

VIEWING THE JAPANESE SCHOOL SYSTEM THROUGH THE PRISM OF PISA

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

Learning outcomes

Mean performance among 15-year-olds: Above the OECD average and stable over time

2. In the PISA 2009 assessment of 15-year-olds, Japan is among the top performing OECD countries in reading (rank 5¹), mathematics (rank 4²) and science (rank 2³). (Figures I.2.15, I.3.10 and I.3.21). In reading, Canada, New Zealand, Australia, the Netherlands and the partner country Singapore perform at the same level as Japan; in mathematics, Switzerland, Japan, Canada, New Zealand and the partner country and economy Liechtenstein and Macao-China show performance levels similar to that of Japan; and in science, Korea, the Netherlands and the partner country Singapore perform at the same level as Japan.

3. Even though there is a general perception that Japan's performance has been declining, the PISA results show that Japan has maintained high performance in reading, about 20 score points above the average, since 2000 (Table V.2.1). Student performance in mathematics and science has also remained broadly unchanged since 2003 and 2006, respectively, when PISA began to measure these trends.

4. Girls outperform boys in reading by an average of 39 points, similar to the OECD average, and this gender gap has been apparent since 2000 (Tables I.2.3 and V.2.4). However, there is no gender gap in performance in mathematics and science (Tables I.3.3 and I.3.6).

5. ***Japan has, however, seen important improvements in students attitudes and dispositions towards learning and school***, which PISA considers key outcomes of education. These are discussed in detail in the later sections, but a brief summary is presented below.

6. Compared with 2000, more Japanese students read for enjoyment and have positive motivation for reading. For example, compared with students' reports in 2000, in Japan, more students like talking about books with other people and have reading as one of their favorite hobbies, while less students find reading is a waste of time for them, find it hard to finish books, cannot sit still and read for more than a few minutes; and read only to get information that they need (Table V.5.3).

7. The disciplinary climate has also improved in Japan since 2000: Less students feel that students don't listen to what the teacher says, that students don't start working for a long time after the lesson begins, they can work well, that noise or disorder affects learning increased, and their teacher has to wait a long time before students settle down (Table V.5.12).

Relative shares of poor-performing students: Below the OECD average and stable over time

8. In Japan, 14% of 15-year-olds do not reach the PISA baseline Level 2 of reading proficiency, less than the OECD average of 19%. This proportion, which has remained unchanged since 2000 (Tables I.2.1 and V.2.2), is larger than that in Korea, Finland, Canada and the partner economies Shanghai-China and Hong Kong-China, where 10% of students or less are lowest performers (Table I.2.1).

9. Level 2 on the PISA reading scale can be considered a baseline level of proficiency, at which students begin to demonstrate the reading competencies that will enable them to participate effectively and productively in life. Students proficient at Level 2 are capable of very basic tasks, such as locating

information that meets several conditions, making comparisons or contrasts around a single feature, working out what a well-defined part of a text means even when the information is not prominent, and making connections between the text and personal experience. Some tasks at this level require students to locate one or more pieces of information, which may need to be inferred and may need to meet several conditions. Others require recognising the main idea in a text, understanding relationships, or construing meaning within a limited part of the text when the information is not prominent and the reader must make low-level inferences. Tasks at this level may involve comparisons or contrasts based on a single feature in the text. Typical reflective tasks at this level require students to make a comparison or several connections between the text and outside knowledge by drawing on personal experience and attitudes.

10. A follow-up of students who were assessed by PISA in 2000 as part of the Canadian Youth in Transitions Survey shows that students scoring below Level 2 face a disproportionately higher risk of poor post-secondary participation or low labour-market outcomes at age 19, and even more so at age 21, the latest age for which data are currently available. For example, the odds of Canadian students who had reached PISA Level 5 in reading at age 15 to achieve a successful transition to post-secondary education by age 21 were 20 times higher than for those who had not achieved the baseline Level 2, even after adjustments for socio-economic differences are made (OECD, 2010, *Pathways to Success*).⁴ Similarly, of the Canadian students who performed below Level 2 in 2000, over 60% had not gone on to any post-school education by the age of 21; by contrast, more than half of the students (55%) who had performed at Level 2 as their highest level were at college or university.

11. In mathematics, 13% of students perform below Level 2 on the PISA mathematics. This is below the OECD average of 22% and that has remained unchanged since 2003 (Tables I.3.1 and Table V.3.2). Students proficient at Level 2 in mathematics can employ basic algorithms, formulae, procedures or conventions. They can interpret and recognise mathematical situations in contexts that require no more than direct inference and extract relevant information from a single source and make use of a single representational mode. They are capable of direct reasoning and making literal interpretations of the results.

12. In science, 11% of students perform below Level 2 on the PISA science scale. This is below the OECD average of 18% and that has remained unchanged since 2006 (Tables I.3.4 and V.3.4). Students proficient at Level 2 can identify key features of a scientific investigation, recall single scientific concepts and information relating to a situation, and use results of a scientific experiment represented in a data table as they support a personal decision. In contrast, students who do not reach Level 2 in science often confuse key features of an investigation, apply incorrect scientific information, and mix personal beliefs with scientific facts in support of a decision.

Relative shares of top-performing students: Above the OECD average and, in reading, an increase over time

13. At the other end of the performance scale, students in Japan do well at the very highest levels of reading proficiency (Levels 5 and 6). Some 13% are top performers in reading (OECD average is 8%), 21% are top performers in mathematics (OECD average is 13%) and 17% are top performers in science (OECD average is 9%) (Tables I.2.1 , I.3.1 and I.3.4).

14. The proportion of top performers in reading has increased from nearly 10% to above 13% in Japan since 2000 (Table V.2.2). However, there was a gender gap in this increase, too: the percentage of top performers increased by almost 4.8 percentage points (statistically significant) among girls, while the percentage of top performers increased by 2.6 percentage points (not statistically significant) among boys. Effectively, the gender gap in top performers widened.

15. Students proficient at Level 6 on the PISA reading scale are capable of conducting fine-grained analysis of texts, which requires detailed comprehension of both explicit information and unstated

implications, and are capable of reflecting on and evaluating what they read at a more general level. They can overcome preconceptions in the face of new information, even when that information is contrary to expectations. They are capable of recognising what is provided in a text, both conspicuously and more subtly, while at the same time being able to apply a critical perspective to it, drawing on sophisticated understandings from beyond the text. This combination of a capacity to absorb the new and to evaluate it is greatly valued in knowledge economies, which depend on innovation and nuanced decision-making that draw on all the available evidence. At 1.9%, Japan has a significantly higher share of the highest-performing readers than the average (0.8%). However, in Australia, New Zealand, the partner economy Shanghai-China and the partner country Singapore, the corresponding percentages are even higher – over 2.0%.

16. At the next highest level, Level 5 on the PISA reading literacy scale, students can still handle texts that are unfamiliar in either form or content. They can find information in such texts, demonstrate detailed understanding, and infer which information is relevant to the task. Using such texts, they are also able to evaluate critically and build hypotheses, draw on specialised knowledge and accommodate concepts that may be contrary to expectations. Some 13% of students in Japan perform at Level 5 or above, well above the average of 8%. However, the share of top performers in reading is even higher – over 14% – in New Zealand, Finland, the partner economy Shanghai-China and the partner country Singapore.

