each other equally well, and that an intellectually homogeneous student body will be conducive to the efficiency of teaching. OECD countries range from essentially undivided secondary education until age 15 to systems with four school types or distinct educational programs as in Austria, Hungary, the Netherlands, and Switzerland (OECD, 1999b). A specific aspect of such differentiation is the separate provision of general academic and vocational programs. Vocational programs differ from academic ones not only with regard to their curriculum, but also in that they generally prepare students for specific types of occupations and, in some cases, for direct entry into the labor market.

Another important dimension is the age at which decisions between different school types are generally made, and therefore students and their parents are faced with choices. Such decisions occur very early in Austria and Germany, at around age 10. By contrast, in countries such as New Zealand, Spain, and the United States, no formal differentiation takes place until the completion of secondary education. Grade repetition can also be considered as a form of differentiation in that it seeks to adapt curriculum content to student performance.²³

It is difficult to define these measures of differentiation in ways that are cross-nationally comparable and interpretable.

However, the analysis shows that these indicators are highly interrelated so that it is possible to combine them into an index of educational institutional differentiation (available for OECD countries only).²⁴ This index can then be related to the impact that the social background of students has on student performance. This analysis shows that the total effect of differentiation on the relationship between social background and student reading performance is 0.55, as measured by the standardized regression coefficient. The extent of institutional differentiation is thus a strong predictor of the impact that family background has on student performance.

The more differentiated and selective an education system is, the larger are the typical performance differences between students from more and less advantaged family backgrounds. This is true for the various aspects of family background that were measured by PISA, and it remains true even when control variables such as national income are taken into account. As a result, both overall variation in student performance and performance differences between schools tend to be greater in those countries with explicit differentiation between types of program and schools at an early age.

The question remains whether differentiation might still contribute to raising overall performance levels. This question cannot be answered conclusively with a cross-sectional survey such as PISA. However, it is striking that the three best-performing countries — Finland, Japan, and Korea — show a very moderate degree of institutional differentiation combined with a consistently high level of student performance across schools and among students from different family backgrounds.

By contrast, among the countries with a high degree of institutional differentiation, only Austria and Belgium perform significantly above the OECD average.

An explanation for these results is not straightforward. There is no intrinsic reason why institutional differentiation should necessarily lead to greater variation in student performance, or even to greater social selectivity. If teaching homogeneous groups of students is more efficient than teaching heterogeneous groups, this should increase the overall level of student performance rather than the dispersion of scores. However, in homogeneous environments, while the high-performing students may profit from the wider opportunities to learn from one another, and stimulate each other's performance, the low performers may not be able to access effective models and support. It may also be that in highly differentiated systems, it is easier to move students not meeting certain performance standards to other schools, tracks or streams with lower performance expectations, rather than investing the effort to raise their performance. Finally, it could be that a learning environment that has a greater variety of student abilities and backgrounds may stimulate teachers to use approaches that involve a higher degree of individual attention for students.

It is difficult to discern conclusive evidence for these possible explanations from PISA. However, it is noteworthy that the majority of the countries in which students report a comparatively low level of individual support from their teachers are also those with a particularly high degree of institutional differentiation.²⁵

These arguments alone still do not explain the greater social selectivity of differentiated school systems that PISA 2000 demonstrates. Even if institutional differentiation leads to more variation in student performance, it does not necessarily increase the gap in performance between students from advantaged and disadvantaged backgrounds. One possible explanation is that more homogeneous learning environments for low-performing students decrease the aspirations of parents and children from lower socio-economic backgrounds, and increase the aspirations of families from higher socio-economic backgrounds. In other words, the very existence of a highly differentiated system may signal to students and parents from lower socio-economic backgrounds what to expect from school.

The reason why the age at which differentiation begins is closely associated with social selectivity may be easier to explain. Students are more dependent upon their parents and their parental resources when they are younger and, in systems with a high degree of educational differentiation, parents from higher socio-economic backgrounds are in a better position to promote their children's chances than in a system in which such decisions are taken at a later age, and students themselves play a bigger role.

Conclusions

The PISA 2000 assessments of performance by 15-year-olds revealed wide differences among countries, and between schools and students within countries. Countries varied both in their average performance, and in the extent of spread around

the average. They also differed in the extent to which family background shaped student performance.

