INDICATOR A6

WHAT IS THE IMPACT OF IMMIGRANT BACKGROUND ON STUDENT PERFORMANCE?

This indicator compares the performance in mathematics and reading of 15-year-old students with an immigrant background with their native counterparts, using data from the OECD Programme for International Student Assessment 2003 survey. It also looks at the motivation of these students to learn.

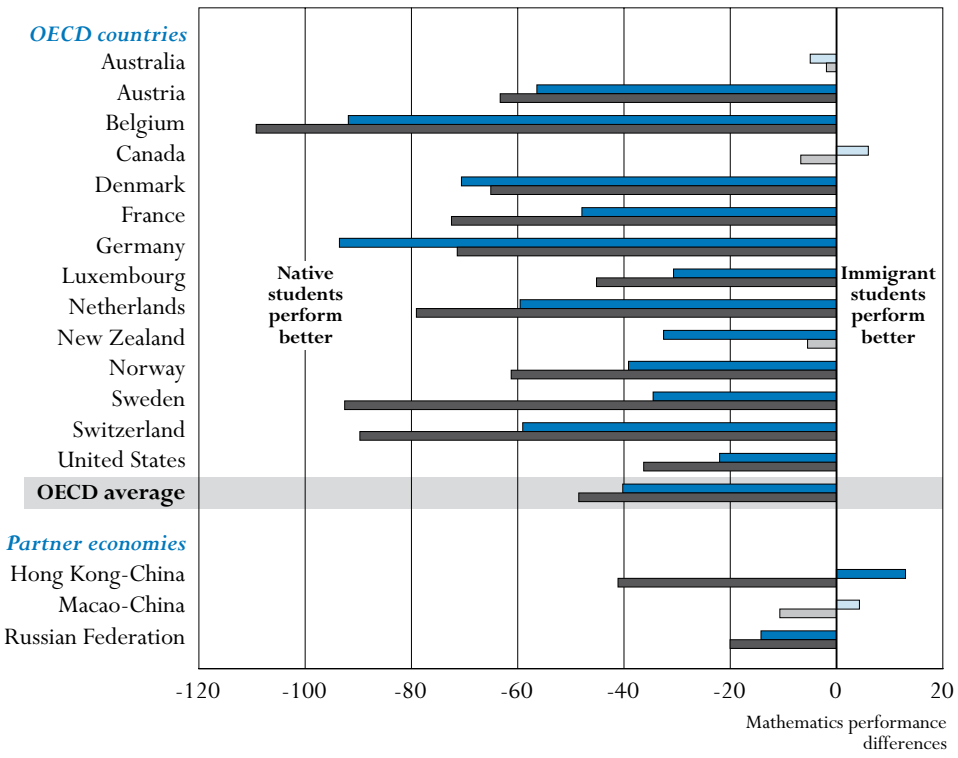
Key results

Chart A6.1. Differences in mathematics performance by immigrant status (2003)

Difference in mathematics performance between native and second-generation students

Difference in mathematics performance between native and first-generation students

Among the 14 OECD countries with significant immigrant populations, first-generation students lag 48 score points behind their native counterparts on the PISA mathematics scale, equivalent to more than a school year's progress, on average. The performance disadvantage of second-generation students also remains significant, at 40 score points. The disadvantage of students with an immigrant background varies widely across countries, from insignificant amounts in Australia, Canada, New Zealand and Macao-China to more than 90 score points in Belgium and Germany even for second-generation children.



Note: Statistically significant differences are marked in darker tones.
Source: OECD PISA 2003. Table A6.1a.
StatLink http://dx.doi.org/10.1787/068061288083

Other highlights of this indicator

- Second-generation students (who were born in the country of the assessment) tend to perform better than their first-generation counterparts (who were born in another country), as one might expect since they did not need to make transitions across systemic, cultural and linguistic borders. However, the gains vary widely across countries. In Canada, Luxembourg, Sweden and Switzerland and the partner economy Hong Kong-China, second-generation students perform significantly better than first-generation students, with the performance gap reduced by 31 score points in Switzerland and 58 score points in Sweden, while in Germany and New Zealand second-generation students born in these countries perform worse than first-generation students.

- The mathematics achievement of the highest performers among students with an immigrant background varies much less across countries than the achievement of the lowest performing students with an immigrant background.

- Despite performing less well on the whole than native students and generally coming from less advantaged families, students who have experienced immigration first-hand tend to report, throughout the OECD area, higher levels of interest and motivation in mathematics.

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Policy context

In most OECD countries, policy makers and the general public are paying increasing attention to issues surrounding international migration. In part, this is a consequence of the growth of immigrant inflows that many OECD countries have experienced since the 1980s, whether from globalising economic activities and family reunions in the aftermath of labour migration movements during the 1960s and 1970s, the dissolution of the Eastern Bloc in Europe, or political instability. The issues go well beyond how migration flows can be channelled and managed, and are increasingly related to how the challenges of integration can be addressed effectively – for both the immigrants themselves and the populations in the countries receiving them. Given the pivotal role of education for success in working life, education and training set the stage for the integration of immigrants into labour markets. They can also contribute to overcoming language barriers and facilitate the transmission of the norms and values that provide a basis for social cohesion.

PISA adds a crucial new perspective to the analyses, by assessing the success of 15-year-old students with an immigrant background in school, both in comparison to their native counterparts and in comparison to similar student populations in other countries. The performance disadvantages of students with an immigrant background shown by this indicator lay out major challenges for education systems and these are unlikely to be resolved on their own. On the contrary, given the anticipated effects of population aging and ongoing needs for skilled labour as well as the extent of family reunification, it is likely that migration to OECD countries will remain high on national policy agendas. Education systems, particularly in Europe, will need to deal more effectively with increasing socio-economic and cultural diversity in their student populations and find ways to ensure that children from immigrant backgrounds ultimately enter the labour market with strong foundation skills, as well as with the capacity and motivation to continue learning throughout life.

Evidence and explanations

Among the 14 OECD countries in which students with an immigrant background accounted for more than 3% of 15-year-old students, first-generation students lag 48 score points behind their native counterparts on the PISA mathematics scale, equivalent to more than an average school year's progress (the average performance gain associated with a school year is estimated at 41 score points) (see Chart A6.1). Even after accounting for socio-economic factors such as the occupation and education of their parents, an average disadvantage of 30 score points remains (see *Where Immigrants Succeed: A Comparative Review of Performance and Engagement in PISA 2003* [OECD, 2006b]).

Box A6.1. Terminology used for describing students' immigrant background

Native students: Students with at least one parent born in the country of assessment. Students born in the country who have one foreign-born parent (children of "combined" families) are included in the native category, as previous research indicates that these students perform similarly to native students.