17. In mathematics, 6% of students in Japan reach the highest level of performance, compared with an OECD average of 3%. In comparison, 27% of students in Shanghai-China attain this level (Table I.3.1). Students proficient at Level 6 on the mathematics scale are capable of advanced mathematical thinking and reasoning. These students can apply insight and understanding, along with a mastery of symbolic and formal mathematical operations and relationships, to develop new approaches and strategies for addressing novel situations. They can formulate and accurately communicate their actions and reflections regarding their findings, interpretations, arguments, and the appropriateness of these to the given situations.

18. At the next highest level, Level 5 on the PISA mathematics scale, students can still develop and work with models in complex situations, identifying constraints and specifying assumptions. They can select, compare, and evaluate appropriate problem-solving strategies for dealing with complex problems related to these models. Students at this level can work strategically using broad, well-developed thinking and reasoning skills, appropriate linked representations, symbolic and formal characterisations, and insight pertaining to these situations. In Japan, 21% of students reach the PISA mathematics Level 5 or above, compared with 13% on average across OECD countries. In Shanghai-China, half of the students reach Level 5, in Singapore and Hong Kong-China more than 30% do, and in Chinese Taipei, Korea, Switzerland and Finland more than 21% do.

19. Students proficient at Level 6 in science can consistently identify, explain and apply scientific knowledge and knowledge about science in a variety of complex life situations. They can link different information sources and explanations and use evidence from those sources to justify decisions. They clearly and consistently demonstrate advanced scientific thinking and reasoning, and they use their scientific understanding to solve unfamiliar scientific and technological problems. Students at this level can use scientific knowledge and develop arguments in support of recommendations and decisions that centre on personal, social, or global situations. Some 2.6% of students in Japan reach Level 6 in science, above the OECD average of 1.1% (Table I.3.4). In comparison, in Singapore, 4.6% of students attain this level, in Shanghai-China, 3.9% do, in New Zealand, 3.6% do, in Finland, 3.3% do, and in Australia, 3.1% of students do.

20. Students proficient at the PISA science Level 5 can identify the scientific components of many complex life situations, apply both scientific concepts and knowledge about science to these situations, and can compare, select and evaluate appropriate scientific evidence for responding to life situations. Students at this level can use well-developed inquiry abilities, link knowledge appropriately and bring critical

insights to situations. They can construct explanations based on evidence and arguments that emerge from their critical analysis. In Japan, 17% of students reach this level, which is above the OECD average of 9%. In comparison, 24% of students in Shanghai-China attain this level, 20% of students in Singapore do so, 19% in Finland do, and 18% of students in New Zealand attain this level.

21. The proportions of top performers have remained unchanged in mathematics since 2003 and in science since 2006 (Tables V.3.2 and V.3.5).

A favourable context for student achievement

22. Countries vary in their demographic, social and economic contexts. These differences need to be taken into account when interpreting differences in student performance.

- In terms of national income level, ***Japan ranks 17th among 34 OECD countries on GDP per capita*** (Table I.1.20 and Figure I.2.1). In fact, only 6% of the variation among OECD countries' mean scores can be predicted on the basis of their GDP per capita. Japan performs better in reading than would be expected from its level of GDP per capita. While GDP per capita reflects the potential resources available for education in each country, it does not directly measure the financial resources actually invested in education. ***In a comparison of countries' average actual spending per student from the age of 6 to the age of 15, Japan ranks 14th among 34 OECD countries***. Across OECD countries, expenditure per student explains 9% of the variation in PISA mean performance between countries (Figure I.2.2). Japan's deviation upwards from the trend line suggests that Japan performs better than would be expected from its spending on education per student. Italy and Slovenia, which spend similar levels on education per student as Japan, perform at least 34 score points lower than Japan (Table I.2.20).
- It is not just the volume of resources that matters but how those resources are invested, and how well countries succeed in ***directing the money where it can make the most difference***. Japan is one of 16 OECD countries in which socio-economically disadvantaged schools have more favourable student-teacher ratios than socio-economically advantaged schools, which implies that students from disadvantaged backgrounds may benefit from considerably more spending per student than the Japanese average (Table II.2.3). In addition, Japan pays teachers comparatively well and provides them with ample time for work other than teaching. While these policies drive costs upward, Japan pays for them with comparatively large class size (Table B7.3 in the 2010 edition of OECD's *Education at a Glance*).
- ***Parents in Japan are better educated than those in most other countries***. Given the close interrelationship between a student's performance and his or her parents' level of education (see Volume II of *PISA 2009 Results*), it is also important to bear in mind the educational attainment of adult populations when comparing the performance of OECD countries, since countries with more highly educated adults are at an advantage over countries in which parents have less education. The percentage of 35-to-44-year-olds who have attained tertiary levels of education, which roughly corresponds to the age group of parents of the 15-year-olds assessed in PISA, is 48% in Japan, which ranks 2nd after Canada in this comparison among the 34 OECD countries (Table I.2.20).
- ***The share of students from disadvantaged backgrounds in Japan is below average***. Socio-economic disadvantage and heterogeneity in student populations pose other challenges for teachers and education systems. As shown in Volume II of *PISA 2009 Results*, teachers instructing socio-economically disadvantaged children are likely to face greater challenges than those with students from more privileged socio-economic backgrounds. A comparison of the socio-economic background of the most disadvantaged quarter of students puts Japan above the

OECD average, while the socio-economic background of the student population as a whole ranks around the OECD average (Table II.3.1).⁵ In other words, while the overall socio-economic context of students in Japan is that of a typical OECD country, the proportion of disadvantaged students in Japan is below that of OECD countries in general (Table I.2.20).

- ***Among OECD countries, Japan has the 3rd smallest proportion of students with an immigrant background.*** On average across OECD countries, 10% of students are from an immigrant background, while in 14 OECD countries, more than 10% of students are from an immigrant background (Table II.4.1). However, the share of students with an immigrant background explains just 1% of the performance variation between countries (Figure I.2.5). The performance of these students in PISA can only be partially attributed to the education system of their host country. Much of the performance difference between these students and native students stems from socio-economic background, the language spoken at home and prior education in their country of origin.

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

Equity in the distribution of learning opportunities

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

Growing differences in performance among schools

25. The difference between high and low performers in reading (*i.e.* variation in students’ performance in reading) is greater in Japan than the OECD average, and around a half of this performance variation is attributable to the performance difference between schools (Table II.5.1). In Japan, this difference is greater than the OECD average of 39%. Japan’s large performance difference between schools is mainly accounted for by the fact that the students took the PISA assessment only a few months after the high school entrance examinations, which has routed students to different schools depending on their prior achievement.

26. The difference between high and low performers in reading grew since 2000, particularly that between schools (Table V.4.1).

Equal access to resources

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

28. In around half of OECD countries, the student-teacher ratio relates positively to the socio-economic background of schools, in other words, disadvantaged schools tend to have more teachers per student. Japan is one of these countries (Table II.2.3). This positive relationship is also particularly pronounced in Belgium, Italy, Ireland, Spain, Estonia Portugal and the Netherlands. This important measure of resource allocation indicates that these countries use the teacher-student ratio to reduce disadvantage. Among OECD countries, only Turkey, Slovenia, Israel and Austria favour socio-economically advantaged students and schools with access to more teachers.

29. In the majority of OECD countries, more advantaged students also enjoy a higher proportion of better-qualified full-time teachers (Table II.2.2). The picture is similar when examining schools whose principals reported that the lack of qualified teachers hinders learning. In Japan, however, disadvantaged students enjoy qualified teachers at the same level as advantaged students. All of these findings suggest that Japan ensures an equitable distribution of human resources, both in the quantity of resources and in their quality.