A number of countries managed to combine high levels of performance with a relatively narrow range of differences among students. The performance of such countries provides considerable grounds for optimism. The results achieved by students in countries/regions such as Finland, Canada, Hong Kong, Korea, and Japan indicate that it is possible to combine high performance standards with an equitable distribution of learning outcomes. Quality and equity do not have to be seen as competing policy objectives.

However, even the countries that performed well overall in the 2000 PISA assessments have areas for concern. In almost all countries, there is a significant minority of students who performed at reading literacy level 1 or below. Such students will not only struggle in school, but also find it difficult to make their way successfully in the world beyond school. In no single country does students' home background fail to have an influence on their school performance, although in some countries this influence is much less marked than in others.

A study such as PISA cannot, on its own, provide clear-cut answers on the factors that explain different levels of student, school, and national performance, or the strategies that countries should use. However, one of the great advantages of cross-national studies is that they can show countries their areas of relative strength and weakness, and stimulate debate about current policies and practices.

In seeking to lift overall performance, and to reduce the impact of socio-economic background, the PISA results provide a number of policy pointers. Important among these are building students' engagement with reading and school more generally, focusing on learning outcomes rather than educational inputs, providing schools with the authority for organizing their own programs — and holding them accountable for the results, and reducing the extent of social and educational differentiation among schools.

The PISA results also pose important questions for deeper investigation. For example, the strength of the findings on student engagement challenges school systems and researchers to delve more deeply into the motivational factors that make learning more effective — and how those factors can be developed. The strong association between student performance and structural differentiation in schooling challenges systems that stream students from a relatively early age to better understand the social and educational processes at work.

Such issues will be pursued in many different ways in the context of each country. But in addition, PISA itself is an ongoing process that aims progressively to develop a richer knowledge base with greater explanatory value. Future developments in PISA will help to deepen our understanding of the ways in which system policies and school practices affect the performance of students from different social backgrounds. At both international and national levels, research studies are underway to add further to the knowledge base in this area of prime policy importance.

1. The scale that is used for this purpose was established such that the average score across OECD countries is 500, with about two-thirds of students across OECD countries scoring between 400 and 600 points.
2. Some countries assessed two full successive grade levels. For these countries, the performance difference between students in the two grade levels can be used to estimate the typical progress achieved over the course of a school year. For other countries, the age-based data from PISA provide only a rough approximation for progress over a school year since it cannot be assumed that the different grade levels are appropriately represented by an age group.
3. Spending per student is approximated by multiplying public and private expenditure on educational institutions per student in 1999 at each level of education by the theoretical duration of education at the respective level, up to the age of 15. Expenditure on schooling is expressed in U.S. dollars using purchasing power parities (PPP). The PPP exchange rates equalize the purchasing power of different currencies. This means that comparisons between countries reflect only differences in the volume of goods and services purchased. Data on expenditure per student are taken from the 2002 edition of OECD's (2002a) *Education at a Glance*.
4. Expenditure per student explains 19% of the variation between countries in mean performance on the reading literacy scale. The correlation for the overall relationship is 0.44.
5. "Classical" cultural activities were measured through self-reports on how often students had participated in the following activities during the preceding year: visited a museum or art

gallery; attended an opera, ballet or classical symphony concert; and watched live theatre. “Classical” cultural possessions in the family home were measured through students’ reports on the availability of the following items in their home: classical literature (examples were given), books of poetry, and works of art (examples were given).

6. Family wealth was derived from students’ reports on: (a) the availability, in their home, of a dishwasher, a room of their own, educational software, and a link to the Internet; and (b) the number of cellular phones, television sets, computers, motor cars, and bathrooms at home. Home educational resources were derived from students’ reports on the availability and number of the following items in their home: a dictionary, a quiet place to study, a desk for study, textbooks, and calculators.
7. To capture a student’s family and home background, an index of economic, social and cultural status (ESCS) was created on the basis of student reports on the following background characteristics: the occupation of the parents; the highest level of education of the student’s parents; an index of family wealth; an index of home educational resources; and an index of cultural possessions in the family home. Details of these measures are provided in Adams and Wu (2002).
8. In such a comparison, the spread of social background characteristics in the population needs to be taken into consideration, as social equity in student learning outcomes may be more difficult to obtain in countries with large social disparities in the population. To shed light on this, one can calculate the difference in reading performance of students at the 95th and 5th percentiles of the PISA index of ESCS, which illustrates the extent of socio-economic differences in the families of 15-year-olds in each country. It is noteworthy that

the cross-country correlation between this measure and the socio-economic differences in PISA scores is small and not statistically significant, suggesting that the results cannot be explained with the spread of social background characteristics as measured by PISA.

