Chapter 7

Education and skills

Education and skills have a strong influence on people's well-being. Education opens opportunities for people and brings a wide range of benefits to society, including higher economic growth, stronger social cohesion and less crime. By investing in education, families and governments can reach many economic and social goals at the same time. This chapter considers a few well-established educational indicators that provide a basic picture of both the current educational status of the adult population and selected skills of youth, skills needed to undertake the broad range of activities essential to life in modern society. This chapter finds that education has increased substantially over the past few decades, with countries converging towards a similar level of educational attainment. However, strong disparities remain in the quality of educational outcomes, as measured by the reading and civic skills of students. Despite the free availability of school services in many countries, educational attainment and students' skills are strongly influenced by the incomes and socio-economic backgrounds of their families, with educational disadvantage cumulating over the life course. This suggests that educational inequalities should be tackled as early as possible in life.

Why do education and skills matter for well-being?

Education and skills are key to the prosperity of nations and to better lives for people (OECD, 2011a). Developing skills is intrinsically valuable for humans as it responds to one of their most important aspirations: the basic need to learn. There are many types of skills, all of which matter for living a good life. In general, the capacity to understand and master the world opens considerable opportunities for people and enhances their control over their lives. In addition, education makes possible activities that bring intrinsic pleasure to individuals, such as reading a book, enjoying an art exhibition, etc.

Education not only has an intrinsic value but also influences well-being indirectly. Individuals benefit from education in a variety of ways: education has a strong positive impact on the material living conditions of people, as higher education leads to higher earnings and greater employability (OECD, 2010c; Boarini and Strauss, 2010; Sianesi and Van Reenen, 2003); more educated people generally have better health status, as they have a healthier life-style and an increased chance of doing a job in a working environment with fewer hazards (Miyamoto and Chevalier, 2010; La Fortune and Looper, 2009). Education also raises civic awareness and fosters political participation (Borgonovi and Miyamoto, 2010; OECD, 2010a). Finally, education provides individuals with the skills necessary to integrate more fully into their societies.

Education matters not only for those acquiring it but also at the wider, societal level. Education and skills bring important economic returns in the form of higher productivity and economic growth (Hanushek and Woessmann, 2010; Sianesi and Van Reenen, 2003), higher macro-economic and political stability, lower criminality and stronger social cohesion (OECD, 2010a; OECD, 2011a; Grossman, 2006). Furthermore, education has a major role to play in coping with the profound structural changes that modern society is undergoing: skills provide a powerful gateway to the future, empowering people and societies with great innovation potential (OECD, 2010b). Finally, improving the skills of those at the bottom of the income ladder plays a key role in countering the long-term trend of growing earnings and income inequality observed in many OECD countries (OECD, 2011a).

Research also shows that educational advantages tend to cumulate over time, starting from the first years of life, and that skills are not acquired solely through formal education (Box 7.1). Students' educational outcomes are largely affected by their family background and in particular by their parents' education (OECD, 2010f). This means that some children are already advantaged over others when they begin formal schooling, while in turn school results exert a strong influence on their university outcomes (Boarini *et al.*, 2008). Moreover, people with higher education and skills are more likely to undertake on-the-job training (OECD, 2010c). The way that inequalities are compounded means that educational deficiencies should be tackled as early as possible and that pupils from a lower socio-economic background should receive adequate support in schools to compensate for their initial disadvantage.

While many things make for a good life, education is perhaps the dimension most valued by parents for improving their children's future life chances. By investing in education, families and governments can reach many economic and social goals at the same time. Existing measures of educational outcomes are well-established and statistically sound. However, their scope is relatively narrow (*e.g.* most available indicators tend to focus on cognitive skills and on the education received in schools) and are usually limited to specific population groups (*e.g.* youth). Enhancing measures of education and skills will allow a

better understanding of the potential impacts on other dimensions of people's lives. Such measures are also needed to design more effective policies.

Measuring education and skills

Education statistics are in general of good quality (Table 7.1), especially for OECD countries. However, while a wealth of information exists on education inputs (*e.g.* expenditures, teacher-to-student ratios, etc.) and outputs (educational attainment, completion rates, etc.), information on outcomes (which informs about the quality of education received and the effective skills that individuals have developed) has traditionally been less common. In the past twenty years, several instruments have been developed, notably the Programme for International Student Assessment (PISA), the Trends in International Mathematics and Science Surveys (TIMMS) and the Progress in International Reading Literacy Study (PIRLS). All these tools measure students' abilities in a broad range of tasks and, most importantly, make it possible to study the way educational systems influence people's abilities.

Despite the large amount of relevant evidence that these surveys have provided, they present three main limitations. Firstly, surveys tend to focus on cognitive abilities, such as literacy, numeracy and IT skills. Secondly, they have often been conducted on specific age groups of the population, *i.e.* youth during their school age. Thirdly, they measure individuals' acquired abilities, without informing about how these abilities are actually used in life. Some of these shortcomings are addressed by the OECD Programme for the International Assessment of Adult Competencies (PIAAC), which is discussed at the end of this chapter. It is important to put in place harmonised instruments that measure other types of skills, which are critical for innovation and economic growth but also for living a good life in general (*e.g.* social and emotional skills[1]; Almlund *et al.*, 2011). For the moment, these exist at national level only.

This chapter considers a few well-established educational indicators that provide a basic picture of both the current educational status of the adult population and selected cognitive skills of the youth. They inform about the competencies that help individuals undertake a broad range of the activities needed to live in modern societies.

Table 7.1. **The quality of environmental indicators**

		Target concept	INDICATORS							
			Relevance to measure and monitor well-being				Statistical quality			
			Face validity	Unambiguous interpretation (good/bad)	Amenable to policy changes	Can be disaggregated	Well-established instrument collected	Comparable definition	Country coverage	Recurrent data collection
Education and skills										
ES I	Educational attainment	Quantity of education	√	√	√	√	√	√	√	√
es 1	Education expectancy		~	√	√	~	√	√	√	√
es 2	Lifelong learning		√	√	√	~	~	√	~	~
ES II	Students' cognitive skills	Quality of education	√	√	√	√	√	√	√	~
es3	Civic skills		√	√	√	√	√	√	~	~

Note: The symbol √ shows that the indicator selected largely meets the considered criterion; the symbol ~ that the indicator meets the criterion to a large extent; the symbol x that the indicator does not meet the criterion or meets it only to a limited extent.

Box 7.1. **Spurring innovation and economic growth through skills: the OECD Innovation and Skills Strategies**

Innovation covers a wide range of activities (*e.g.* invention and implementation, breakthroughs and minor improvements) and therefore requires a wide variety of skills. Among the most important ones are:

- *Basic skills and digital-age literacy*. These include reading, writing and numeracy as well as the skills needed to use digital technology and access and interpret information in a knowledge-based society.
- *Academic skills*. These are associated with disciplines found in educational institutions, such as humanities, mathematics, history, law and science. These skills are generally obtained through the education system and are transferable across situations.
- *Technical skills*. These are specific skills needed in an occupation and may include both academic and vocational skills and knowledge of certain tools or processes.
- *Generic skills*. Commonly mentioned skills in this category include problem-solving, critical and creative thinking, ability to learn, and ability to manage complexity.
- *"Soft" skills*. This category is sometimes grouped with (or classified as) generic skills. It includes working and interacting in teams and heterogeneous groups; communication; motivation; volition and initiative; ability to read and manage one's own and others' emotions and behaviours during social interactions; cultural openness; and receptiveness to innovation.
- *Leadership*. Similar in nature to "soft" skills, this includes team-building, steering, coaching and mentoring, lobbying and negotiating, co-ordination, ethics and charisma.
- *Managerial and entrepreneurial skills*. These skills and competencies relate to leadership, communication and self-confidence, as well as to relevant technical skills, and are readily transferable.

While measures of basic skills, digital skills, academic skills, technical skills and generic skills of youth are available from existing international assessment surveys, good measures of soft skills, leadership and managerial skills are available only at the national level.

The **OECD Innovation Strategy** recommends that public policies aim at equipping people with the foundations to learn and develop the broad range of skills needed for innovation in all of its forms, as well as with the flexibility to upgrade skills and adapt to changing market conditions.