Weak impact of students' socio-economic background on learning outcomes

30. Students who did not surpass the most basic performance level on PISA were not a random group, and the results show that socio-economic disadvantage does not have a strong impact on student performance in Japan (Table II.1.2): some 9% of the variation in student performance in Japan is explained by students' socio-economic background while the OECD average is 14%. Also, in other OECD countries, such as Iceland, Estonia, Finland, Norway, Canada, Korea and Italy, students' socio-economic backgrounds have a below-average impact on performance. In contrast, Hungary, Belgium, Turkey, Chile, Luxembourg, Germany, the United States, France and New Zealand all show an above-average impact of socio-economic background on reading performance. In other words, in these countries two students from different socio-economic backgrounds vary much more in their learning outcomes than is normally the case in OECD countries. It is important to emphasise that these countries, do not necessarily have a greater proportion of socio-economically disadvantaged students than other countries, but that socio-economic differences among students in these countries have a particularly strong impact on learning outcomes.

31. If inequalities in societies were always closely linked to the impact of socio-economic disadvantage on learning outcomes, the ability of public policy to improve equity in access to learning opportunities would be limited, at least in the short term. However, there is almost no relationship between income inequalities in countries and the impact of socio-economic background on learning outcomes (Figure II.1.3), that is, some countries succeed even under difficult conditions to mitigate the impact of socio-economic background on educational success.

32. In general, the accuracy with which socio-economic background predicts student performance varies considerably across countries. Most of the students who perform poorly in PISA come from

challenging socio-economic backgrounds, and yet some of their disadvantaged peers excel in PISA and beat the odds against them. These students show that overcoming socio-economic barriers to achievement is possible. While the prevalence of resilience is not the same across educational systems, it is possible to identify substantial numbers of resilient students in practically all OECD countries.⁶ In Japan, 11% of students can be considered resilient, in that they are among the 25% most socio-economically disadvantaged students in the country yet perform much better than what would be predicted based on their background (Table II.3.3). Across the OECD, an average of 7% of students are resilient, while the share of resilient students is over 11% in Korea, Finland and the partner country and economies Shanghai-China, Hong Kong-China, Macao-China and Singapore. These results confirm that, in Japan, policies to improve performance should not just focus on disadvantaged students, but also on those who perform poorly because of other factors, such as those discussed below.

Some other contexts related to poor performance

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

- *Family composition:* In Japan, single-parent families are slightly less prevalent than the OECD average (15% of 15-year-olds come from single-parent families compared with an average of 17%). *Japanese students from these families face a much higher risk of low performance than is the case across OECD countries* (Table II.2.5). Two-thirds of the performance differences between students come from single-parent families and other type of families are related to the differences in socio-economic background between these families.
- *Concentration of socio-economic disadvantage in schools:* Some 30% of students in Japan attend schools with a socio-economically disadvantaged intake, where 57% of students are disadvantaged themselves (*i.e.* they are grossly overrepresented); 31% of students are in socio-economically privileged schools, where only 8% of students are disadvantaged themselves. Disadvantaged students tend to perform worse than expected when they attend disadvantaged schools, and by a larger margin than in many other OECD countries. Advantaged students also tend to perform worse than expected when enrolled in disadvantaged schools, by an even larger margin. In contrast, advantaged students tend to perform better than expected when attending advantaged schools, and by a larger margin than in many other OECD countries, while disadvantaged students also tend to perform better than expected in these schools, and by a larger-than-average margin. In schools with a mixed socio-economic intake, disadvantaged students tend to do better than expected and advantaged students tend to perform worse than expected (Table II.5.10). This suggests that *efforts to improve performance should mainly be directed towards schools with disadvantaged intake rather than towards individual students from disadvantaged backgrounds.*

Student engagement, strategies and practices

34. To become effective learners, students need to be able to figure out what they need to learn and how to achieve their learning goals. They also need to master a wide repertoire of cognitive and meta-cognitive information-processing strategies to be able to develop efficient ways of learning. At the same time, fostering effective ways of learning, including goal setting, strategy selection and controlling and evaluating the learning process, should not come at the expense of students' enjoyment of reading and learning, since proficiency is the result of sustained practice and dedication, both of which go hand-in-hand with high levels of motivation to read and learn.

Improving students' enjoyment of and motivation for reading

35. Volume III of *PISA 2009 Results* shows that in all OECD countries, students who enjoy reading the most perform significantly better than students who enjoy reading the least (Table III.1.1). More Japanese students reported that they do not read for enjoyment at all compared to many other OECD countries, but about the average proportion of students spend one to two hours per day on reading for enjoyment. On average across OECD countries, 37% of students reported that they do not read for enjoyment at all, while this figure reaches 44% in Japan and 44% or more in Austria, the Netherlands, Luxembourg, Switzerland and Belgium (Table III.1.3). In contrast, 10% of students in Japan reported spend one to two hours per day on reading for enjoyment, which is similar to the OECD average of 11%.

The percentage of Japanese students who read for enjoyment increased by 11 percentage points since 2000 (Table V.5.1). 36. The difference in the percentage of boys and girls who read for enjoyment is smaller in Japan than it is in most OECD countries. Across OECD countries, 73% of girls read for enjoyment, while 52% of boys do. In Japan, 58% of girls read for enjoyment, while 54% of boys read for enjoyment – a much narrower gender gap than the OECD average. Korea is the only OECD country where similar proportions of boys and girls ready for enjoyment (Table V.5.1).

37. ***Japanese students tend to have better motivation for reading than many other OECD countries.*** Some 67% of students reported that they enjoy going to a bookstore or a library (the OECD average is 42%); 44% reported that they like talking about books with other people (the OECD average is 38%); and 42% reported that reading is one of their favorite hobbies (the OECD average is 33%). In contrast, 15% of students reported that reading is a waste of time for them (the OECD average is 24%); 21% reported that they cannot sit still and read for more than a few minutes (the OECD average is 25%); 24% reported that they read only to get information that they need (the OECD average is 46%) and 28% reported that they find it hard to finish books (the OECD average of 33%) (Table III.2.11).

38. ***Japanese students' motivation for reading has improved since 2000.*** Compared with students' reports in 2000, less students find it hard to finish books (improved by 12 percentage points); more students like talking about books with other people (improved by 7 percentage points); less students cannot sit still and read for more than a few minutes (improved by 7 percentage points); less student read only to get information that they need (improved by 7 percentage points); more students reported that reading is one of their favorite hobbies (improved by 6 percentage points) and less students find reading is a waste of time for them (improved by 5 percentage points) (Table V.5.3).

Students who read fiction achieve higher scores in reading

39. There has been considerable debate as to what types of reading may be most effective in fostering reading skills and improving reading performance. Across OECD countries, students who read fiction regularly because they want to – at least several times a month – tend to perform better in reading in all OECD countries except Mexico and Turkey; and students who regularly read magazines, non-fiction books or newspapers because they want to tend to perform better in reading in most countries (Table III.1.6). In contrast, reading comic books regularly is associated with little performance advantaged in some countries, but it is associated with lower performance in other countries. In Japan, students who read fiction tend to perform better in reading to a great extent, while student who read non-fiction books or newspapers regularly tend to perform better in reading, but to a lesser extent. There is no performance difference between Japanese students who read comics regularly and those who do not, and between Japanese students who read magazines regularly and those who do not. The performance advantage for Japanese students who read fiction regularly increased since 2000 (Table V.5.8).