9. The scale had the response categories “agree,” “agree somewhat,” “disagree,” and “disagree somewhat.”
10. The scale had the response categories “agree,” “agree somewhat,” “disagree,” and “disagree somewhat.”
11. Specifically, students were asked to rate how frequently they read different kinds of material and how much time they invest in reading for enjoyment. Both aspects were combined into an index, in which the engagement level for the average OECD student is set at 0, and two-thirds of students score between +1 and -1. Thus a positive or negative score does not indicate positive or negative engagement in reading, but shows whether students are more or less engaged than the average for other students in OECD countries.
12. The within-country correlation between reading performance and engagement averages 0.38 in OECD countries, and the cross-country correlation between mean reading performance and mean engagement is 0.27.
13. The average difference between the reading literacy scores of students who report these characteristics as more favorable or less favorable (separated by one standard deviation in the international distribution of students ranked according to each characteristic) is 18 points in the case of student-teacher relations and 10 points in the case of disciplinary climate (see OECD, 2001).
14. An increase of one unit on the respective PISA indices (corresponding to one international standard deviation) is

associated with gains on the reading literacy scale of about 6, 2, and 5 points respectively (see OECD, 2001). When interpreting such results, it should be noted that many factors influencing student performance, in particular those related to teachers and teaching, were not directly measured in PISA 2000. The results reported here are therefore likely to understate the impact of such factors.

15. For these countries, the effect size of the relationship between the PISA index of school autonomy and student performance on the reading literacy scale is between 8 and 38 score points on the PISA reading literacy scale (see OECD, 2001).
16. It should be noted that the analysis is subject to the limitation that there were 32 countries from which PISA students were sampled in 2000. While this number of countries is an advance over most previous comparative analyses, it remains small. Consequently, effects need to be fairly strong to be detectable by conventional statistical standards. Expressed as a bivariate correlation, only coefficients of 0.30 or higher will be statistically significant.
17. The performance differences between schools are indicated in Table 9.
18. The cross-country correlation between average performance and the proportion of the OECD average variation in student performance that is accounted for by schools is -0.46 .
19. These were estimated with a multilevel model (i.e., one that looks successively at the additional effect of a range of factors), taking account of ESCS, gender, ethnicity, and family structure at the student level, and mean ESCS at the school level.
20. The score difference shown is for half a standard deviation of difference on the PISA index of ESCS. What is important here

is not the absolute value of these differences, but the comparison between individual student and whole-school effects across different countries.

21. A measure of 0.5 of a student-level standard deviation was chosen for the comparisons because this value describes realistic differences between schools in terms of their socio-economic composition. On average across OECD countries, the difference between the 75th and 25th quartiles of the school mean index of ESCS is 0.72 of a student-level standard deviation and, in all but one OECD country, this difference is greater than, or equal to, half a student-level standard deviation on the socio-economic index.
22. Since no data on students' earlier achievement are available from PISA, it is not possible to determine to what extent the school background relates directly or indirectly to students' performance — by way of selection or self-selection, for example. In the interpretation of these findings, it also needs to be borne in mind that differences in the averages of schools' socio-economic backgrounds are naturally much smaller than comparable differences between individual students, given that every school's intake is mixed in terms of socio-economic variables.
23. In PISA, grade repetition was estimated by calculating the standard deviation in the grade levels reported by students for each of the countries. Note that this measure also captures the degree to which students enter school earlier or later than the statutory entry age and may therefore overstate apparent grade repetition.
24. For the purpose of this analysis, the normalized components were added with equal weight.

25. In the Czech Republic, Germany, Italy, and Luxembourg, for example, at least 51% of students say that their teachers of the language of assessment never show interest in every student's learning or do so only in some lessons (as opposed to most lessons or every lesson), at least 27% of students say that their teachers never or only in some lessons provide an opportunity for students to express their opinions, and 58% or more of students say that their teachers never or only in some lessons help them with their learning. For a further analysis of the relationship between teacher support and student performance, see OECD (2001).

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