To address the global dimensions of the supply and demand for skills, the OECD is preparing a global Skills Strategy. **The OECD Skills Strategy** seeks to help both OECD and non-member countries to improve: *i)* responsiveness – ensuring that education/training providers can adapt to changing demand; *ii)* quality and efficiency in learning provision – ensuring that the right skills are acquired at the right time, the right place and in the most effective mode; *iii)* flexibility in provision – allowing people to study/train in what they want, when they want and how they want; *iv)* transferability of skills – ensuring that skills gained at school are documented in a commonly accepted and understandable form and that the skills acquired over the course of the working life are recognised and certified; *v)* ease of access – *e.g.* by reducing barriers to entry, such as institutional rigidities, up-front fees and age restrictions, and by providing a variety of entry and re-entry pathways; and *vi)* lower the costs of re-entry – *e.g.* by granting credits for components of learning, and offering modular instruction, through credit accumulation and credit-transfer systems.

Source: OECD, 2010c; OECD, 2011a.

Selected indicators

Educational attainment (ES I)

Educational attainment gives a basic indication of the level of formal education attained by people in a given country. The definition chosen here focuses on the percentage of the population aged 25-64 who have completed at least an upper-secondary degree. This choice

was made because, in OECD countries, the large majority of the population has already completed a lower educational degree (*i.e.* a primary degree); in addition, the economy of many of these countries increasingly needs high-skilled workers, requiring university training for which an upper-secondary credential is a necessary requisite. The chapter also discusses some specific evidence on tertiary educational attainment.

The data behind this indicator are collected through the annual OECD questionnaire on National Educational Attainment Categories (NEAC), which uses Labour Force Survey (LFS) data.[2] However, this indicator does not take into account people who have not completed a degree but might have learned useful skills outside school settings. In addition the indicator does not reflect the quality of education received, which may vary both within and across countries.

Education expectancy (es 1)

The educational attainment of the adult population is informative as a proxy of the stock of human capital accumulated in a country. It is, however, not informative about the educational opportunities available to today's youth. It may therefore be complemented by a measure of educational expectancy, which can be defined as the number of years of schooling that youth aged 15 today may expect to undertake while aged 15 to 29, based on the current enrolment of people aged 15-29. The threshold has been set at 15, the compulsory school age in many OECD countries, as the challenge is to extend education beyond that.

Data for this indicator are collected through the annual OECD data collection on the school-work transitions, which rely on Labour Force Surveys as the main source of information. The data usually refer to the first quarter of the calendar year, or the average of the first three months, thereby excluding summer employment. The indicator relies on the distribution of 15-29 year-olds in education, work or neither of the two. It is thus a good proxy of the numbers of years that an individual is likely to spend in education between age 15 and 29. However, this indicator may not reflect drop-out rates and temporary interruptions of study. Another limitation is that long study durations (*i.e.* beyond the prescribed time) will result in an overestimate of this indicator.

Lifelong learning (es 2)

Formal learning undertaken in schools and universities is the main pillar of the education received during people's life course. However, people improve their competencies and acquire new skills in other settings and times, notably in the labour market. Adult education and training increase people's productivity and earnings possibilities (OECD, 2005; OECD, 2004).

While measuring skills developed on the job is hard, existing indicators of participation in formal and non-formal education provide information on workers' learning opportunities. Formal education includes educational programmes for adults provided by schools, colleges, universities and other educational institutions; non-formal education is defined as an organised and sustained educational activity that does not correspond exactly to the above definition of formal education, and which may take place both within and outside educational institutions and cater to persons of all ages. Depending on the national context, it may cover educational programmes to impart adult literacy, basic education for out-of-school children, life skills, work skills and general culture.[3]

The source for this indicator is a specific OECD data collection. Data for non-EU countries were calculated from country-specific household surveys. Data for countries in the European Statistical System come from the pilot EU Adult Education Survey (AES). The EU AES surveys were carried out between 2005 and 2008 by 29 countries in the EU, EFTA and EU candidate countries. The EU AES is a pilot exercise which proposed a common framework for the first time, including a standard questionnaire, tools and quality reporting (OECD, 2010b).

Students' cognitive skills (ES II)

The measures presented so far provide information on countries' educational potential. They do not, however, indicate anything about the actual quality of the competences gained by people and therefore about how the qualifications earned contribute to individual well-being, *e.g.* by improving access to the labour market. Indicators that directly measure the skills of individuals are therefore needed. For this purpose, an indicator of reading skills of 15-year-old students is used here. This indicator captures reading literacy, defined as the "understanding, using, reflecting on and engaging with written tests, in order to achieve one's goals, to develop one's knowledge and potential, and to participate in society" (OECD, 2010c).

The indicator on reading skills was collected through the 2009 Programme on International Students Assessment (PISA) coordinated by the OECD. The 2009 wave of PISA tested 470 000 students, representing 26 million 15-year-olds in the schools of the 65 participating countries. The PISA student population is defined using stringent criteria to ensure a high level of coverage and full comparability of the assessment across countries (OECD, 2009b). The quality of the indicator is thus high. Despite the fact that reading literacy measures a relatively narrow set of competencies, there is strong evidence that reading literacy is strongly correlated with other cognitive and non-cognitive measures tested by PISA (*e.g.* mathematics, sciences, IT skills, etc. – OECD, 2011b). Finally, while this indicator covers only youth, cognitive skills at age 15 are strongly correlated with later educational outcomes and labour market performance (Juhn *et al.*, 1993).

Students' civic skills (es 3)

Standard cognitive skills are critical for doing well in the labour market and for performing many other activities that contribute to people's well-being, but they need to be complemented with other types of skills that make society strong and inclusive. Civic skills cover knowledge and understanding of civics and citizenship. Civic education focuses on people's knowledge and understanding of formal institutions and the processes of civic life (such as voting in elections), while citizenship education focuses on knowledge and understanding of opportunities for participation and engagement in both civics and civil society (*e.g.* ethical consumption), which are important for democracies. The indicator on civic skills shown here refers to both types of knowledge (*i.e.* civics and citizenship) of students aged around 14-15.[4]

The indicator is based on the International Civic and Citizenship Education Study (ICCS) carried out in 2009 on more than 140 000 Grade 8 (or equivalent) students in more than 5 300 schools from 38 countries. The participation rate required for each country was around 85% of the selected schools, and most of the countries sampled met this requirement. The ICCS is carried out by the International Educational Agency, which has a longstanding experience in international assessment surveys. Since not all OECD countries are covered, the indicator on civic skills is considered here as a secondary indicator.

Average patterns

Educational levels have increased in all countries

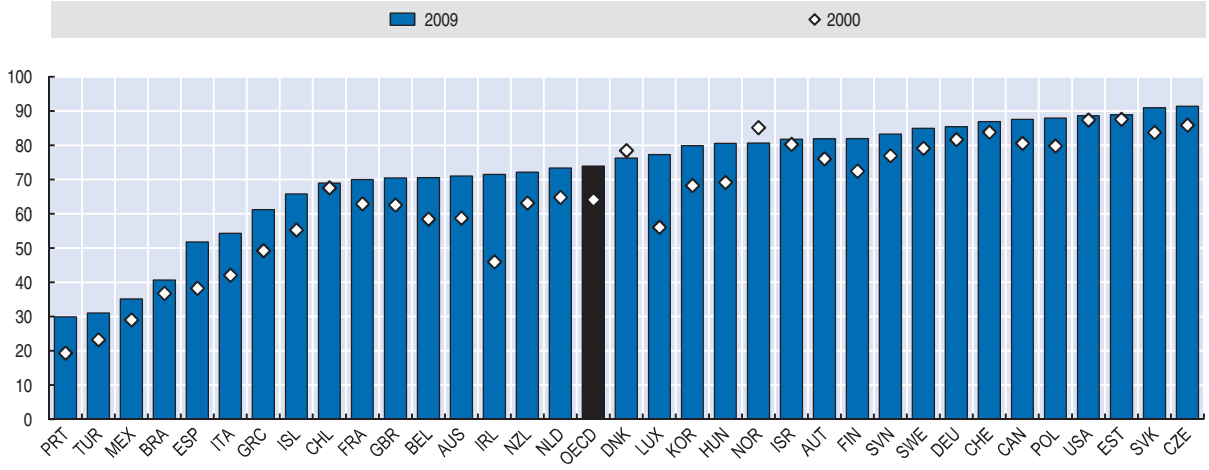
Today the large majority of the population aged 25-64 in OECD countries holds at least an upper secondary education degree, with a few remarkable exceptions, *e.g.* Portugal, Turkey and Mexico (Figure 7.1), where the share is around 30%. This share is notably lower than in Brazil, the only emerging country with available comparable information. About 30% of the population has completed a tertiary education programme in OECD countries, but tertiary educational attainment varies widely across countries, ranging between half of the population in Canada to around 10% of the population in Turkey (Figure 7.2).