40. In Japan, 72% of students read comics regularly (the OECD average is 22%), 65% of students read magazines regularly (the OECD average is 58%), 58% of students read newspapers regularly (the

OECD average is 62%), 42% of students read fiction regularly (the OECD average is 31%) and 11% of students read non-fiction books regularly (the OECD average is 19%) (Table III.2.7). Boys tend to read comics regularly more than girls do (the gender gap in Japan is 19 percentage points, compared to the OECD average of 10 percentage points), and tend to read newspapers more than girls do (the gender gap in Japan is 9 percentage points compared to the OECD average of 7 percentage points) (Table III.2.8). In contrast, more girls tend to regularly read fiction regularly (the gender gap in Japan is 11 percentage points compared with the OECD average of 19 percentage points), and tend to read magazines more than boys (the gender gap in Japan is 8 percentage points compared with the OECD average of 14 percentage points).

41. *Since 2000, the percentage of Japanese students who read fiction regularly increased by 15 percentage points*, while the share of students who read magazines, newspapers and comic books decreased by 18 percentage points, 12 percentage points and 12 percentage points, respectively (Table V.5.6). During the same period, there was no change in the percentage of Japanese students who read non-fiction books regularly.

42. Although students who read fiction are more likely to achieve high scores, it is students who read a wide variety of materials who perform particularly well in reading. In Japan, students who read fiction tend to perform better; but if they also read non-fiction books and/or newspapers, their scores are even higher (Table III.1.24). Japanese students seem to read a greater variety of materials than students in many other countries, since Japan has one of the highest scores among OECD countries in the *index of diversity of reading materials*, after Turkey and Finland (Table II.1.10).

Students extensively engaged in online reading activities perform better

43. Students who are extensively engaged in online reading activities, such as reading e-mails, chatting on line, reading news online, using an on line dictionary or encyclopedia, participating in online group discussions, and searching for information online, are generally more proficient readers than students who do little online reading. In Japan, the performance difference between students who are more engaged in online reading activities and those who are less engaged is greater than in many other OECD countries (Table III.1.12). Japanese students engage in online reading activities less frequently than students in other OECD countries; and unlike in many other OECD countries, girls in Japan tend to engage more in online reading activities than boys.

44. In all countries that took part in PISA 2009, students who perform well in reading tend to be those who have a deep understanding of which learning strategies are most effective in attaining different learning goals and who read a wide variety of materials for their own enjoyment.

Performance gaps can be closed by a greater awareness of effective learning strategies

45. PISA measures approaches to learning in two ways: by examining the extent to which students reported employing certain strategies, and by looking at students' awareness of which strategies work best. The latter indicator, new to PISA 2009, is a more robust measure because it also provides for an external validation of students' knowledge of what works, rather than just their preferences. Across countries, students who are better-informed about what will help them learn tend to have substantially higher reading proficiency (Figures III.1.10 and III.13). This applies both to an awareness of strategies to understand and remember information and to strategies to summarise information. Japanese students, on average, have above-average levels of awareness of strategies to understand and remember information, while they have around the OECD average level of awareness of strategies to summarise information (Tables III.1.14 and III.1.16). The reported use of strategies to control one's learning is also associated with higher student performance in every country, although, on average, this association is not as strong as an awareness of effective learning strategies (Tables III.1.18, III.1.20 and III.1.22).

46. Although PISA shows that an awareness of effective learning strategies is closely associated with reading performance, across OECD countries, an awareness of strategies to summarise information is more strongly related to reading performance than an awareness of strategies to understand and remember information (Tables III.1.14 and III.1.16). This is also the case in Japan: the difference in reading performance between students with high and low levels of awareness of strategies to summarise information is larger than that between students with high and low levels of awareness of strategies to understand and remember information. In fact, the performance difference between Japanese students with high and low levels of awareness of strategies to summarise information is one of the greatest among OECD countries, next to France and Belgium (Table III.1.16).

47. Reading a lot is not enough: students who read a lot but who do not understand how to learn effectively perform worse in reading than students who read less but understand how to learn in all countries including Japan (Table III.1.28). This confirms previous research that shows that, while enjoying reading is a necessary step towards becoming a better reader, it is not sufficient if it does not go hand-in-hand with a good understanding of how to use reading to learn effectively.

48. In Japan, an awareness of strategies to summarise information plays an important role in closing the performance gap between boys and girls and between socio-economically disadvantaged and advantaged students. In general across OECD countries, girls and socio-economically advantaged students tend to have a better awareness of strategies to summarise information than boys and disadvantaged students, and, in turn, students with this better awareness tend to perform better (Table III.3.10). In other words, an awareness of these strategies mediates the impact of students' background and gender on performance. This mediating effect is particularly strong in Japan: 22% of the total impact of students' socio-economic background on performance is filtered through the different levels of students' awareness of these strategies (the OECD average is 17%); and 38% of the total impact of students' gender on performance is filtered through the different levels of students' awareness of these strategies.

49. This underlines the importance for parents, teachers and schools to provide students with the tools to become effective readers and learners. It is important for students to develop an awareness of the most effective learning strategies to summarise information, especially boys and socio-economically disadvantaged students. This can be fostered by letting students experiment with different approaches, discussing with students what they find helpful and unhelpful, and encouraging them to reflect on the different approaches they use to achieve learning goals.

The learning environment in the classroom and at school

50. Education policies and practices will only nurture student achievement if they result in more effective teaching and learning in the classroom. Results from PISA suggest that schools and countries where students work in a climate characterised by expectations of high performance and the will to work, good teacher-student relations, and high teacher morale tend to achieve better results, on average across countries. Even after accounting for socio-economic background and other aspects of the learning environment measured by PISA, the results show that reading performance is positively related to higher values, at the school level, on the *index of disciplinary climate* in 16 OECD countries, including Japan; on the *index of teacher-student relations* in 10 OECD countries, including Japan; and on the *index of teacher-related factors affecting school climate* in 14 OECD countries, including Japan (Table IV.2.13c). ***In Japan, the difference in reading performance between schools that show higher or lower levels of these three aspects is greater than in most OECD countries.***

51. The learning environment is also shaped by parents and school principals. Parents who are interested in their children's education are more likely to support their school's efforts and participate in school activities, thus adding to available resources, and school principals can define their schools'

educational objectives and guide their schools towards them. These parents also tend to have an advantaged socio-economic background. PISA shows that school principals' perceptions of parents' pressure to adopt high academic standards and raise student achievement tend to be positively related to higher school performance in 19 OECD countries, including Japan, but it is positively related to performance in only 4 OECD countries, not including Japan, after accounting for students' and schools' socio-economic backgrounds (Tables IV.2.13b and IV.2.13c).

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

53. These analyses are examined in greater detail in the following sections.

Weak teacher-student relations

54. Positive teacher-student relations can help to establish an environment that is conducive to learning. Research finds that students, particularly disadvantaged students, tend to learn more and have fewer disciplinary problems when they feel that their teachers take them seriously. One explanation is that positive teacher-student relations help foster social relationships, create communal learning environments and promote and strengthen adherence to norms conducive to learning. PISA asked students to agree or disagree with several statements regarding their relationships with the teachers in school. These statements include whether students get along with the teachers and whether teachers are interested in their personal well-being, whether teachers take the student seriously, whether teachers are a source of support if students need extra help, and whether teachers treat the student fairly.