First-generation students: Students born outside of the country of assessment whose parents are also foreign-born.

Second-generation students: Students born in the country of assessment with foreign-born parents.

This suggests that schools and societies face major challenges in bringing the human potential that immigrants bring with them fully to fruition. At the same time, Chart A6.1 shows that the performance disadvantage of students with an immigrant background varies widely across countries, from insignificant amounts in Australia, Canada and New Zealand and the partner economy Macao-China to more than 90 score points in Belgium and Germany even for second-generation children. Further to this, Table A6.1 shows considerable differences in the absolute performance levels of immigrants, with second-generation 15-year-old immigrants in Canada outperforming their German counterparts by 111 score points, a gap that is equivalent to almost three school years. Some of these differences can be explained by socio-economic contextual factors but the residual performance gap that remains after taking such factors into account is sufficiently large to make cross-national analyses a rich source for the search of effective policies for the integration of these students. It should be noted that there is no positive association between the size of these student populations in the countries studied and the size of the performance differences between native students and those with an immigrant background. This finding contradicts the assumption that high levels of immigration will generally impair integration (OECD, 2006b).

Without longitudinal data, it is not possible to assess directly to what extent the observed disadvantages of students with an immigrant background are alleviated over successive generations. However, comparing the performance of students who were born in a different country with students who were themselves born in the country but have foreign-born parents shows important differences (Table A6.1a). In the OECD area as a whole, second-generation students tend to perform better than their first-generation counterparts, as one might expect as they did not need to make transitions across systemic, cultural, and linguistic borders. However, these gains vary widely across countries. In Canada, Luxembourg, Sweden and Switzerland and the partner economy Hong Kong-China, second-generation students perform significantly better than first-generation students, with the performance gap reduced by 31 score points in Switzerland and 58 score points in Sweden. In other countries the performance advantage of second-generation students over first-generation students is much smaller and not statistically significant. Germany and New Zealand even show the opposite pattern, with second-generation students born in these countries performing worse than first-generation students. Given the nature of the PISA data, these patterns may be influenced by differences in the composition of the first and second-generation student populations.

It is noteworthy that the mathematics achievement of the highest performers among students with an immigrant background varies much less across countries than the achievement of the lowest performing students with an immigrant background (see Chart A6.2). Level 2 on the PISA proficiency scale represents the baseline level of mathematics proficiency at which students begin to demonstrate the kind of skills that enable them to actively use mathematics: for example, they are able to use basic algorithms, formulae and procedures, to make literal interpretations and to apply direct reasoning. Students who are classified below Level 2 may thus face considerable challenges in terms of their labour market and earnings prospects, as well as their capacity to participate fully in society. Chart A6.2 compares the distribution across the PISA proficiency levels in mathematics between first-generation and native students. The findings indicate that among native students, only a small percentage fail to reach Level 2, whereas the situation is very different for students with an immigrant background. More than 40% of first-generation students in Belgium, France, Norway and Sweden and more than 30% of first-generation

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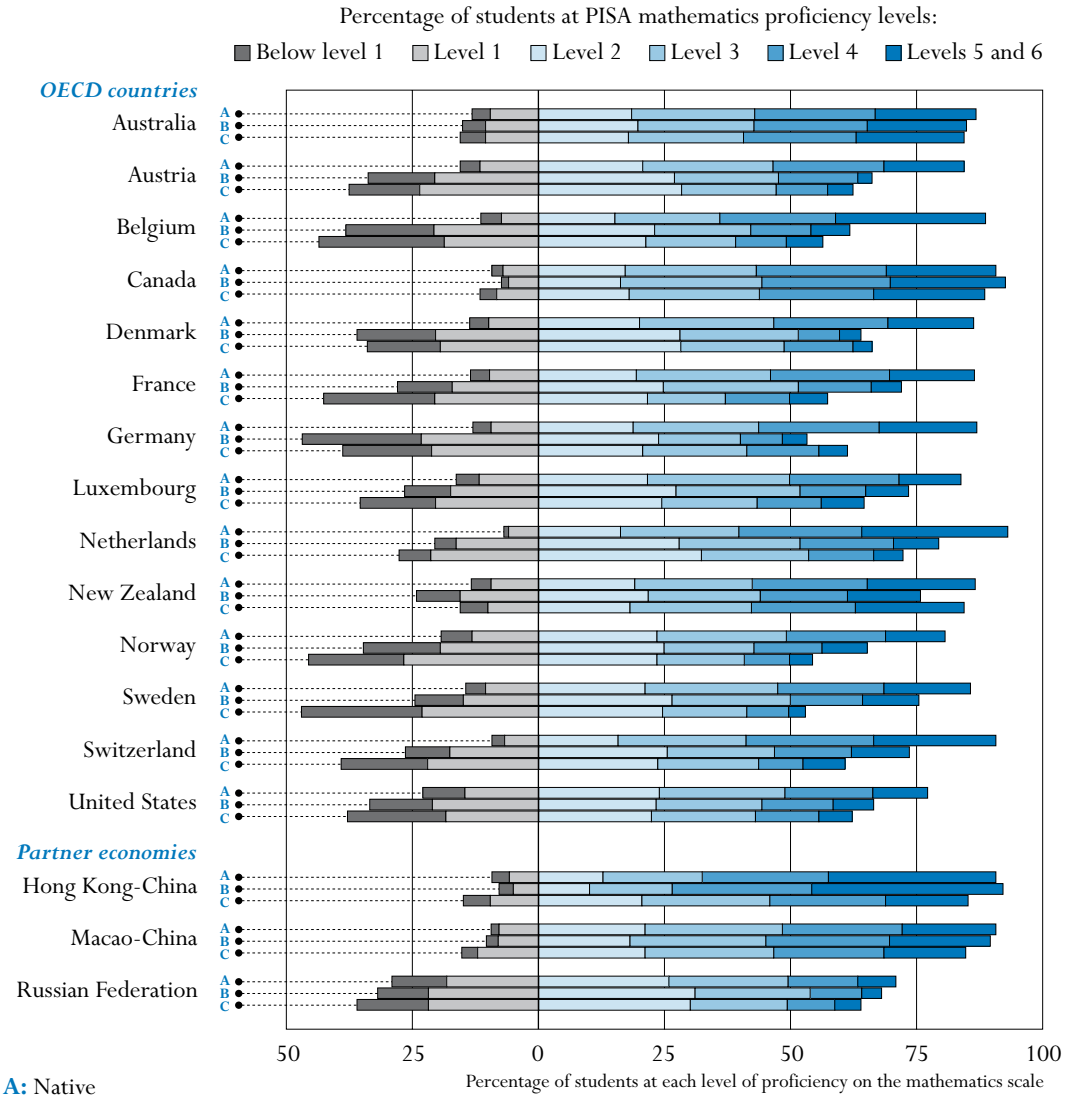
Chart A6.2. Percentage of students at each level of proficiency on the mathematics scale by immigrant status (2003)



A: Native
B: Second-generation
C: First-generation

Source: OECD PISA 2003. Tables A6.2a, A6.2b and A6.2c.