With the exception of Denmark, where the share of the population with at least an upper-secondary degree has decreased in the last ten years, the average educational attainment has increased in all other OECD and non-OECD countries included in Figure 7.1, with a significant convergence in attainment levels across countries. In general, the stronger increase in educational attainment has been observed in countries starting from a lower stock of human capital, though education continued to rise also in some countries with already high educational attainment, as for instance in the Eastern European countries.

In all countries analysed most of the increase in educational attainment level can be attributed to an increasing number of tertiary graduates, while the number of upper-secondary graduates has remained broadly stable. In the past ten years the increase in the number of tertiary graduates has been high in Poland and Korea (Figure 7.2). A range of factors affecting educational attainment and the policy levers bearing on it are discussed in Box 7.2.

Figure 7.1. **Population that has attained at least an upper secondary education**

Percentage of the population aged 25 to 64



Note: The first available year is 2002 for Estonia, Israel and Slovenia; and 2007 for Chile and Brazil. Due to a change of the educational attainment classification, data before and after 2005 are not comparable for Norway. Starting from 2002, data on educational attainment below upper secondary school for Japan are no longer available. The OECD value is the simple average of the countries available in 2000 and 2009.

Source: OECD (2011), *Education at a Glance 2011: OECD Indicators*, Paris.

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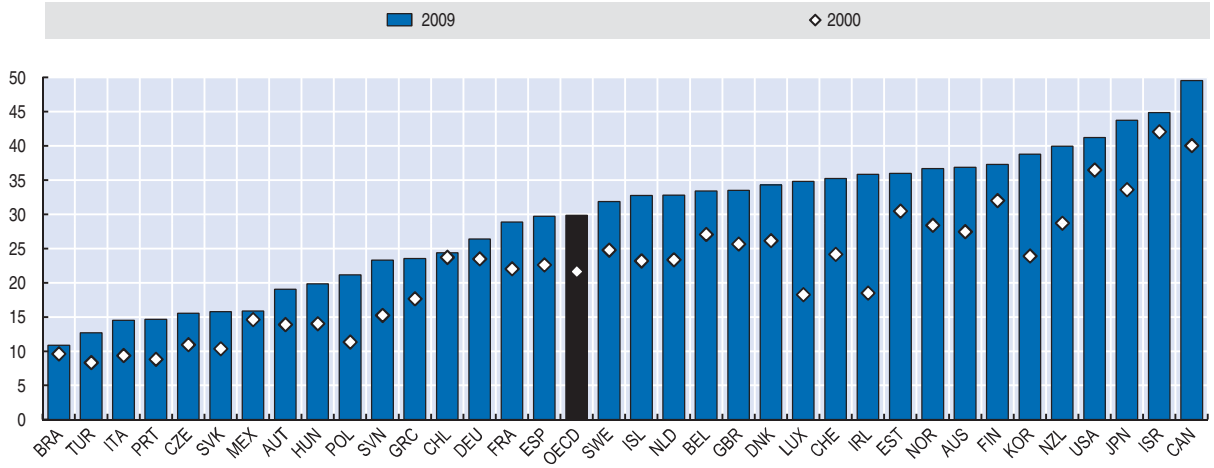
Figure 7.2. **Population that has attained a tertiary degree**

Percentage of the population aged 25-64



Note: The first available year is 2002 for Estonia, Israel and Slovenia; and 2007 for Chile and Brazil. Due to a change of educational attainment classification, data before and after 2005 are not comparable for Norway. The OECD value is the simple average of the countries available in 2000 and 2009.

Source: OECD (2011), *Education at a Glance 2011: OECD Indicators*, Paris.

StatLink http://dx.doi.org/10.1787/888932492815

Box 7.2. **Factors influencing educational attainment**

Educational attainment results from the combination of: *i)* the demand for skills, as expressed by the economy and the labour market; and *ii)* the supply of skills, which itself depends on the demand of educational qualifications by individuals and households and the supply of these qualifications by the educational system. The structure of industry and the level of economic development play an important role in the former. Trade, migration openness and labour market regulation are also important determinants of the demand for skills (OECD, 2011a). In particular, over the recent past, there have been large changes in the structure of employment by industry and occupation. Employment in agriculture and manufacturing has declined, while employment in services has grown. This has led to growth in occupations requiring higher skills.

Many factors determine the supply of education and skills. These include expected returns to education (Becker, 1967; Freeman, 1986; Heckman *et al.*, 2005); liquidity constraints and financial market failures that prevent individuals from financing their studies through borrowing; a combination of cyclical, structural and demographic effects (Card and Lemieux, 2000; Heckman *et al.*, 2005); the disutility of school versus work (Card 2001); the quality of education, as a function of both peers' ability and resources directed to enhance school quality (Hoxby 2005; Epple and Sieg, 2006); and behavioural determinants of investment in education, including higher divorce rates, implying women's increased financial responsibility for children, girls' earlier maturity, and higher level of non-cognitive skills (Goldin *et al.*, 2006). Educational attainment also depends on the characteristics of the educational system, particularly its flexibility and its effectiveness.

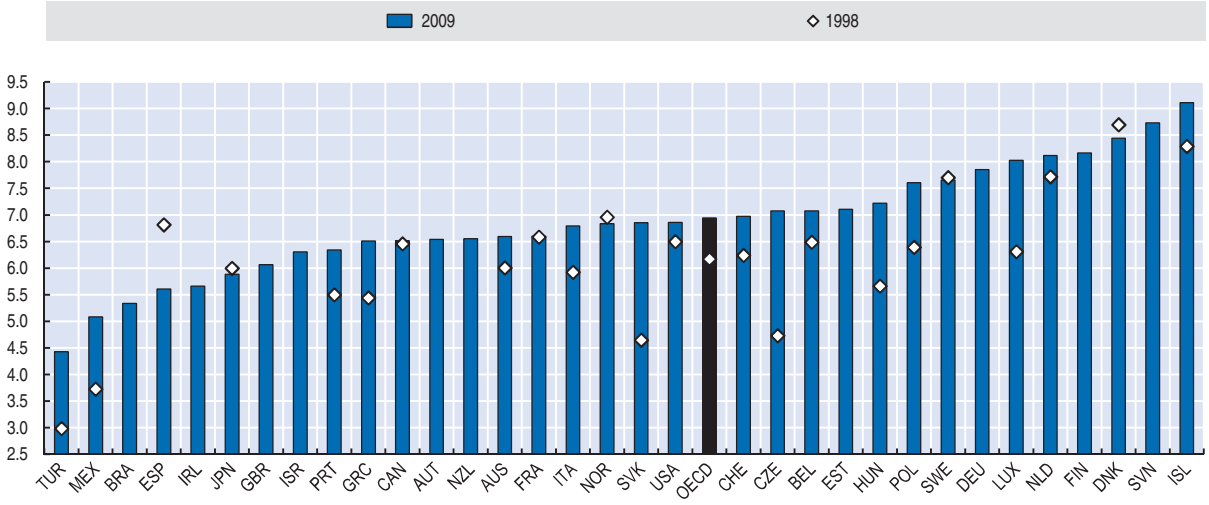
OECD estimates of the impact of the various determinants of higher educational attainment show that graduation rates increase with individual returns to education and with the flexibility and accountability of tertiary education institutions (Oliveira *et al.*, 2007). This study also found that the availability of financial help for students increases graduation rates, as do universal financing systems, as opposed to family-based financing systems. Graduation rates are also higher in countries that have a higher PISA performance and a higher share of foreign students enrolled in universities.