55. Students in Japan reported one of the weakest teacher-student relations among OECD countries (Figure IV.4.1). For example, 28% of students in Japan agree or strongly agree that their teachers are interested in their well-being (the OECD average is 66%), 63% agree or strongly agree that most teachers really listen to what the student has to say (the OECD average is 67%), 64% agree or strongly agree that teachers are a source of support if students need extra help (the OECD average is 79%), 73% agree or strongly agree that they get along with their teachers (the OECD average is 85%) and 74% agree or strongly agree that teachers treat the student fairly (the OECD average is 79%). There is a positive relationship between teacher-student relations and student performance in Japan. For example, the quarter of students in Japan reporting the poorest student-teacher relations are two times more likely to also be among the quarter of the poorest performing students, which is the highest likelihood among the countries and economies that participated in PISA (Table IV.4.1).⁷ Differences in student-reported teacher interest in their well-being may reflect either different student expectations of their teachers' level of involvement, or different roles that teachers assume with respect to their students. A low percentage of agreement with these statements suggests a possible mismatch between student expectations and what teachers are actually doing.

56. In PISA 2000, students were asked some similar questions. For example, in 2000, 50% of students agreed or strongly agreed that most of their teachers really listen to what the student has to say, and that proportion increase by 13 percentage points in 2009. Also, since 2000, the percentage of students who agreed or strongly agreed that most teachers treat the student fairly increased by 5 percentage points (Table V.5.11).

Excellent – and improving – disciplinary climate

57. The disciplinary climate in the classroom and school can also affect learning. Classrooms and schools with more disciplinary problems are less conducive to learning, since teachers have to spend more time creating an orderly environment before instruction can begin. More interruptions within the classroom disrupt students' engagement in and concentration on their lessons. PISA asked students to describe the frequency with which interruptions occur in reading lessons. The disciplinary climate is indicated in PISA by the frequency of certain events: students don't listen to the teacher in language-of-instruction class; there is noise and disorder; the teacher has to wait a long time for students to quieten down; students cannot work well; and students don't start working for a long time after the lesson begins.

58. The majority of students in OECD countries enjoy orderly classrooms in their language-of-instruction classes, and especially so in Japan. Japanese students reported the best disciplinary climate among students in all other OECD countries (Table IV.4.2). Some 93% of Japanese students reported that their teacher never or only in some lessons has to wait a long time before students settle down (the OECD average is 72%), 92% reported that they never or only in some lessons feel that students don't listen (the OECD average is 71%), 91% reported that they never or only in some lessons feel that students don't start working for a long time after the lesson begins (the OECD average is 75%), 90% reported that noise or disorder never or only in some lessons affects learning (the OECD average is 68%), and 87% of students reported that they can work well practically most of the time (the OECD average is 81%) (Figure IV.4.2).

59. *Since 2000, the disciplinary climate improved in Japan* (Table V.5.12). The percentage of students who reported that they never or only in some lessons feel that students don't listen to what the teacher says, that they never or only in some lessons feel that students don't start working for a long time after the lesson begins, that they feel they can work well, that noise or disorder never or only in some lessons affects learning increased by around eight percentage points or more since 2000. The percentage of students who reported that their teacher never or only in some lessons has to wait a long time before students settle down increased by two percentage points since 2000.

60. In Japan, as in most OECD countries, there is a positive relationship between disciplinary climate and student performance. For example, the quarter of students in Japan reporting the poorest disciplinary climate is 2.3 times more likely to also be the quarter of poorest-performing students. That is the highest likelihood among the countries and economies that participated in (Table IV.4.2).⁸

61. What is also noteworthy is that there is a comparatively small variation on this measure among students in Japan, but the difference in disciplinary climates among schools is much greater than that in other OECD countries. Over a quarter of the variation in the *index of disciplinary climate* is attributable to the differences between schools, while the OECD average is 15% (Table IV.4.2).

Positive attitudes and behaviour among teachers

62. To determine the extent to which teacher behaviour influences student learning, school principals in PISA were asked to report the extent to which they perceived learning in their schools to be hindered by such factors as teachers' low expectations of students, poor student-teacher relations, absenteeism among teachers, staff resistance to change, teachers not meeting individual students' needs, teachers being too

strict with students, and students not being encouraged to achieve their full potential. Japan is slightly below the OECD average on these measures, and the reports from school principals highlight a number of challenges: 39% of students in Japan are enrolled in schools whose principals reported that learning is hindered to some extent or a lot because students are not being encouraged to achieve their full potential (OECD average is 23%), 37% are enrolled in schools whose principals reported that this is the case because staff resist change (the OECD average is 28%), 29% are in schools where, according to principals, teachers do not meet individual students needs (the OECD average is 28%) and 24% are in schools where teachers' low expectations of students hinders learning (in contrast, in Finland that proportion is just 6% and the OECD average is 22%) (Figure IV.4.5). But only 3% of school principals see teachers' absenteeism as a problem (the OECD average is 17%).

How schooling is organised: upper secondary level

63. When examining the characteristics of schools attended by 15-year-olds, it is important to keep in mind that the students assessed in PISA could be found both in lower and upper secondary schools, and this distribution differs greatly across countries. *In Japan, all 15-year-olds assessed in PISA attend upper secondary schools*, while over 95% of 15-year-olds are in lower secondary schools in Spain, Norway, Finland, Denmark, Poland, Sweden, Iceland, Estonia and Germany (Table IV.3.1). The organisational features described in this section concern Japan's upper secondary schools. It is important to note that issues including the allocation of resources between schools, the level of school autonomy, school competition, the proportion of private schools and performance variation between schools are features of Japanese upper secondary schools,

64. Many countries have shifted public and governmental concern away from control over the resources and content of education to focus on outcomes. This becomes apparent when the distribution of decision-making responsibilities in education is reviewed across successive PISA assessments. In addition, some countries have made greater efforts to devolve responsibility to the frontline, encouraging responsiveness to local needs and strengthening accountability. PISA shows a clear relationship between the relative autonomy of schools in managing instructional policies and practices and outcomes across systems when autonomy is coupled with accountability.

Great school autonomy over curricular and assessment policies and less autonomy over resource allocation

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

66. In Japan, schools tend to have greater responsibility in developing curricula and assessments compared with other OECD countries. In Japan, 98% of students are in schools whose principals reported that only principals and/or teachers have considerable responsibility in establishing student assessment policies (the OECD average is 66%), 94% reported that only principals and/or teachers have considerable responsibility in deciding which courses are offered (the OECD average is 50%), 93% reported that only principals and/or teachers have considerable responsibility in determining course content (the OECD average is 45%), and 89% reported that only principals and/or teachers have a considerable responsibility in choosing which textbooks are used (the OECD average is 78%) (Figure IV.3.3b).

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

68. Japan shows below-average school autonomy in resource allocation (Table IV.3.5). Comparing schools in Japan, there is no significant relationship between the level of a school's autonomy in allocating resources and reading performance. But in some countries where more schools tend to post achievement data publicly, students in schools with more responsibility for resource allocation tend to perform better. For example, in Chile, the quarter of students in schools whose principals reported the lowest levels of school responsibility for resource allocation is 2.0 times more likely to also be the poorest-performing quarter of students. In Chile, 36% of students are in schools that post achievement data publicly while less than 4% of Japanese students are enrolled in such schools (Table IV.3.13).

Limited competition among schools

69. Students in some school systems are encouraged or even obliged to attend their neighbourhood school. However, reforms over the past decades in many countries have tended to give more authority to parents and students to choose schools that meet their educational needs or preferences best. The assumption has been that if students and parents have sound information and choose schools based on academic criteria, this will foster competition among schools and create incentives for institutions to organise programmes and teaching in ways that better respond to diverse student requirements and interests, thus reducing the costs of failure and mismatches. In some school systems, schools not only compete for student enrolment, but also for funding. Direct public funding of independently managed institutions, based on student enrolments or student credit-hours, is one model for this. Giving money to students and their families through, for example, scholarships or vouchers, to spend in public or private educational institutions of their choice is another method (Figure IV.3.4).