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students in Austria, Denmark, Germany, Luxembourg, Switzerland and the United States and the partner economy the Russian Federation perform below Level 2. In over one-half of the OECD countries compared in this indicator, still more than one-quarter of second-generation students have not acquired the skills to be considered able to actively use mathematics according to the PISA definition. In Germany, 47% of second-generation students perform below Level 2 and in Austria, Belgium, Denmark, France, Luxembourg, Norway, Switzerland and the United States, and the partner economy the Russian Federation, still more than 25% of second-generation students score below Level 2.

A very different picture emerges for Australia and Canada and the partner economies Hong Kong-China and Macao-China. In these countries, the percentage of students performing below Level 2 is comparatively low in all groups, with less than 16% of first-generation, second-generation or native students failing to reach Level 2. The comparatively positive situation of students with an immigrant background in Australia and Canada may, in part, be a result of selective immigration policies resulting in immigrant populations with greater wealth and education. In Hong Kong-China and Macao-China the ethnic background and language between native students and those with an immigrant background is often similar, even if large socio-economic differences exist. However, the bottom line is that these countries have only a relatively small proportion of students at low levels of mathematical literacy.

The trends in reading are similar to those in mathematics. With the exception of the Russian Federation, the percentage of native students who fail to reach Level 2 in reading is less than 20% across all of the countries included in this study. Among students with an immigrant background, however, it is considerably higher (see Tables A6.2d, A6.2e and A6.2f, available on line at [*http://dx.doi.org/10.1787/068061288083*]). In 10 OECD countries – Austria, Belgium, Denmark, France, Germany, Luxembourg, Norway, Sweden, Switzerland and the United States – and in the partner economy the Russian Federation more than 25% of first-generation students fail to reach Level 2. As in mathematics, countries with high percentages of students with an immigrant background below Level 2 in reading may consider introducing support measures particularly geared to the needs of these student groups.

Findings from PISA suggest that students are most likely to initiate high quality learning, using various strategies, if they are well motivated, not anxious about their learning and believe in their own capacities. On the same token, high performance could lead to better motivation and attitudes towards schooling less anxiety. How well do schools and families foster and strengthen positive predispositions to learning among students with an immigrant background and thus contribute to laying a foundation for them to leave school with the motivation and capacity to continue learning throughout life? Chart A6.3 shows that these students report no signs of a lack of instrumental motivation in mathematics (see also Box A5.1 in Indicator A5). Despite performing less well on the whole than native students and generally coming from less advantaged families, students who experience immigration first-hand tend to report, throughout the OECD area, higher levels of instrumental motivation in mathematics than their native and second-generation peers. In fact, in none of the countries studied do students with an immigrant background report lower levels of interest. Much of this difference remains after accounting for socio-economic aspects as well as student performance in mathematics. The consistency of this finding is striking, given the substantial differences between countries in terms of immigration histories, immigrant populations, immigration and integration policies, and the performance of students with immigration background in PISA.

This points to areas where schools and policy makers could develop additional programmes to seek to reduce achievement gaps by using the strong instrumental motivation of students with an immigrant background. Schools and teachers may need to pay additional attention to reducing differences in these essential non-achievement outcomes. This could prove beneficial not only for these students' potential to learn throughout life, but also for helping to increase their level of achievement.

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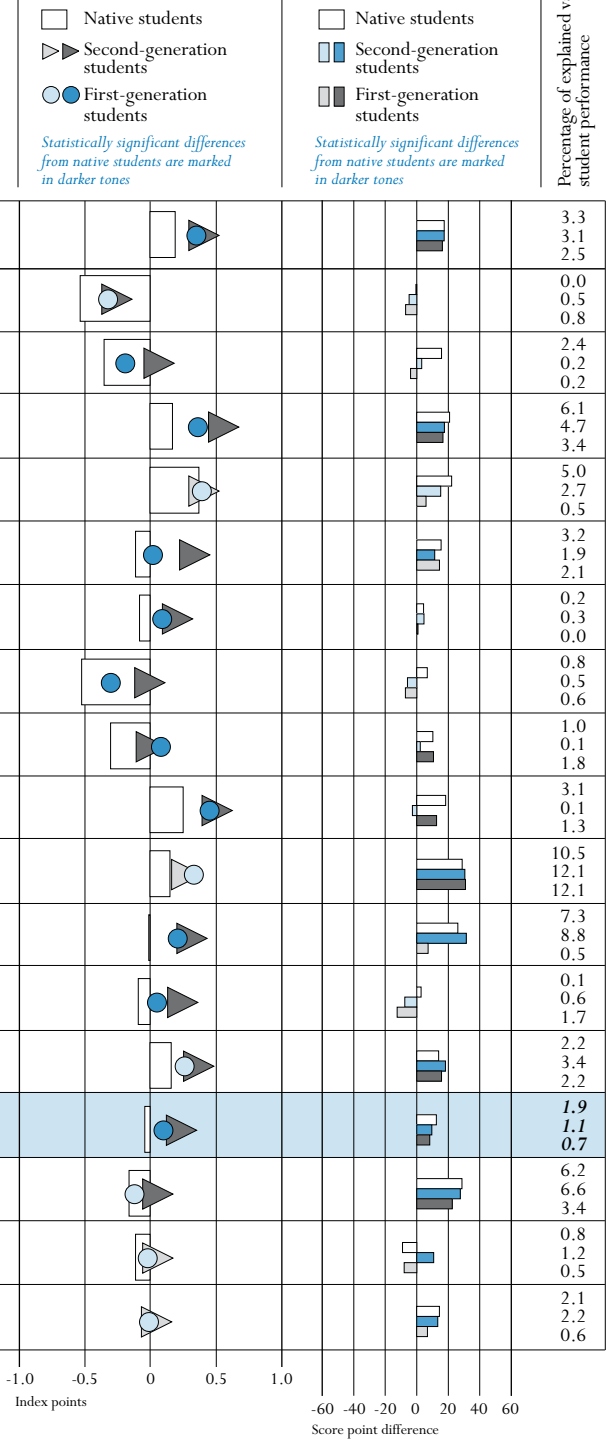
Chart A6.3. Students' instrumental motivation in mathematics by immigrant status (2003)