Most youth may expect to study for six or seven years past age 15

In most OECD countries, today's 15-year-olds expect to pursue their studies for six or seven additional years (Figure 7.3). In Slovenia, Finland, Iceland and the Netherlands, youth aged 15 expect, on average, to continue to study for eight additional years or more, but in Mexico and Turkey for only five. Countries may differ in the transition patterns from education to work and, for a given number of additional expected years of education, whether youth alternate employment with studies or instead stay in education for the entire length of their studies may make a difference. However, no strong evidence suggests that uninterrupted spells of education are better than interrupted ones. Starker, more worrisome differences exist with respect to the expected years that youth will spend in neither education nor employment: in Mexico and Italy, 35% of youth aged 15 to 24 who are not in education are either unemployed or inactive. This contrasts with a level of only 10% in the Nordic countries and the Netherlands.

Over time, educational expectancy has increased substantially in most OECD countries, in particular beyond the upper-secondary educational level. In Spain, however, education expectancy has decreased. The highest increases in education expectancy have been observed in the Czech Republic and Slovak Republic, followed by Luxembourg, Turkey and Mexico.

Figure 7.3. **Additional expected years in education at age 15**



Note: Data refer to 15-24 years old for Japan. The OECD average excludes Chile, Estonia, Israel, Japan and Slovenia. Data for 1998 are not available for Austria, Estonia, Finland, Germany, Ireland, Israel, New Zealand, Slovenia, the United Kingdom and Brazil.

Source: OECD (2011), *Education at a Glance 2011: OECD indicators*, Paris.

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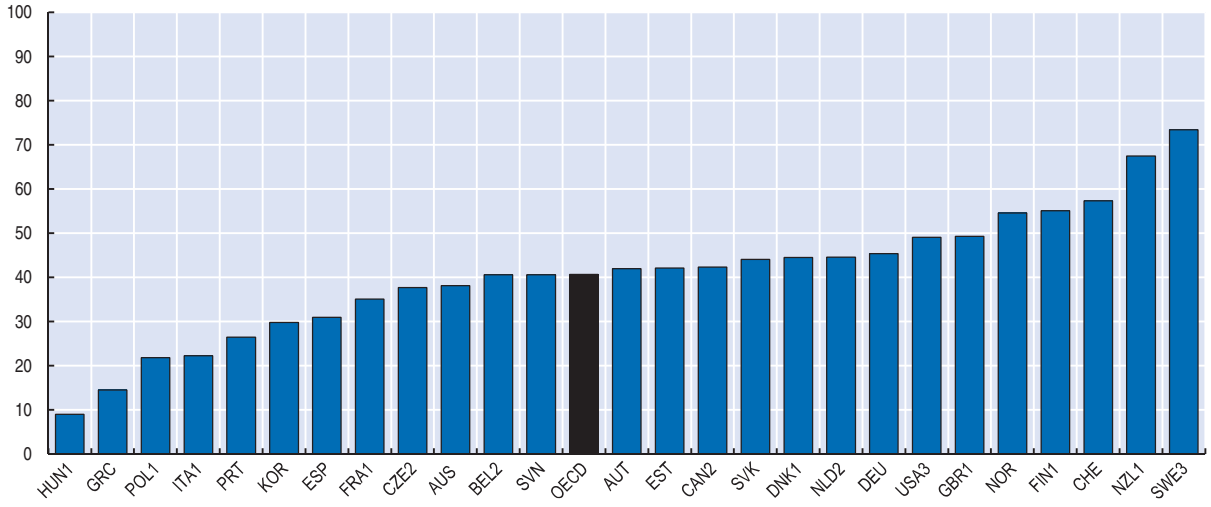
Lifelong learning

The Nordic countries and Switzerland are the countries where adults' participation in formal and non- formal education is the highest, with more than half of adults report having participated in some kind of lifelong learning activities during the year preceding the survey (Figure 7.4). Conversely, in Greece only around 10% of the population is involved in such activities. Participation in education beyond the age of schooling is, however, very much dependent on the individual's initial educational attainment, profession and industrial sector of employment, as adults with higher education and in white-collar occupations

tend to update their skills more often than adults with lower education and in blue-collar occupations. This suggests that initial differences in educational attainment tend to reinforce over time. Box 7.3 discusses good practices in setting up adult learning systems.

Figure 7.4. **Population that has participated in formal and non-formal further education**

Percentage of the population aged 25 to 64, 2007



Note: The year of reference is 2008 for countries marked with a "1", 2006 for those marked with a "2", and 2005 for those marked with a "3". Formal education includes educational programmes for adults provided by various educational institutions; non-formal education is defined as an organised and sustained educational activity that may take place both within and outside educational institutions.

Source: OECD (2010), *Education at a Glance 2010*, Paris. Data drawn from the EU Adult Education Survey for EU countries; the Multi-Purpose Household Survey (2006-2007) for Australia; the Access and Support to Education Survey (2007) for Canada; the Educational Development Institute Survey (2007) for Korea; the Adult Literacy and Life Skills Survey (2006) for New Zealand; the Swiss Labour Force Survey (2007) for Switzerland; and the National Household Education Survey (2005) for the United States.

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Box 7.3. **Good practices of lifelong learning systems**

The characteristics of adult learning systems partly explain the large differences in adult participation in formal and informal training and education highlighted by Figure 7.4. In particular, adult participation in these learning activities is highest in countries where education and training systems are more flexible, barriers to entry (*e.g.* institutional rigidities, high fees, age restrictions) are lower, where people needing a second chance or wanting to upgrade their skills have several choices in terms of entry and re-entry pathways and where the educational credentials acquired are well recognised through the accumulation and transfer of credits.

Another important determinant of adult learning at country level is the composition of the industrial and business sector, particularly in terms of firm size. The training supply is 50% lower in small and medium-size enterprises than in large firms (Martinez- Fernandez, 2008; Dalziel, 2010; Kubitz, 2011), due to a combination of lack of resources and time, red tape, lack of managerial skills and lack of customised training.

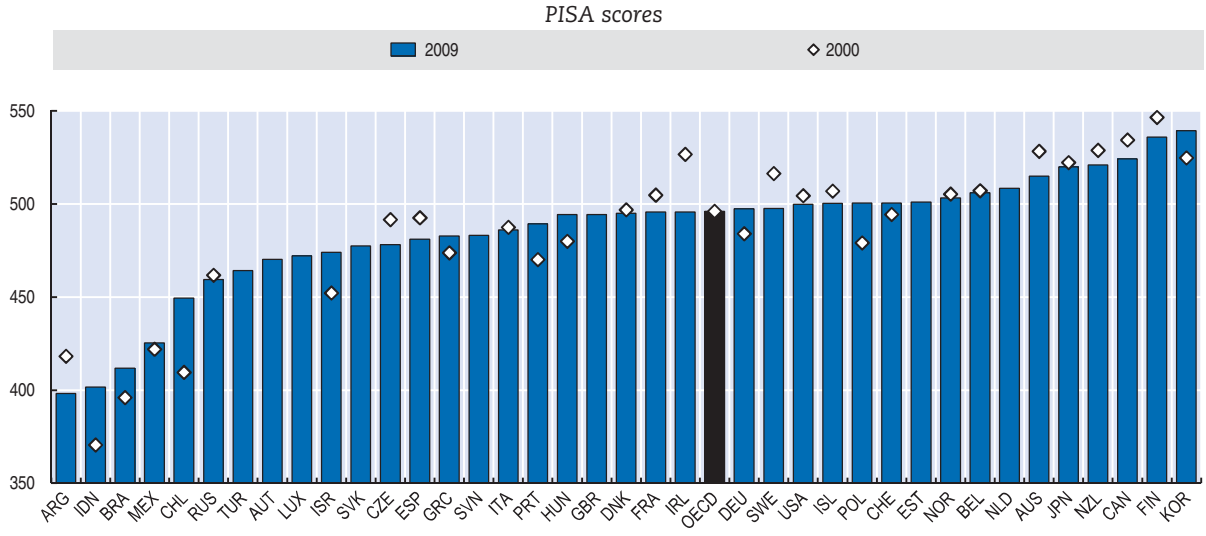
Source: OECD, 2011a.

Students' reading skills vary widely across countries

The average reading scores of 15 year-old pupils vary across countries (Figure 7.5). They are much lower than the OECD average in Mexico and Chile, as well as in other major economies, and much higher in Finland and Korea. The gap between the highest- and the lowest-performing OECD countries is 114 points on the PISA reading scale, the equivalent of the skills acquired in more than two school years. The gap between the highest- and lowest-performing emerging countries is even larger, at 242 score points, which is equivalent to more than five years of formal schooling. In many countries, including Mexico, Chile and Turkey, the highest reading proficiency achieved by most students was Level 2.[5] By contrast, 16% of students attained at least Level 5 in New Zealand, twice as high as the OECD average. Countries with similar levels of GDP per capita achieve very different results on this measure, with the correlation between GDP per capita and PISA reading performance predicting only 6% of the differences in average PISA scores across countries (OECD, 2010d). The determinants of reading skills are discussed more broadly in Box 7.4.