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

71. Some 13 OECD countries allow parents and students to choose public schools and use vouchers or tax credits in their school-choice arrangements. Eleven OECD countries, including Japan, give parents freedom of choice of public schools, but do not offer vouchers or tax credits; two OECD countries restrict parents and students in the choice of public schools, but offer tax credits or vouchers to attend other schools; and in four OECD countries, parents and students must attend the public school nearest to where they live and are not offered any kind of subsidy to attend other schools (Figure IV.3.4).

72. Competition among schools, as reported by school principals in PISA, is consistent with these school-choice arrangements as reported by central and regional governments, and is greatest in school systems that grant parents and students the freedom to choose public schools and offer subsidies in the form of vouchers or tax credits to attend other schools. In countries with these characteristics, 85% of students attend schools whose principals reported that they compete with at least one other school for enrolment. The lowest levels of school competition are found in countries that restrict attendance to public

schools and do not offer subsidies to attend other schools. In the average country in this category, 52% of students attend schools whose principals reported that they compete for student enrolment with at least one other school (Figure IV.3.4). Levels of school competition are similar in countries that restrict attendance to public schools, yet offer subsidies, and in countries that do not restrict attendance to public schools but offer no subsidies. In these countries, around 75% of students attend schools whose principals reported that they compete with other schools for enrolment. The use of vouchers or tax credits and opening choice among public schools enhances school competition for enrolment. However, competition among schools is less frequent in remote and rural areas, where public schools are usually located at greater distances from each other, making it more difficult for parents and students to choose a school other than the one that is closest to their home (Table IV.2.6).

73. Among schools within a country, competition and performance do seem related; but once the socio-economic profile of students and schools are taken into consideration, the relationship weakens, since privileged students are more likely to attend schools that compete for enrolment (Tables IV.2.4b and IV.2.4c). This may reflect the fact that socio-economically advantaged students, who tend to achieve higher scores, are also more likely to attend schools that compete for enrolment, even after accounting for location and attendance in private schools (Table IV.2.6). In Japan, school competition is not related to performance even before accounting for the socio-economic and demographic background of students and schools (Table IV.2.4b).

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

Above-average proportion of private schools

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

76. Across OECD countries, 15% of students are enrolled in privately managed schools that are either privately or government funded, although in many countries government authorities retain significant control over these schools, including the power to shut down non-performing schools.

Enrolment in privately managed schools exceeds 50% of 15-year-old students in the Netherlands, Ireland and Chile, and in Australia and Korea between 35% and 40% of students are enrolled in such schools. In Japan, 29 % of students attend schools that are privately managed and 71% attend schools that are publicly managed. In contrast, in Turkey, Iceland and Norway, more than 98% of students attend schools that are publicly managed (Table IV.3.9).

77. On average across OECD countries, privately managed schools display a performance advantage of 30 score points on the PISA reading scale (Table IV.3.9). However, once the socio-economic backgrounds of students and schools is accounted for, public schools come out with a slight advantage of seven score points, on average across OECD countries. In Japan, public and privately managed schools do not show a performance difference before accounting for the socio-economic background, and public schools outperform private schools after accounting for students' and schools' socio-economic backgrounds.

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

- Across OECD countries, the most common configuration is the one that gives schools the freedom to make curricular decisions, yet restricts competition for enrolment among schools. These school systems have relatively limited levels of choice for parents and students and there is little competition for enrolment among schools. Private schools are not widely available in these countries. Twenty-two OECD countries, including Japan, fall into this category.
- School systems that offer relatively low levels of autonomy to schools and low levels of choice to parents are also fairly common across OECD countries: 4 OECD countries share this configuration and 11 partner countries and economies do.
- Six other OECD countries offer high levels of autonomy and choice, either in the form of a high prevalence private schools or competition among schools for enrolment. In these school systems, schools have the freedom to choose teaching methods to meet learning objectives, and parents and students can choose among a variety of schools for enrolment.

Heterogeneous classrooms

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

80. In most high-performing countries, it is the responsibility of schools and teachers to engage with the diversity of student interests, capacities, and socio-economic contexts, without making students repeat the school year or transferring them to educational tracks or schools with lower performance requirements. The data from PISA show that creating homogeneous schools and/or classrooms through selection is

unrelated to the average performance of education systems, but clearly associated with larger variations in student achievement and a significantly larger impact of socio-economic background on learning outcomes. In particular, the earlier in the student's career the selection occurs, the greater the impact of socio-economic background on learning outcomes. That suggests that selection tends to reinforce inequalities, as students from disadvantaged backgrounds tend to be exposed to lower-quality learning opportunities when compared to their peers from more advantaged backgrounds (Figure IV.2.1a).

81. PISA data also show that grade repetition is not only negatively related to equity but is also negatively related to the average performance of education systems. That is, school systems with high rates of grade repetition tend to also be school systems with poorer student performance. Moreover, the more schools group students by ability in all subjects and the more frequently schools transfer students to other schools because of students' low academic achievement, behavioural problems or special learning needs, the lower the school systems' overall performance, even after accounting for national income. While transferring students with difficulties out of a school may be advantageous to the school, the practice seems to relate negatively to the performance of the education system as a whole, and to larger performance differences among schools (Figure IV.2.1a and Table IV.2.1). Transferring students for these reasons may hurt student achievement because changing schools implies a loss of social capital, since students have limited access to the resources that are shared in the school they are moving out of and need to recreate support and friendship networks in their new schools. Furthermore, when school transfers are motivated by behavioural problems, low academic achievement and special learning needs, students who are transferred out are more likely to be received by schools with larger proportions of similar students. Students who are transferred for these reasons not only pay the cost in terms of lost social capital, but are also less likely to benefit from higher achieving peers. Also, in systems where transferring students or grade repetition is commonplace, teachers and the school community have an incentive to evade problems by transferring students rather than committing effort and resources to solving the underlying problems. They also tend to have more autonomy to adapt the learning environment in their schools (Figure IV.2.2). Equally important, a greater rate of student transfers seems also be related to greater socio-economic inequities.

82. PISA classifies school systems into 12 groups, according to the differentiation⁹ policies and practices they adopt (Figure IV.3.2).

- Thirteen OECD countries are characterised by relatively low levels of formal differentiation. In these school systems, students are not systematically streamed, schools are not selective in their admissions processes, and students usually do not repeat grades and are not transferred to other schools. As a result, classrooms tend to be heterogeneous.
- School systems in six other OECD countries, including Japan, stratify students into different programmes based on students' academic performance, usually before they are 15 years old. Grade repetition is not common in these school systems, nor is horizontal differentiation at the school level. In Japan, all students enter primary school at the same age and there is no grade repetition, consequently there is no variation in the grade level among 15-year-olds and Japan is classified as having low levels of vertical differentiation. The first selection in the education system occurs at the age of 15 when there are two distinct education programmes available to 15-year-olds. Some 88% of students are in schools that select students always based on students' records of academic performance and/or recommendations of feeder schools. Japan is thus classified as using a medium level of horizontal differentiation at the system level. Finally, 8% of Japanese students are in schools that are very likely to transfer difficult students to other schools, and 11% are in schools that group students by ability in all subjects. Thus Japan is classified as using low levels of horizontal differentiation at the school level.
- In four OECD countries, school systems also apply horizontal differentiation at the level of the school system. These school systems are characterised by their use of streaming and early

selection into these programmes based on students' academic performance, but generally, they do not use grade repetition or school-level differentiation.

- Among the countries whose school systems use vertical differentiation to create homogeneous learning environments, the Netherlands and Switzerland also apply high levels of horizontal differentiation at the school level and at the level of the school system.