		Percentage of students agreeing or strongly agreeing with the following statements:				Index of instrumental motivation in mathematics	Change in mathematics score per unit change in the index of instrumental motivation in mathematics	Percentage of explained variance in student performance
		Making an effort in mathematics is worth it because it will help me in the work that I want to do later.	Learning mathematics is worthwhile for me because it will improve my career prospects.	Mathematics is an important subject for me because I need it for what I want to study later on.	I will learn many things in mathematics that will help me get a job.			
OECD countries								
Australia	A	82	86	72	79			3.3
	B	85	88	78	81			3.1
	C	85	89	79	80			2.5
Austria	A	64	50	34	54			0.0
	B	64	58	44	63			0.5
	C	70	55	47	63			0.8
Belgium	A	65	64	55	56			2.4
	B	71	71	60	63			0.2
	C	73	72	66	68			0.2
Canada	A	78	86	71	78			6.1
	B	83	89	76	82			4.7
	C	87	90	83	84			3.4
Denmark	A	91	88	75	83			5.0
	B	84	88	72	77			2.7
	C	90	92	75	81			0.5
France	A	73	73	64	61			3.2
	B	73	77	67	65			1.9
	C	78	78	74	77			2.1
Germany	A	73	79	46	71			0.2
	B	72	78	57	75			0.3
	C	75	82	60	77			0.0
Luxembourg	A	48	56	47	49			0.8
	B	55	66	51	57			0.5
	C	67	74	65	69			0.6
Netherlands	A	69	70	62	58			1.0
	B	81	80	76	81			0.1
	C	73	71	70	69			1.8
New Zealand	A	84	88	75	81			3.1
	B	87	92	84	86			0.1
	C	89	91	84	85			1.3
Norway	A	82	82	75	73			10.5
	B	84	82	81	78			12.1
	C	84	82	77	73			12.1
Sweden	A	69	86	66	73			7.3
	B	78	89	76	76			8.8
	C	81	91	80	77			0.5
Switzerland	A	75	73	50	64			0.1
	B	81	80	56	72			0.6
	C	79	83	63	74			1.7
United States	A	81	82	72	82			2.2
	B	84	84	77	88			3.4
	C	83	85	79	85			2.2
OECD average	A	***74***	***76***	***62***	***69***			***1.9***
	B	***76***	***80***	***67***	***73***			***1.1***
	C	***79***	***81***	***71***	***76***			***0.7***
Partner economies								
Hong Kong-China	A	72	80	69	60			6.2
	B	72	81	70	61			6.6
	C	84	88	75	73			3.4
Macao-China	A	76	84	65	61			0.8
	B	79	86	71	65			1.2
	C	81	86	76	69			0.5
Russian Federation	A	77	70	68	72			2.1
	B	76	70	68	71			2.2
	C	77	70	70	73			0.6



A: Native
B: Second-generation
C: First-generation

Source: OECD PISA 2003 database.

StatLink http://dx.doi.org/10.1787/068061288083

In most European countries, students with an immigrant background come from lower level socio-economic backgrounds and their parents often are less educated than native students' parents. This is also the case in the United States and Hong-Kong China. In contrast, the background characteristics of these students and their native counterparts are similar in Australia, Canada and New Zealand, and in the partner economies Macao-China and the Russian Federation. At the country level, there is a relationship between the relative mathematics performance of students with an immigrant background and their relative educational and socio-economic background. However, performance differences remain between these students and native ones in many countries after accounting for these background characteristics. For example, there are still significant performance differences between native and second-generation students in Austria, Belgium, Denmark, France, Germany, Luxembourg, the Netherlands, New Zealand, Norway and Switzerland. This suggests that the relative performance levels of students with an immigrant background cannot solely be attributed to the composition of immigrant populations in terms of their educational and socio-economic background. Students with an immigrant background who do not speak the language of instruction at home tend to be lower performing in mathematics in several countries. Even after accounting for parents' educational and occupational status, the performance gap associated with the language spoken at home remains significant in Belgium, Canada, Germany and the United States, as well as in the partner economies Hong Kong-China, Macao-China and the Russian Federation. Countries with a strong relationship between the language students speak at home and their performance in mathematics may want to consider strengthening language support measures in schools (OECD, 2006b).

Definitions and methodology

PISA was most recently administered in 2006; however, since those data are not yet available, this indicator is based on data from the PISA 2003 survey.

The target population for this indicator was all 15-year old students (in participating countries) enrolled in educational institutions at the secondary-school level regardless of grade level, type of institution, and part- or full-time enrolment status. Fifteen-year olds were defined as students who were between 15 years and 3 months to 16 years and 2 months at the beginning of the PISA testing period. The term "student" is used frequently to denote this target population. Information on students' immigrant background is compiled from students' responses provided in the PISA student questionnaire.

See Box A6.1 above for definitions of the terms "native students", "first-generation students" and "second-generation students".

This indicator includes the 14 OECD countries with significant populations of students with an immigrant background (at least 3% of participating students): Australia, Austria, Belgium, Canada, Denmark, France, Germany, Luxembourg, the Netherlands, New Zealand, Norway, Sweden, Switzerland and the United States. Three partner economies are part of this analysis: Hong Kong-China, Macao-China and the Russian Federation.

The OECD average in this indicator takes the 14 OECD countries as a single entity, to which each country contributes with equal weight. The OECD average corresponds to the arithmetic mean of the respective country statistics.

Further references

For further information about PISA 2003, see *Learning for Tomorrow's World – First Results from PISA 2003* (OECD, 2004a) and the *PISA 2003 Technical Report* (OECD, 2005b). For further information about the expectations and attitudes of students from an immigrant background, see *Where Immigrants Succeed: A Comparative Review of Performance and Engagement in PISA 2003* (OECD, 2006b). PISA data are also available on the PISA website: *www.pisa.oecd.org.*

The following additional material relevant to this indicator is available on line at:

StatLink http://dx.doi.org/10.1787/068061288083

- ***Table A6.2d. Percentage of native students at each level of proficiency on the reading scale***
- ***Table A6.2e. Percentage of second-generation students at each level of proficiency on the reading scale***
- ***Table A6.2f. Percentage of first-generation students at each level of proficiency on the reading scale***

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Table A6.1a.