When looking at changes since 2000, Chile, Israel, Poland and Portugal recorded the largest improvements, while Ireland and Sweden experienced the biggest declines. These trends have led to a small fall in cross-country differences in student reading scores (OECD, 2010e). In emerging countries, reading scores are generally lower than in OECD countries, but have risen significantly in some of them, such as Brazil and Indonesia. In many countries, improvements in scores were largely driven by gains at the bottom end of the distribution of reading skills, suggesting greater equity in learning outcomes. The share of top performers (*i.e.* pupils attaining reading proficiency of 5 or 6) increased in Japan and Korea; these countries are now among the countries with the highest proportion of high-achieving students from all the countries participating in the 2009 assesment. New Zealand and Finland still have higher proportions of top performing students than Japan and Korea, but the share has declined in the former. Several countries that had a high share of top-performers in 2000, such as Ireland, recorded a fall.

Figure 7.5. **Reading skills of 15-year-old students**



Note: PISA scores are measured on a scale which is normalised to be 500 for the OECD average. Data for 2000 are not available for Austria, Estonia, Luxembourg, the Netherlands, the Slovak Republic, Slovenia, Turkey and the United Kingdom.

Source: OECD (2010), *PISA 2009 at a Glance*, OECD, Paris

StatLink http://dx.doi.org/10.1787/888932492872

Box 7.4. **Determinants of students' reading skills**

There is a large body of research on the determinants of learning outcomes as measured by PISA or other survey results (Fuchs and Woessmann, 2007; and Woessmann *et al.*, 2007, for a review). This research suggests that the main determinants of these learning outcomes are: *i)* pupils' socio-demographic characteristics; *ii)* pupils' learning strategies and attitudes to learning; *iii)* school policies and other features of the educational systems; and *iv)* characteristics of the countries, including their economies.

Family background generally has a strong, positive effect on student performance in all countries. The school system further reinforces this effect, through peer-selection and concentration of the best teachers in the best schools (OECD, 2010f). Pupils' learning strategies and attitudes towards learning also impact on learning outcomes, as students who know how to summarise large amounts of information and to make sense of what they have read tend to perform better on PISA scores (OECD, 2010g). In addition, students who enjoy reading and who are used to reading a variety of material tend to display higher reading skills.

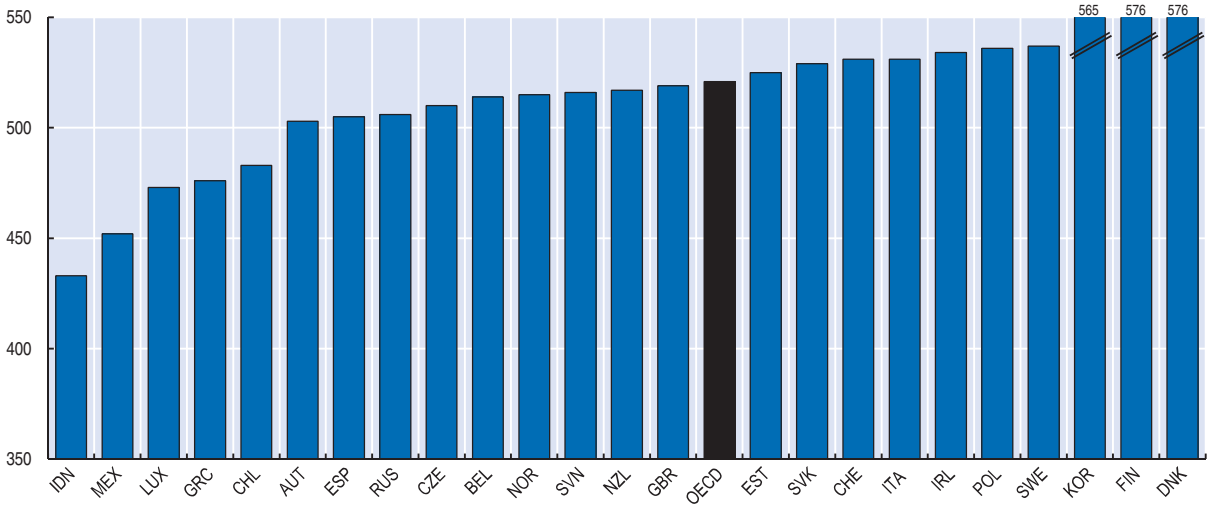
Although generally less important than family background, features of the school system – both institutional characteristics such as accountability and autonomy as well as resource endowments – also matter for students performance. Many studies suggests that student outcomes respond to the incentives that schools have when the system is designed to be performance-oriented (Fuchs and Woessmann, 2007; OECD, 2007 and 2010h; Woesmann *et al.*, 2007; Boarini and Luedemann, 2009). Some studies also suggest that, in developed countries, the overall level of educational spending as well as the pupil/teacher ratio have no clear impact on student outcomes, with the exception of pupils from a difficult socio-economic background and pupils in the very early stage of education for whom resources do matter (Piketty and Valdenaire, 2006; Gufstafsson, 2003; OECD, 2004). By contrast, higher teachers' wages are associated with higher reading skills at the country level (Boarini and Luedemann, 2009; OECD, 2010h). Finally, factors such as the level of economic development and the existing stock of human capital influence pupils' cognitive skills, though this influence is weak (OECD, 2010d).

Students' civic skills

Civic competencies of 15 year-olds are highest in Korea, Finland and Denmark and lowest in Mexico, Luxembourg and Greece (Figure 7.6). Pupils in emerging countries show very uneven levels of civic knowledge, with relatively low levels in Indonesia and the Russian Federation. On average, across the countries analysed by the International Civic and Citizen Education Study (ICCS), 16% of 15 year-old students do not possess even basic civic proficiency (*i.e.* pupils have no knowledge of fundamental civic principles and do not even have a working knowledge of the operation of civic, civil and political institutions). Based on a special module of the ICCS survey (called Civic Education Study, CIVED), which was fielded for the first time in 1999, the civic content knowledge of students seems to have decreased on average in the 15 countries covered by both ICCS and CIVED. The average civic content knowledge has increased in Slovenia and fallen in Norway, Greece, Poland and the Slovak and Czech Republics.

Figure 7.6. **Civic competencies of students in selected countries**

Scores in civic knowledge, 2009



Note: Data are normalised to the ICCS average of 500. Data for Denmark, Switzerland, New Zealand, Norway, Belgium and the Czech Republic met guidelines for sampling participation rates only after schools that refused to participate in the study were replaced by others. Data for the United Kingdom nearly satisfied guidelines for sample participation only after replacement schools were included. Data for the United Kingdom refer to England only; data for Belgium refer to the Flemish region only.

Source: International Civic and Citizen Education Study, 2011

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Indicators of education and skills are well correlated across countries

Almost all indicators analysed in this chapter are correlated with each other (Table 7.2), though this correlation is not perfect. This suggests that it is important to consider them all when assessing patterns of education and skills. In particular:

- Adult educational attainment is well correlated with reading skills, education expectancy and civic competencies.
- Reading skills are well correlated with civic competencies and educational attainment and correlated to a lesser extent with education expectancy.
- Education expectancy is well correlated with educational attainment, reading skills and civic competencies.
- Civic competencies are strongly correlated with reading skills and well correlated with educational attainment and education expectancy.

Table 7.2. **Correlation between different indicators of education and skills**

		ES I Educational attainment		es 1 Education expectancy		ES II Lifelong learning		es 2 Students'cognitive skills		es 3 Civic skills	
ES I	Educational attainment	1	(35)	0.58***	(33)	0.37	(27)	0.52***	(35)	0.50**	(23)
es 1	Education expectancy			1	(34)	0.18	(26)	0.44***	(34)	0.50**	(21)
es 2	Lifelong learning					1	(27)	0.28	(27)	0.26	(19)
ES II	Students'cognitive skills							1	(39)	0.84***	(25)
es 3	Civic skills									1	(25)

Note: Values in parenthesis refer to the number of observations. ** Indicates that correlations are significant at the 5% level; *** indicates that they are significant at the 1% level.