83. Many of the best-performing countries have developed elaborate support systems to foster the motivation of the full diversity of students to become independent and lifelong learners. They tend to train teachers to be better at diagnosing learning problems so that they can be addressed through personalised instruction. They also help individual teachers to become aware of specific weaknesses in their own practices, which often means not just becoming aware of what they do but also changing the underlying mindset. These systems disseminate best practices among their teachers and encourage their teachers to make the necessary changes to their own teaching methods with incentives that are not solely material. As noted above, the personalisation is achieved by creating flexible learning pathways through the education system rather than by establishing individualised goals or institutional tracking, which have often been shown to lower expectations of students and provide easy ways for teachers and schools to avoid problems rather than solving them.

Setting standards, conducting examinations

84. As discussed in the 2009 edition of *OECD's Education at a Glance*, over the past decade, assessments of student performance have become common in many OECD countries – and the results are often widely reported and used in both public and more specialised debate. However, the rationale for assessments and the nature of the instruments used vary greatly within and across countries. Methods employed in OECD countries include different forms of external assessment, external evaluation or inspection, and schools' own quality assurance and self-evaluation efforts.

85. One aspect relating to accountability systems concerns the existence of standards-based external examinations. These are examinations that focus on a specific school subject and assess a major portion of what students who are studying this subject are expected to know or be able to do (Bishop, 1998, 2001). Essentially, they define performance relative to an external standard, not relative to other students in the classroom or school. These examinations usually have a direct impact on students' education – and even on their futures – and may thus motivate students to work harder. Other standardised tests, which may be voluntary and implemented by schools, often have only indirect consequences for students. For teachers, standardised assessments can provide information on students' learning needs and can be used to tailor their instruction accordingly. In some countries, such as Brazil, Hungary, Italy, Malaysia, Mexico, Poland and the Slovak Republic, such tests are also used to determine teachers' salaries or to guide professional development (for data, see the 2009 edition of *Education at a Glance*). At the school level, information from standardised tests can be used to determine the allocation of additional resources, and what interventions are required to establish performance targets and monitor progress.

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

87. Among OECD countries, there are standards-based external examinations for secondary school students in the Czech Republic, Denmark, Estonia, Finland, France, Hungary, Iceland, Ireland, Israel, Italy, Japan, Korea, Luxembourg, the Netherlands, New Zealand, Norway, Poland, the Slovak Republic, Slovenia, Turkey and the United Kingdom. In Australia, these examinations cover 81% of secondary students, in Canada 51% and in Germany 35%. In Austria, Belgium, Chile, Greece, Mexico, Portugal,

Spain, Sweden and Switzerland, such examinations do not exist or only in some parts of the system (Table IV.3.11).

88. In PISA 2009, school principals were asked to report on the types and frequency of assessment used: standardised tests, teacher-developed tests, teachers' judgemental ratings, student portfolios or student assignments. Some 76% of students in OECD countries are enrolled in schools that use standardised tests. Standardised tests are relatively uncommon in Slovenia, Belgium, Spain, Austria and Germany, where less than half the 15-year-olds attend schools that assess students through standardised tests. In contrast, the use of standardised tests is practically universal in Luxembourg, Finland, Korea, the United States, Poland, Denmark, Sweden and Norway, where over 95% of students attend schools that use this assessment at least once a year (Table IV.3.10). In Japan, 65% of students are in schools that use standardised tests.

A variety of accountability arrangements

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

90. It is more common for schools to use achievement information to monitor school progress from year to year: on average across OECD countries, some 77% of students are in schools that do so. In 21 countries, more than 80% of students attend schools that use achievement data this way. Only in Denmark, Luxembourg, Switzerland and Austria do less than 50% of students attend schools that use achievement data to monitor progress. In Japan, 61% of students are in schools that use achievement data this way.

91. Data on student achievement can also be used to identify aspects of instruction or the curriculum that could be improved. Across OECD countries, 77% of students are in schools that reported doing so, and over 90% of students in New Zealand, the United States, the United Kingdom, Iceland, Poland, Mexico, Chile, Spain and Israel attend schools that reported using achievement data in this way. Curriculum and instructional assessment using achievement data is less common in Greece and Switzerland, where less than 50% of students attend schools that use achievement data this way. In Japan, 83% of students are in schools that use achievement data this way.

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

93. PISA 2009 collected data on the nature of accountability systems and the ways in which the resulting information was used (Table IV.3.13). Some school systems make achievement data public to make stakeholders aware of the comparative performance of schools and, where school-choice programmes are available, to make parents aware of the choices available to them. Across OECD countries, an average of 37% of students attend schools that make achievement data available to the public; but in

Belgium, Finland, Switzerland, Japan, Austria and Spain, less than 10% of students attend such schools. In the United States and the United Kingdom, however, more than 80% of students attend schools that make student achievement data publicly available. In seven OECD countries and nine partner countries and economies, schools whose school principals reported that student achievement data are posted publicly perform better than schools whose achievement data is not made publicly available, before accounting for the socio-economic and demographic backgrounds of students and schools, but no such relationship is seen in Japan. Moreover, since in most of the countries the schools that post achievement data publicly tend to be socio-economically advantaged schools, this performance advantage is often not observed once socio-economic background is accounted for (Figure IV.2.6b).

94. Across OECD countries, an average of 66% of students attend schools whose achievement data is tracked over time by administrative authorities. In 25 OECD countries, more than 50% of students attend such schools, while in Japan 11% of students do (Table IV.3.13).

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

96. Some school systems make achievement data available to parents in the form of report cards and by sending teacher-formulated assessments home. Some school systems also provide information on the students' academic standing compared with other students in the country or region or within the school (Table IV.3.14). Across OECD countries, an average of 52% of students attend schools that use achievement data relative to national or regional benchmarks and/or as a group relative to students in the same grade in other schools and 79% of Japanese students attend such schools; but in 17 countries, over 50% of students attend schools that do not provide any information regarding the academic standing of the students in either of these ways. In contrast, in Sweden, the United States, Korea, Chile, Norway and Turkey, more than 80% of students attend schools that provide parents with this information as compared with national or regional student populations.

97. An average of 59% of students across OECD countries attends schools whose student achievement data is used to monitor teacher practices (Table IV.3.15). In Japan, 52% of students are in such schools. In comparison, over 80% of students in Poland, Israel, the United Kingdom, Turkey, Mexico, Austria and the United States attend such schools, while 30% of students or less in Finland, Switzerland, Greece and Sweden attend such schools. Many schools across OECD countries complement this information with qualitative assessments, such as teacher peer reviews, assessments by school principals or senior staff, or observations by inspectors or other persons external to the school. Most schools across OECD countries use either student-derived, direct observations or reviews to monitor teachers, but school principals in Finland reported that they rarely use either to monitor teacher practices. Some 18% of students in Finland attend schools that use student assessments to monitor teachers; around 20% of students attend schools that use more qualitative and direct methods to monitor teacher practices; and only 2% of students attend schools that monitor teacher practices using observations of classes by inspectors or other persons external to the school. In Japan, 52% of students attend schools that use student assessments to monitor teachers; 86% of students attend schools that use observations of lessons by the principal or senior staff to monitor teacher practices; 43% of students attend schools that use teacher peer review to monitor teacher practices; and 23% of students attend schools that monitor teacher practices using observations of classes by inspectors or other persons external to the school.

98. There has also been a growing trend among OECD countries to use outstanding performance in teaching as a criterium for base salary and additional payments awarded to teachers in public institutions.