Differences in mathematics performance, by immigrant status (2003)

		Performance on the mathematics scale						Difference in the mathematics score					
		Native students		Second-generation students		First-generation students		Second-generation students minus native students		First-generation students minus native students		First-generation students minus second-generation students	
		Mean score	S.E.	Mean score	S.E.	Mean score	S.E.	Difference	S.E.	Difference	S.E.	Difference	S.E.
OECD countries	**Australia**	527	(2.1)	522	(4.7)	525	(4.9)	-5	(4.7)	-2	(4.9)	3	(4.8)
	Austria	515	(3.3)	459	(8.8)	452	(6.0)	**-56**	(9.3)	**-63**	(6.0)	-7	(9.5)
	Belgium	546	(2.5)	454	(7.5)	437	(10.8)	**-92**	(7.6)	**-109**	(10.9)	-17	(12.4)
	Canada	537	(1.6)	543	(4.3)	530	(4.7)	6	(4.4)	-7	(4.8)	**-13**	(5.1)
	Denmark	520	(2.5)	449	(11.2)	455	(10.1)	**-70**	(11.1)	**-65**	(9.8)	5	(13.5)
	France	520	(2.4)	472	(6.1)	448	(15.0)	**-48**	(6.6)	**-72**	(15.0)	-25	(15.5)
	Germany	525	(3.5)	432	(9.1)	454	(7.5)	**-93**	(9.6)	**-71**	(7.9)	**22**	(11.2)
	Luxembourg	507	(1.3)	476	(3.3)	462	(3.7)	**-31**	(3.7)	**-45**	(4.1)	**-14**	(5.6)
	Netherlands	551	(3.0)	492	(10.3)	472	(8.4)	**-59**	(11.1)	**-79**	(8.8)	-19	(10.8)
	New Zealand	528	(2.6)	496	(8.4)	523	(4.9)	**-32**	(9.1)	-5	(5.6)	**27**	(8.0)
	Norway	499	(2.3)	460	(11.7)	438	(9.3)	**-39**	(11.3)	**-61**	(9.4)	-22	(13.8)
	Sweden	517	(2.2)	483	(9.8)	425	(9.6)	**-34**	(9.1)	**-92**	(9.7)	**-58**	(10.9)
	Switzerland	543	(3.3)	484	(5.0)	453	(6.1)	**-59**	(4.9)	**-89**	(6.0)	**-31**	(6.4)
	United States	490	(2.8)	468	(7.6)	453	(7.5)	**-22**	(7.2)	**-36**	(7.5)	-14	(7.4)
	OECD average	***523***	***(0.7)***	***483***	***(2.1)***	***475***	***(1.9)***	***-40***	***(2.0)***	***-48***	***(2.1)***	***-8***	***(2.4)***
Partner economies	**Hong Kong-China**	557	(4.5)	570	(4.6)	516	(5.3)	**13**	(4.3)	**-41**	(4.5)	**-54**	(5.2)
	Macao-China	528	(5.9)	532	(4.1)	517	(9.2)	4	(7.9)	-11	(10.4)	-15	(10.4)
	Russian Federation	472	(4.4)	457	(7.2)	452	(5.9)	**-14**	(7.2)	**-20**	(5.4)	-6	(8.3)

Note: Differences that are statistically significant are indicated in bold.
Source: OECD PISA 2003.
StatLink http://dx.doi.org/10.1787/068061288083

Table A6.2a.

Percentage of native students at each level of proficiency on the mathematics scale (2003)

		Native students - proficiency levels											
		Below Level 1 (below 358 score points)		Level 1 (from 358 to 420 score points)		Level 2 (from 421 to 482 score points)		Level 3 (from 483 to 544 score points)		Level 4 (from 545 to 606 score points)		Levels 5 and 6 (above 607 score points)	
		%	S.E.	%	S.E.	%	S.E.	%	S.E.	%	S.E.	%	S.E.
OECD countries	**Australia**	3.7	(0.4)	9.5	(0.5)	18.5	(0.7)	24.4	(0.7)	23.9	(0.6)	20.0	(0.7)
	Austria	4.0	(0.7)	11.6	(0.9)	20.6	(1.0)	25.9	(1.3)	21.9	(0.9)	16.0	(1.1)
	Belgium	4.0	(0.4)	7.4	(0.5)	15.2	(0.7)	20.8	(0.8)	22.9	(0.7)	29.7	(1.0)
	Canada	2.1	(0.3)	7.1	(0.4)	17.3	(0.6)	26.0	(0.8)	25.8	(0.6)	21.7	(0.7)
	Denmark	3.8	(0.5)	9.8	(0.7)	20.0	(0.9)	26.6	(0.9)	22.8	(0.9)	17.0	(1.0)
	France	3.8	(0.6)	9.7	(0.9)	19.5	(1.0)	26.5	(1.1)	23.7	(1.2)	16.8	(1.0)
	Germany	3.6	(0.6)	9.4	(0.8)	18.9	(1.3)	24.8	(1.0)	23.9	(1.1)	19.4	(1.1)
	Luxembourg	4.5	(0.5)	11.8	(1.0)	21.6	(1.4)	28.2	(1.0)	21.7	(1.1)	12.2	(0.8)
	Netherlands	0.9	(0.3)	6.0	(0.7)	16.3	(1.2)	23.4	(1.2)	24.3	(1.4)	29.0	(1.5)
	New Zealand	4.0	(0.5)	9.4	(0.7)	19.0	(0.7)	23.4	(0.9)	22.7	(0.9)	21.5	(0.9)
	Norway	6.1	(0.5)	13.2	(0.8)	23.5	(1.1)	25.7	(1.1)	19.6	(1.1)	11.8	(0.7)
	Sweden	3.8	(0.4)	10.5	(0.6)	21.2	(0.9)	26.2	(0.9)	21.1	(0.9)	17.2	(0.8)
	Switzerland	2.6	(0.4)	6.7	(0.6)	15.8	(0.8)	25.3	(1.1)	25.3	(0.8)	24.2	(1.6)
	United States	8.4	(0.7)	14.5	(0.9)	24.0	(0.8)	24.8	(0.9)	17.5	(0.8)	10.9	(0.8)
Partner economies	**Hong Kong-China**	3.5	(0.8)	5.8	(0.8)	12.8	(1.0)	19.6	(1.4)	25.0	(1.4)	33.2	(1.8)
	Macao-China	1.5	(0.9)	7.8	(3.2)	21.1	(4.1)	27.3	(3.6)	23.8	(3.6)	18.5	(2.6)
	Russian Federation	10.9	(1.1)	18.2	(1.2)	25.9	(1.1)	23.6	(1.0)	13.9	(1.0)	7.5	(0.8)

Source: OECD PISA 2003.
StatLink http://dx.doi.org/10.1787/068061288083

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Table A6.2b.