Source: OECD's calculations.

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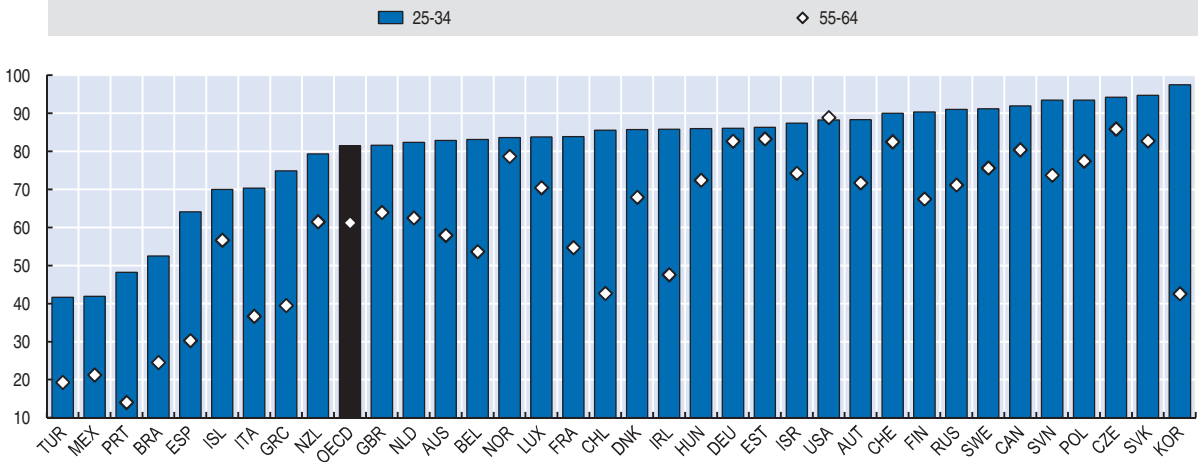
Inequalities

Youth are more educated than the elderly

Educational attainment differs substantially across groups of the population. In particular, younger generations are more educated than older ones (Figure 7.7). For instance, in Portugal the number of people with at least an upper-secondary degree is three times higher in the age group 25-34 than among the 55-64 years old. Korea, Turkey, Mexico, Spain, Chile and Brazil also have much higher shares of young graduates, confirming the fast catch-up of these countries with respect to their stock of human capital only a few decades ago.

Figure 7.7. **Population that has attained at least an upper-secondary degree by age**

Percentage of various age groups, 2009



Note: Data for the Russian Federation refer to 2002. Data exclude the ISCED 3C short programmes.
Source: OECD (2011), *Education at a Glance 2011: OECD Indicators*, Paris.

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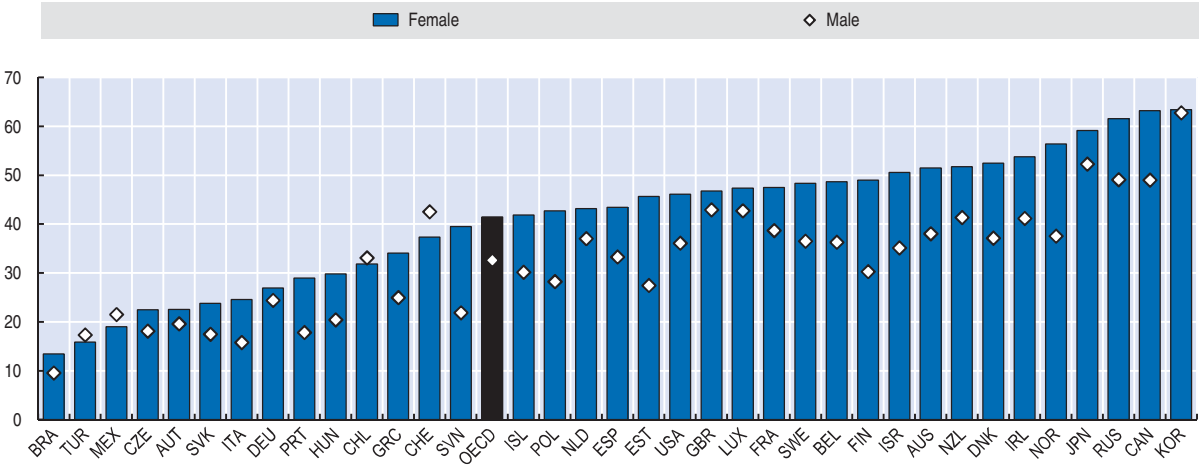
Among the young generations female graduates outnumber male graduates

A relatively recent trend in OECD countries is that women are achieving higher degrees than men are (Figure 7.8). On average there are more young women with a tertiary or upper-secondary degree than men, particularly so in Portugal, Spain, Iceland, Italy and Greece. There are more tertiary or upper-secondary educated men only in Switzerland, Austria and Turkey. In all countries for which information is available, women's educational attainment has increased significantly over the past 30 years: educational attainment of women has been multiplied by 9 in Korea and by more than 3 in Spain, Portugal and Mexico (OECD, 2011b). If these recent trends continue over the next two decades, women graduates will outnumber men graduates of all ages in most OECD countries.

Figure 7.8. **Population that has attained at least an upper secondary degree by gender**

Percentage of population aged 25 to 34, 2009



Note: Data for the Russian Federation refer to 2002.
Source: OECD (2011), *Education at a Glance 2011: OECD Indicators*, Paris.

StatLink http://dx.doi.org/10.1787/888932492929

Educational attainment also varies markedly between the native population and the foreign-born (OECD, 2010i). In Portugal, Ireland and Hungary, the number of tertiary graduates is higher among foreign-born than natives. In most other OECD countries, the shares of tertiary graduates among the foreign-born and native populations are comparable, with the exception of the United States where the native population are more educated than the foreign-born.

Individual educational attainment is also strongly related to parents' socio-economic background. Even though primary and secondary education is a universal right in many OECD countries, and in two-thirds of these countries tertiary education fees are low, the completion of higher education depends strongly on family income. This influence is very large in South European countries and in Luxembourg (Causa and Johansson, 2010). More generally, the correlation between parents' earnings and children's earnings attributable to educational attainment is very high in Italy, the United States and the United Kingdom and quite low in Nordic countries (D'Addio, 2007).

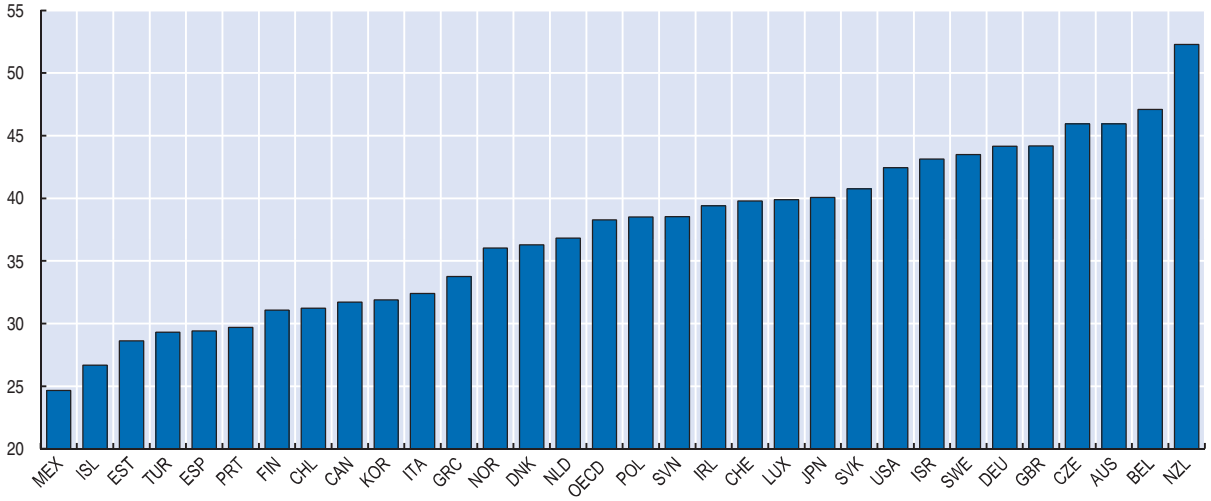
Reading skills are high among pupils from advantaged social-backgrounds, girls and native pupils

Educational outcomes, as measured by the cognitive skills of 15-year-olds, vary greatly for most countries, especially France, Luxembourg and United States (OECD 2010f). In Turkey, Chile and Estonia, by contrast, the skills of students are relatively homogenous. Skills inequalities can be decomposed into within-schools and between-schools differences. Most OECD countries present higher within-school variance than between-school variance (*i.e.* relatively homogeneous school performance across the country but strong variation across the students of the same school). Between-schools variation is however quite high in Turkey, Italy and Israel, indicating social stratification across schools (*i.e.* the concentration of students with the same socio-economic background in similar types of schools).