While such practices were used in 38% of the 29 countries with available data in 2002, in 2008, 45% of these countries used these practices (Table D.3.3 in the 2010 edition of OECD's *Education at a Glance*).

99. PISA groups OECD countries into four groups sharing similar profiles based on three dimensions (Figure IV.3.6). The first is whether achievement data are used for various benchmarking and information purposes. The second is whether achievement data are used to make decisions that affect the school. The idea is that school systems that use achievement data for benchmarking and information purposes are more likely to use this data to compare themselves with other schools, monitor progress across time, have their progress tracked by administrative authorities, to make their achievement data public and provide parents with their child's achievement benchmarked to national or regional populations. School systems that use achievement data for decision-making are more likely to use achievement data to determine the allocation of resources, make curricular decisions, and to evaluate teachers' instruction.

- A first group of countries, composed of 16 OECD countries, tends to use achievement data for benchmarking and information purposes and also for decisions that affect the school.
- Three OECD countries use achievement data for benchmarking and information, but not for decisions affecting the school.
- A third group, comprising four OECD countries, including Japan, uses achievement data for decisions affecting the school, but not for benchmarking and information.
- The fourth group, composed of nine OECD countries, is less likely to use achievement data either for benchmarking and information or for decision making.

Prioritising teachers' salaries over class size

100. Effective school systems require the right combination of trained and talented personnel, adequate educational resources and facilities, and motivated students ready to learn. But performance on international comparisons cannot simply be tied to money: across OECD countries, expenditure per student explains only 9% of the variation in the mean PISA performance between countries (Figure I.2.2).

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

Distributing school resources equitably

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

103. In other words, while much of the variation in student performance cannot be predicted solely by levels of resources, resources are closely related to the socio-economic composition of individual schools, such that socio-economically advantaged students attend schools with better resources. In Japan, socio-economically disadvantaged schools tend to have smaller class size, which could suggest that more human resources are allocated to disadvantaged schools. On the other hand, some advantaged schools also show a more favourable distribution of resources. For example, these schools tend to have more learning time in the language of instruction and offer more extra-curricular activities (Table IV.2.11).

Providing nearly universal pre-primary education

104. Whether and how long students are enrolled in pre-primary education is also an important resource consideration. Many of the inequalities that exist within school systems are already present once students enter formal schooling and persist as students' progress through school. Earlier entrance into the school system may reduce these inequities. On average across OECD countries, 72% of today's 15-year-old students reported that they had attended pre-primary education for more than one year. Attendance in more than one year of pre-primary education was practically universal in Japan (97%), and in the Netherlands, Hungary, Belgium, Iceland and France, over 90% of 15-year-old students reported that they had attended pre-primary school for more than one year. More than 90% of students in 27 OECD countries had attended pre-primary school for at least some time, and 98% or more of students in Japan (99%), Hungary, France and the United States reported having done so. Pre-primary education is rare in Turkey, where less than 30% of 15-year-olds had attended pre-primary school for at least a year. More than one year of pre-primary education is uncommon in Chile, Ireland, Canada and Poland, where less than 50% of students attended pre-primary school for that length of time (Table IV.3.18).

105. PISA 2009 results show that, in general, students who had attended pre-primary education perform better in reading at the age of 15 than students who had not (Figure II.5.9 and Table II.5.5). In 32 OECD countries, students who had attended pre-primary education for more than one year outperformed students who had not attended pre-primary education at all – in many countries by the equivalent of well over a school year. This finding holds in most countries even after accounting for students' socio-economic backgrounds. However, across countries, there is considerable variation in the impact of attendance in pre-primary education and reading performance when students are 15 years old. Among OECD countries, in Israel, Belgium, Italy and France, students who attended pre-primary education for more than one year perform at least 64 score points higher in reading than those who did not, which corresponds to the equivalent of roughly one-and-a-half school years. This was the case even after accounting for students' socio-economic background. On the other hand, in Estonia, Finland, the United States and Korea, there is no marked difference in reading scores between those who attended pre-primary school for more than one year and those who did not attend at all, after accounting for students' socio-economic background. In

Japan, the students who had attended pre-primary education for one year or more scored an average of 39 points higher on the PISA reading scale than those who did not – roughly the equivalent of one school year – and after accounting for students’ socio-economic background, the performance advantage is 24 score points. These results underline the importance of pre-primary education, and international comparisons of primary-school children show high pre-primary enrolment rates among both advantaged and disadvantaged Japanese children. *The next challenge will be to increase the positive impact of pre-primary education on performance later on in students’ school careers.*

106. One factor that may explain the variations in the impact of pre-primary education on later school performance is the quality of pre-primary education. This hypothesis is supported by the fact that the impact tends to be greater in education systems where pre-primary education is of longer duration, has smaller pupil-to-teacher ratios or benefits from higher public expenditure per pupil (Table II.5.6).

107. When this impact is compared according to socio-economic background, in most OECD countries, there is no significant difference in the impact between students from socio-economically disadvantaged and advantaged backgrounds (Table II.5.8). Students benefit equally from attending pre-primary school in 31 OECD countries including Japan and 25 partner countries and economies. The United States is the only OECD country where PISA shows that disadvantaged students benefit more from pre-primary education. Part of the difference in the impact of attendance in pre-primary education on the performance of students from different socio-economic backgrounds may be due to the fact that many factors other than pre-primary education (*e.g.* education in and out of school that students received between the ages of 6 and 15) may influence 15-year-olds’ performance.

¹ Though rank 5 is the best estimate, due to sampling and measurement error the rank could be between 3 and 6.

² Though rank 4 is the best estimate, due to sampling and measurement error the rank could be between 3 and 6.

³ Though rank 2 is the best estimate, due to sampling and measurement error the rank could be between 2 and 3.

⁴ No such data are available for Japan.

⁵ This is measured by the *PISA index of economic, social and cultural status* of students. The index has an average of 0 and a standard deviation of 1 for OECD countries. The index value for the most disadvantaged quarter of students is -0.93 for Japan and -1.14 for the OECD average. The index value for the entire student population is -0.01 for Japan and 0.00 for the OECD average.

⁶ Resilient students are those who come from a socio-economically disadvantaged background and perform much better than would be predicted by their background. To identify these students, first, the relationship between performance and socio-economic background across all students participating in the PISA 2009 assessment is established. Then the actual performance of each disadvantaged student is compared with the performance predicted by the average relationship among students from similar socio-economic backgrounds across countries. This difference is defined as the student’s residual performance. A disadvantaged student is classified as resilient if his or her residual performance is found to be among the top quarter of students’ residual performance from all countries.

⁷ In Japan, one unit of the PISA index of teacher-student relations is positively associated with 22.9 score points on the PISA reading scale (Table IV.4.1).

⁸ In Japan, one unit of the PISA index of disciplinary climate is positively associated with 35.1 score points on the PISA reading scale (Table IV.4.2).

⁹ Vertical differentiation refers to the ways in which students progress through the education systems as they become older. Even though the student population is differentiated into grade levels in practically all schools in PISA, in some countries, all 15-year-old students attend the same grade level, while in other countries they are dispersed throughout various grade levels as a result of policies governing the age of entrance into the school system and/or grade repetition. Horizontal differentiation refers to differences in instruction within a grade or education level. It can be applied by the education system or by individual schools that group students according to their interests and/or performance. At the system level, horizontal differentiation can be applied by schools that select students on the basis of their academic records, by offering specific programmes (vocational or academic, for example), and by setting the age at which students are admitted into these programmes. Individual schools can apply horizontal differentiation by grouping students according to ability or transferring students out of the school because of low performance, behavioural problems or special needs