Percentage of second-generation students at each level of proficiency on the mathematics scale (2003)

		Second-generation students - proficiency levels											
		Below Level 1 (below 358 score points)		Level 1 (from 358 to 420 score points)		Level 2 (from 421 to 482 score points)		Level 3 (from 483 to 544 score points)		Level 4 (from 545 to 606 score points)		Levels 5 and 6 (above 607 score points)	
		%	S.E.	%	S.E.	%	S.E.	%	S.E.	%	S.E.	%	S.E.
OECD countries	Australia	4.7	(1.0)	10.4	(1.0)	19.7	(1.6)	23.1	(2.0)	22.4	(2.3)	19.7	(2.0)
	Austria	13.2	(3.4)	20.6	(3.6)	27.0	(3.9)	20.6	(3.5)	15.7	(3.6)	2.9	(1.5)
	Belgium	17.4	(2.5)	20.7	(2.0)	23.1	(2.4)	19.0	(3.1)	11.9	(2.4)	7.8	(2.0)
	Canada	1.4	(0.6)	5.9	(1.0)	16.3	(1.7)	28.0	(2.3)	25.5	(2.3)	22.9	(9.0)
	Denmark	15.7	(3.9)	20.4	(4.6)	28.0	(6.9)	23.5	(6.7)	8.2	(3.6)	4.2	(2.6)
	France	10.9	(2.3)	17.1	(2.3)	24.8	(3.5)	26.7	(2.8)	14.5	(2.6)	5.9	(2.3)
	Germany	23.5	(4.2)	23.3	(3.3)	23.8	(3.4)	16.3	(2.7)	8.4	(2.3)	4.8	(1.4)
	Luxembourg	9.3	(1.3)	17.4	(2.1)	27.3	(2.3)	24.5	(2.0)	13.1	(1.7)	8.5	(1.1)
	Netherlands	4.2	(1.5)	16.4	(4.2)	27.9	(4.3)	23.9	(4.2)	18.6	(3.2)	9.0	(2.6)
	New Zealand	8.7	(3.3)	15.6	(3.1)	21.8	(3.4)	22.2	(3.1)	17.4	(2.7)	14.4	(2.7)
	Norway	15.2	(4.9)	19.5	(4.8)	25.0	(7.9)	17.7	(5.8)	13.6	(4.2)	9.0	(3.6)
	Sweden	9.6	(2.4)	14.8	(3.4)	26.5	(3.2)	23.5	(4.9)	14.4	(3.7)	11.2	(3.3)
	Switzerland	8.8	(1.6)	17.6	(2.3)	25.6	(2.7)	21.3	(2.4)	15.3	(1.7)	11.4	(2.3)
	United States	12.5	(2.5)	21.0	(3.0)	23.3	(2.3)	21.0	(2.4)	14.2	(2.2)	8.0	(2.0)
Partner economies	Hong Kong-China	2.9	(0.8)	4.9	(0.9)	10.2	(1.4)	16.3	(1.5)	27.8	(1.9)	37.9	(2.2)
	Macao-China	2.4	(0.7)	7.9	(1.2)	18.2	(1.8)	26.9	(2.4)	24.6	(2.2)	20.0	(2.1)
	Russian Federation	10.0	(2.4)	21.9	(3.1)	31.0	(4.1)	22.8	(3.7)	10.3	(2.5)	4.0	(2.0)

Source: OECD PISA 2003.

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Table A6.2c.

Percentage of first-generation students at each level of proficiency on the mathematics scale (2003)

		First-generation students - proficiency levels											
		Below Level 1 (below 358 score points)		Level 1 (from 358 to 420 score points)		Level 2 (from 421 to 482 score points)		Level 3 (from 483 to 544 score points)		Level 4 (from 545 to 606 score points)		Levels 5 and 6 (above 606 score points)	
		%	S.E.	%	S.E.	%	S.E.	%	S.E.	%	S.E.	%	S.E.
OECD countries	Australia	5.1	(1.0)	10.5	(1.5)	17.9	(1.5)	22.7	(1.9)	22.4	(2.0)	21.5	(2.0)
	Austria	14.1	(2.4)	23.6	(3.9)	28.4	(3.2)	18.7	(2.2)	10.2	(1.8)	5.1	(1.4)
	Belgium	25.0	(4.6)	18.6	(2.7)	21.2	(3.0)	17.9	(2.7)	10.0	(2.1)	7.3	(1.6)
	Canada	3.3	(0.7)	8.3	(1.4)	18.0	(2.4)	25.7	(2.2)	22.8	(2.0)	22.0	(2.1)
	Denmark	14.4	(4.3)	19.4	(4.7)	28.2	(4.5)	20.5	(4.4)	13.6	(3.8)	3.8	(2.3)
	France	22.0	(5.3)	20.6	(4.1)	21.7	(4.2)	15.3	(3.7)	12.8	(3.9)	7.5	(2.7)
	Germany	17.5	(2.8)	21.3	(3.4)	20.7	(2.9)	20.5	(2.4)	14.4	(2.7)	5.6	(2.0)
	Luxembourg	15.0	(1.7)	20.4	(2.1)	24.4	(2.0)	18.9	(1.7)	12.9	(1.6)	8.5	(1.4)
	Netherlands	6.3	(2.1)	21.4	(4.8)	32.2	(5.6)	21.3	(5.0)	12.9	(4.2)	5.8	(2.3)
	New Zealand	5.5	(1.3)	10.0	(1.9)	18.2	(3.1)	24.1	(2.8)	20.7	(2.1)	21.6	(1.9)
	Norway	18.9	(4.3)	26.8	(5.1)	23.5	(4.2)	17.3	(4.5)	8.9	(4.3)	4.6	(2.2)
	Sweden	24.0	(4.2)	23.1	(3.9)	24.7	(4.2)	16.5	(2.7)	8.4	(2.4)	3.3	(1.5)
	Switzerland	17.2	(2.1)	21.9	(2.4)	23.7	(2.7)	20.0	(2.0)	8.8	(1.3)	8.4	(1.7)
	United States	19.5	(3.4)	18.3	(2.4)	22.4	(4.0)	20.6	(3.3)	12.7	(2.5)	6.5	(1.6)
Partner economies	Hong Kong-China	5.2	(1.3)	9.6	(1.3)	20.5	(2.3)	25.4	(2.5)	23.0	(2.2)	16.3	(1.6)
	Macao-China	3.2	(1.8)	12.1	(4.0)	21.2	(4.0)	25.5	(4.2)	21.9	(3.8)	16.1	(3.7)
	Russian Federation	14.1	(2.5)	21.9	(3.2)	30.1	(3.0)	19.3	(2.1)	9.5	(1.8)	5.2	(1.5)

Source: OECD PISA 2003.

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Table A6.3.