In general, the best-performing school systems manage to provide high-quality education to all students. Indeed, Canada, Finland, Japan and Korea perform well above the OECD mean performance and students tend to perform well regardless of their own background or the school they attend. These countries not only have large proportions of students performing at the highest levels of reading proficiency, but also relatively few students at the lower proficiency levels. Countries where the impact of socio-economic background on reading skills is high include New Zealand, France, Austria and Hungary (Figure 7.9).[6] Like reading skills, civic competencies too are strongly influenced by socio-economic background.

Figure 7.9. **The impact of socio-economic background on students' reading skills**

Point difference in the PISA reading-score associated with one unit increase in the PISA index of economic, social and cultural status, 2009



Source: OECD (2010), *PISA 2009 Results: Overcoming Social Background. Equity in Learning Opportunities and Outcomes. Volume II*, Paris.

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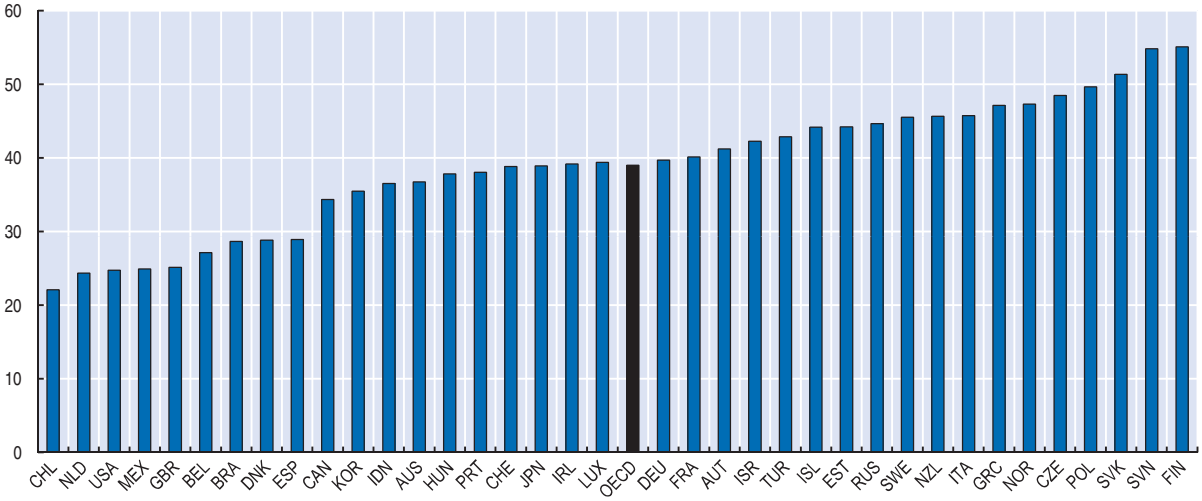
Girls outperformed boys in reading skills in all the countries participating in PISA 2009 (Figure 7.10), especially in Finland and Slovenia. Among OECD countries, the reading gap amounts to 39 score points, equivalent to more than half a proficiency level or one year of schooling. The gender gap did not narrow in any country between 2000 and 2009, while it widened in Israel, Korea, Portugal, France and Sweden. Factors such as predisposition, temperament, peer pressure and socialisation may contribute to boys having less interest

in reading than girls. PISA results suggest that boys would catch up with girls in reading performance if they had higher levels of motivation and used more effective learning strategies.

Figure 7.10. **Gender differences in reading skills**

Point difference in PISA reading score, girls minus boys



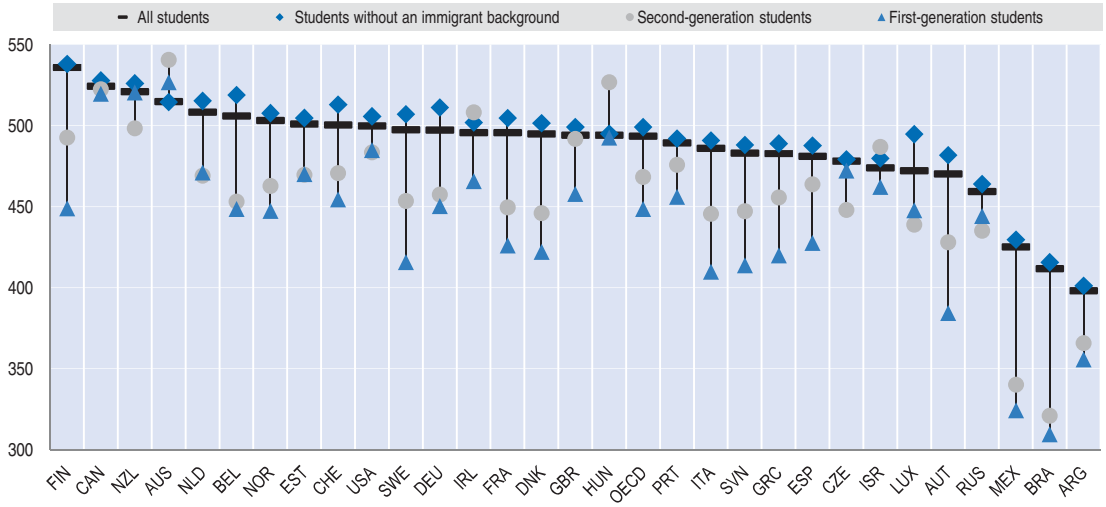
Source: OECD (2010), *PISA 2009 Results: What Students Know and Can Do. Student performance in reading, mathematics and science*, Paris

StatLink http://dx.doi.org/10.1787/888932492967

The competencies of 15-year-old students also depend on the origin of the pupil and on the language spoken at home (Figure 7.11). First-generation students – those who were born outside the country of assessment and who have foreign-born parents score on average 52 points below students without an immigrant background. There is no positive association between the size of the immigrant student population and average performance at the country level, and there is also no relationship between the population of students with an immigrant background and the performance gap between native and immigrant students. Thus high levels of immigration do not lead to lower mean performance. Speaking a foreign language in the family is also a penalising factor for reading skills.

Figure 7.11. **The impact of immigration on reading skills**

PISA scores in reading



Source: OECD (2010), *PISA 2009 Results: Overcoming Social Background. Equity in Learning Opportunities and Outcomes. Volume II*, Paris.

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The statistical agenda ahead

As discussed in this chapter, some effort is required to extend the coverage of existing international assessment surveys to groups of the population other than the youth. This is notably the objective of the OECD Programme for the International Assessment of Adult Competencies (PIAAC), which was field-tested in 2010 and whose first results will be published in 2013. PIAAC will interview adults aged 15-65 years (5 000 per country) and assess their literacy and numeracy skills, as well as their ability to solve problems in technology-rich environments. This survey will also collect additional information on how skills are used at work and in other contexts such as at home and in community life.

While PIAAC expands the range of skills measured with respect to previous similar surveys, its first edition will not assess non-cognitive skills, such as social and personality skills. Personality skills can be defined as "relatively enduring patterns of thoughts, feelings and behaviours that reflect the tendency to respond in certain ways under certain circumstances" (Roberts, 2009). Personality skills are usually grouped under the "big five factors": openness to experience, conscientiousness, extraversion, agreeableness and neuroticism. Research shows that these factors are key to several important outcomes, such as individual labour market performance, health status and the propensity to commit crimes. While there are many existing national surveys that collect information on the "big five" factors (*e.g.* the German longitudinal survey SOEP), internationally comparable instruments are almost non-existent. The OECD is developing a project on Education and Social Progress which will aim, inter alia, at measuring personality skills through a common harmonised questionnaire. This exploratory work will be used to investigate the links between skills and measures of social progress (Box 7.5).