Index of instrumental motivation in mathematics and student performance on the mathematics scale (2003)

Results based on students' self-reports

		Index of instrumental motivation in mathematics						Change in the mathematics score per unit of the index of instrumental motivation in mathematics								
		Native students		Second-generation students		First-generation students		Native students		Explained variance in student performance (r-squared x 100)	Second-generation students		Explained variance in student performance (r-squared x 100)	First-generation students		Explained variance in student performance (r-squared x 100)
		Mean index	S.E.	Mean index	S.E.	Mean index	S.E.	Effect	S.E.	%	Effect	S.E.	%	Effect	S.E.	%
OECD countries	**Australia**	0.19	(0.02)	**0.35**	(0.04)	**0.37**	(0.03)	**17.4**	(1.2)	3.3	**17.4**	(3.3)	3.1	**16.3**	(2.8)	2.5
	Austria	-0.53	(0.03)	-0.32	(0.10)	**-0.29**	(0.07)	-0.6	(1.7)	0.0	-4.9	(7.1)	0.5	-7.1	(4.5)	0.8
	Belgium	-0.35	(0.02)	**-0.19**	(0.07)	**0.03**	(0.06)	**15.8**	(1.6)	2.4	3.2	(6.3)	0.2	-4.0	(5.6)	0.2
	Canada	0.17	(0.01)	**0.36**	(0.05)	**0.52**	(0.04)	**20.8**	(1.1)	6.1	**17.6**	(3.2)	4.7	**16.6**	(3.4)	3.4
	Denmark	0.37	(0.02)	0.39	(0.09)	0.37	(0.10)	**22.2**	(1.7)	5.0	15.1	(10.5)	2.7	5.9	(9.2)	0.5
	France	-0.11	(0.02)	**0.02**	(0.05)	**0.30**	(0.10)	**15.5**	(1.6)	3.2	**11.4**	(3.8)	1.9	14.4	(10.9)	2.1
	Germany	-0.08	(0.02)	**0.09**	(0.06)	**0.17**	(0.06)	**4.4**	(2.2)	0.2	4.6	(5.8)	0.3	0.7	(6.3)	0.0
	Luxembourg	-0.52	(0.02)	**-0.30**	(0.05)	**-0.04**	(0.05)	**6.6**	(1.9)	0.8	-5.9	(3.5)	0.5	-7.2	(3.8)	0.6
	Netherlands	-0.30	(0.02)	**0.08**	(0.07)	**-0.03**	(0.09)	**10.3**	(1.9)	1.0	2.2	(8.5)	0.1	10.7	(7.6)	1.8
	New Zealand	0.25	(0.02)	**0.45**	(0.06)	**0.47**	(0.04)	**18.3**	(2.1)	3.1	-2.8	(6.9)	0.1	**12.5**	(5.1)	1.3
	Norway	0.15	(0.02)	0.33	(0.12)	0.24	(0.09)	**28.8**	(1.5)	10.5	**30.5**	(10.2)	12.1	**30.9**	(7.9)	12.1
	Sweden	-0.01	(0.02)	**0.21**	(0.07)	**0.28**	(0.04)	**26.1**	(1.8)	7.3	**31.5**	(8.8)	8.8	7.2	(7.6)	0.5
	Switzerland	-0.09	(0.02)	**0.05**	(0.04)	**0.21**	(0.05)	2.8	(1.8)	0.1	-7.6	(4.0)	0.6	**-12.5**	(4.2)	1.7
	United States	0.16	(0.02)	0.26	(0.05)	**0.33**	(0.06)	**13.8**	(1.7)	2.2	**18.2**	(5.0)	3.4	**15.7**	(6.4)	2.2
	OECD average	***-0.04***	***(0.01)***	***0.10***	***(0.02)***	***0.20***	***(0.02)***	***12.4***	***(0.5)***	***1.9***	***9.6***	***(1.2)***	***1.1***	***8.2***	***(1.6)***	***0.7***
Partner economies	**Hong Kong-China**	-0.16	(0.02)	-0.12	(0.03)	**0.02**	(0.03)	**28.7**	(2.3)	6.2	**27.6**	(4.0)	6.6	**22.5**	(5.2)	3.4
	Macao-China	-0.11	(0.05)	-0.02	(0.04)	0.02	(0.06)	-9.1	(7.5)	0.8	**10.7**	(4.6)	1.2	-8.0	(10.8)	0.5
	Russian Federation	0.00	(0.02)	-0.01	(0.05)	0.01	(0.06)	**14.4**	(1.6)	2.1	**13.4**	(5.2)	2.2	6.8	(4.7)	0.6

		Regression estimate of the index of instrumental motivation in mathematics							
		Accounting for ESCS				Accounting for mathematics performance			
		Second-generation students		First-generation students		Second-generation students		First-generation students	
		Coef.	S.E.	Coef.	S.E.	Coef.	S.E.	Coef.	S.E.
OECD countries	**Australia**	**0.18**	(0.04)	**0.19**	(0.03)	**0.17**	(0.04)	**0.19**	(0.03)
	Austria	0.14	(0.10)	**0.16**	(0.07)	0.20	(0.10)	**0.22**	(0.08)
	Belgium	**0.24**	(0.07)	**0.43**	(0.07)	**0.29**	(0.08)	**0.51**	(0.07)
	Canada	**0.19**	(0.05)	**0.33**	(0.04)	**0.17**	(0.05)	**0.36**	(0.04)
	Denmark	0.12	(0.09)	0.06	(0.10)	0.18	(0.10)	0.14	(0.10)
	France	**0.19**	(0.06)	**0.48**	(0.11)	**0.23**	(0.06)	**0.55**	(0.12)
	Germany	**0.16**	(0.06)	**0.24**	(0.07)	**0.22**	(0.07)	**0.29**	(0.07)
	Luxembourg	**0.21**	(0.06)	**0.48**	(0.06)	**0.24**	(0.05)	**0.51**	(0.05)
	Netherlands	**0.42**	(0.07)	**0.30**	(0.09)	**0.44**	(0.07)	**0.36**	(0.09)
	New Zealand	**0.24**	(0.07)	**0.20**	(0.04)	**0.25**	(0.07)	**0.22**	(0.04)
	Norway	**0.27**	(0.12)	**0.25**	(0.07)	**0.32**	(0.11)	**0.32**	(0.08)
	Sweden	**0.30**	(0.08)	**0.39**	(0.05)	**0.31**	(0.07)	**0.53**	(0.05)
	Switzerland	**0.10**	(0.05)	**0.25**	(0.05)	**0.15**	(0.05)	**0.31**	(0.05)
	United States	**0.14**	(0.05)	**0.21**	(0.06)	**0.14**	(0.05)	**0.23**	(0.06)
	OECD average	**0.29**	***(0.02)***	**0.28**	***(0.04)***	**0.20**	***(0.02)***	**0.31**	***(0.02)***
Partner economies	**Hong Kong-China**	**0.07**	(0.03)	**0.22**	(0.03)	0.00	(0.03)	**0.26**	(0.03)
	Macao-China	0.09	(0.07)	0.10	(0.08)	0.09	(0.06)	0.13	(0.08)
	Russian Federation	-0.01	(0.06)	0.02	(0.06)	0.01	(0.06)	0.05	(0.06)

Note: Statistically significant values are indicated in bold.

Source: OECD PISA 2003.

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Reader's Guide

Coverage of the statistics

Although a lack of data still limits the scope of the indicators in many countries, the coverage extends, in principle, to the entire national education system (within the national territory) regardless of the ownership or sponsorship of the institutions concerned and regardless of education delivery mechanisms. With one exception described below, all types of students and all age groups are meant to be included: children (including students with special needs), adults, nationals, foreigners, as well as students in open distance learning, in special education programmes or in educational programmes organised by ministries other than the Ministry of Education, provided the main aim of the programme is the educational development of the individual. However, vocational and technical training in the workplace, with the exception of combined school and work-based programmes that are explicitly deemed to be parts of the education system, is not included in the basic education expenditure and enrolment data.

Educational activities classified as "adult" or "non-regular" are covered, provided that the activities involve studies or have a subject matter content similar to "regular" education studies or that the underlying programmes lead to potential qualifications similar to corresponding regular educational programmes. Courses for adults that are primarily for general interest, personal enrichment, leisure or recreation are excluded.

Calculation of international means

For many indicators an OECD average is presented and for some an OECD total.

The OECD average is calculated as the unweighted mean of the data values of all OECD countries for which data are available or can be estimated. The OECD average therefore refers to an average of data values at the level of the national systems and can be used to answer the question of how an indicator value for a given country compares with the value for a typical or average country. It does not take into account the absolute size of the education system in each country.

The OECD total is calculated as a weighted mean of the data values of all OECD countries for which data are available or can be estimated. It reflects the value for a given indicator when the OECD area is considered as a whole. This approach is taken for the purpose of comparing, for example, expenditure charts for individual countries with those of the entire OECD area for which valid data are available, with this area considered as a single entity.

Note that both the OECD average and the OECD total can be significantly affected by missing data. Given the relatively small number of countries, no statistical methods are used to compensate for this. In cases where a category is not applicable (code "a") in a country or where the data value is negligible (code "n") for the corresponding calculation, the value zero is imputed for the purpose of calculating OECD averages. In cases where both the numerator and the denominator of a ratio are not applicable (code "a") for a certain country, this country is not included in the OECD average.

For financial tables using 1995 data, both the OECD average and OECD total are calculated for countries providing both 1995 and 2004 data. This allows comparison of the OECD average and OECD total over time with no distortion due to the exclusion of certain countries in the different years.

For many indicators an EU19 average is also presented. It is calculated as the unweighted mean of the data values of the 19 OECD countries that are members of the European Union for which data are available or can be estimated. These 19 countries are Austria, Belgium, the Czech Republic, Denmark, Finland, France, Germany, Greece, Hungary, Italy, Ireland, Luxembourg, the Netherlands, Poland, Portugal, the Slovak Republic, Spain, Sweden and the United Kingdom.

Classification of levels of education

The classification of the levels of education is based on the revised International Standard Classification of Education (ISCED-97). The biggest change between the revised ISCED and the former ISCED (ISCED-76) is the introduction of a multi-dimensional classification framework, allowing for the alignment of the educational content of programmes using multiple classification criteria. ISCED is an instrument for compiling statistics on education internationally and distinguishes among six levels of education. The glossary available at *www.oecd.org/edu/eag2007* describes in detail the ISCED levels of education, and Annex 1 shows corresponding typical graduation ages of the main educational programmes by ISCED level.

Symbols for missing data

Six symbols are employed in the tables and charts to denote missing data:

a Data is not applicable because the category does not apply.

c There are too few observations to provide reliable estimates (*i.e.* there are fewer than 3% of students for this cell or too few schools for valid inferences). However, these statistics were included in the calculation of cross-country averages.

m Data is not available.

n Magnitude is either negligible or zero.

w Data has been withdrawn at the request of the country concerned.

x Data included in another category or column of the table (*e.g.* *x*(2) means that data are included in column 2 of the table).

~ Average is not comparable with other levels of education.

Further resources

The website *www.oecd.org/edu/eag2007* provides a rich source of information on the methods employed for the calculation of the indicators, the interpretation of the indicators in the respective national contexts and the data sources involved. The website also provides access to the data underlying the indicators as well as to a comprehensive glossary for technical terms used in this publication.

Any post-production changes to this publication are listed at *www.oecd.org/edu/eag2007*.

The website *www.pisa.oecd.org* provides information on the OECD Programme for International Student Assessment (PISA), on which many of the indicators in this publication draw.

Education at a Glance uses the OECD's StatLinks service. Below each table and chart in *Education at a Glance 2007* is a url which leads to a corresponding Excel workbook containing the underlying data for the indicator. These urls are stable and will remain unchanged over time. In addition, readers of the *Education at a Glance* e-book will be able to click directly on these links and the workbook will open in a separate window.

Codes used for territorial entities

These codes are used in certain charts. Country or territorial entity names are used in the text. Note that in the text the Flemish Community of Belgium is referred to as "Belgium (Fl.)" and the French Community of Belgium as "Belgium (Fr.)".

AUS	Australia	ITA	Italy
AUT	Austria	JPN	Japan
BEL	Belgium	KOR	Korea
BFL	Belgium (Flemish Community)	LUX	Luxembourg
BFR	Belgium (French Community)	MEX	Mexico
BRA	Brazil	NLD	Netherlands
CAN	Canada	NZL	New Zealand
CHL	Chile	NOR	Norway
CZE	Czech Republic	POL	Poland
DNK	Denmark	PRT	Portugal
ENG	England	RUS	Russian Federation
EST	Estonia	SCO	Scotland
FIN	Finland	SVK	Slovak Republic
FRA	France	SVN	Slovenia
DEU	Germany	ESP	Spain
GRC	Greece	SWE	Sweden
HUN	Hungary	CHE	Switzerland
ISL	Iceland	TUR	Turkey
IRL	Ireland	UKM	United Kingdom
ISR	Israel	USA	United States

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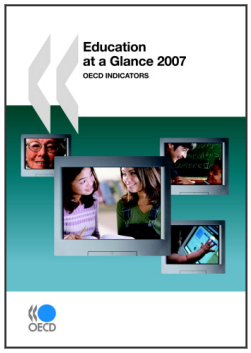

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