Box 7.5 **The OECD Project on Education and Social Progress**

The Education and Social Progress (ESP) project focuses on the role that individual's *cognitive and non-cognitive skills* play in fostering social progress in OECD countries. The project also looks at the role of *learning contexts*, such as family, school and community, in shaping these skills. The focus on skills is inspired by recent interdisciplinary research, which demonstrates that investment in skills is one of the most efficient ways to reduce educational, economic and social inequalities (*e.g.* Cunha and Heckman, 2008).

The project focuses on the following cognitive and non-cognitive skills: *cognitive ability*, which can be described as the mental capacity to acquire knowledge through thought, experience and the senses; and *personality traits*, which can be identified as "relatively enduring patterns of thoughts, feelings and behaviours that reflect the tendency to respond in certain ways under certain circumstance" (Roberts, 2009).

The project will investigate a variety of social progress measures as outcomes of skills, including *health* (*e.g.* health-related lifestyles and outcomes); *societal engagement* (*e.g.* civic and political participation); *family cohesion* (*e.g.* teenage pregnancy); *subjective well-being* (*e.g.* life satisfaction, happiness); *trust and tolerance* (*e.g.* interpersonal trust, tolerance); *public safety* (*e.g.* crime, bullying); and *the environment* (*e.g.* ecological behaviour).

It will be equally important to develop internationally comparable measures of skills and cognitive development of very young children, as the school-readiness of young children is a strong predictor of future learning outcomes, but also of adult health and other important social outcomes.[7] Interesting examples of such measures exist in Canada and Australia (Box 7.6).

Box 7.6. **Measuring childhood early development: The Canadian Early Development Instrument and the Australian Early Development Index**

The Canadian Early Development Instrument (EDI) provides an outcome measure of children's early development. It measures children's readiness to learn in the school environment in five general domains identified as relevant by research: physical health and well-being; social competence; emotional maturity; language and cognitive development; and communication skills and general knowledge in relation to developmental benchmarks rather than curriculum-based ones. The Early Development Instrument can be applied at either junior or senior kindergarten level, *i.e.* on either 4 or 5-year olds. A teacher completed the questionnaire based on her/his observations after several months of classroom/school interaction with the child.

The instrument provides information about groups of children in order to: *i)* report on areas of strength and deficit for populations of children; *ii)* monitor populations of children over time; and *iii)* predict how children will do in elementary school. The EDI was developed by the Offord Centre for Child Studies, McMaster University, Canada, and has now been completed on over 520 000 Canadian children. It is largely based on the National Longitudinal Survey of Children and Youth (NLSCY) and other existing developmental tests.

The Australian Early Development Index (AEDI) is a population measure of young children's development. Like the EDI, it provides information on the following five aspects of early childhood development: physical health and wellbeing; social competence; emotional maturity; language and cognitive skills (school-based); and communication skills and general knowledge.

The AEDI is based on the Canadian EDI and has been adapted for use in Australia. The AEDI was first trialed in 2002-2003 and then piloted in 60 communities across Australia between 2004 and 2008. The first national implementation was carried out in 2009, and in 2010 follow-up data collection occurred in some small areas.

Other important future actions to develop further educational statistics and improve their quality include (UNESCO, 2011):

- Ensuring consistency in definitions and standards in collecting and compiling international education statistics, in particular with respect to human capital – understood as the skills used in the labour market (Box 7.7) – the inclusivity of education,[8] e-learning and early childhood education.
- Linking education data to other datasets to get a fuller picture of education pathways and transitions.
- Exploring the potential role of administrative data in supplementing survey data (using administrative data may reduce the burden of survey producers and provide additional information to be matched to longitudinal datasets on education).
- Developing better statistics on education outcomes of students, along with their determinants. While the OECD Assessment of Higher Education Learning Outcomes (AHELO) will assess learning outcomes of higher education students and the value-added of university, it will be important to develop instruments to determine the value-added of schools. In particular, there is a strong need to better measure teachers' skills, motivation and teaching strategies, extending the scope of studies such as the OECD Teaching and Learning International Survey (TALIS).
- Finally, developing satellite accounts for the education sector would be important to better understand the role played by education in economic growth. This would in particular help in the study of the productivity of the education sector and how educational services influence the material well-being of households.

Box 7.7. **The OECD Project on measuring the stock of human capital**

The purpose of the OECD human capital project is to identify common methodologies for measuring the stock of human capital for comparative analysis, both across countries and over time, and to implement these methodologies using OECD data. Estimates of the stock of human capital will notably help to assess the sustainability of current well-being over time. The method employed in this project is the lifetime income approach (Jorgenson and Fraumeni, 1989; Jorgenson and Fraumeni, 1992a; Jorgenson and Fraumeni, 1992b) that measures the value of the total stock of human capital embodied in individuals as the total discounted present value of the expected future incomes that could be generated over the lifetime of the people currently living.

Selected findings for the first phase of the project include:

- The estimated value of human capital is substantially larger than that of traditional physical capital by a factor ranging from around eight to over ten across the participating countries. These results are broadly in line with those reported in a number of national studies.

- The distributions of human capital by age, gender and education indicate that men have a higher stock of human capital than women. In addition, younger people have greater human capital than older people, although the detailed patterns vary across countries.
- Decomposition analysis demonstrates that in the past fifteen years or so, the observed increase in women's educational attainment has had little effect on the change in human capital per capita for all countries; population ageing has contributed negatively to the change in human capital per capita. The sensitivity analysis shows that estimates of the value of human capital depend on the choices of two parameters, *i.e.* the annual real income growth rate and the discount rate. But the within-country distribution of human capital and the trend in the human capital volume index in each country are less sensitive to these parameters.

Despite some deficiencies (such as the exclusion of the non-economic and social benefits of human capital investment, sensitivity to key exogenous parameters), the lifetime income approach, by bringing together the influence of a broad range of factors (demography, mortality, educational attainment and labour market aspects), allows comparing the relative importance of these factors and drawing useful policy implications.

Source: Liu, 2011.

Conclusion

This chapter has looked at education and skills in OECD countries and selected emerging countries. Education has increased substantially over the past decades, and countries have been converging towards a similar level of educational attainment. However, strong disparities remain in the quality of educational outcomes, as measured by reading and civic skills. Women are becoming more educated than men, reversing a historical gap. Finally, despite the free availability of school services in many countries, educational attainment and outcomes are strongly influenced by family income and socio-economic background. This suggests that special educational support should be granted to pupils with a disadvantaged economic and social background.

Notes

1. See the OECD Education and Social Progress Project (Box 7.5).
2. The INES Program provides methodological guidance on the development of internationally comparable data and indicators on education systems. The INES program has also contributed to assist in the revisions of the International Standard Classification of Education (ISCED), which is used for comparing educational attainment across countries.
3. The Adult Education Survey (AES) uses an extensive list of possible non-formal educational activities, including courses, private lessons and guided on-the-job training, to prompt respondents to list all of their learning activities in the previous 12 months. Some of these learning activities might be of short duration.
4. More precisely, the indicator covers the following domains: civic society and systems (40%), civic principles (30%), civic participation (20%) and civic identities (10%); and two cognitive domains: knowing (25%) and reasoning and analysing (75%).
5. PISA 2009 provides an overall reading literacy scale for reading texts, drawing on all the questions in the reading assessment. The metric for the overall reading scale is based on the mean for the OECD countries, set at 500 in PISA 2000, with a standard deviation of 100. To help interpret what

students' scores mean in substantive terms, the scale is divided into levels, based on a set of statistical principles. Tasks are located within each level of proficiency and describe the kinds of skills and knowledge needed to complete them successfully, For PISA 2009, the range of task difficulty allows for the description of seven levels of reading proficiency (level 1a, 1b, 2, 3, 4, 5, 6). At level 2, students can locate one or more pieces of information in a text, recognise the main idea in the text, understand relationships, or infer meaning from a limited part of the text when the information is not prominent. Reflective tasks at this level require readers to make a comparison or several connections between the text and outside knowledge by drawing on personal experiences and attitudes.

6. In all countries covered by the ICCS, students whose parents worked in higher-status occupations reported higher civic knowledge scores. On average, the gap in civic scores between students with parents in the top six occupational status categories and students in the bottom six categories was 87 scale points, the equivalent of two standard deviations of the civic skills score. However, there are considerable differences among countries, with some countries having a more even distribution of achievement with regard to socio-economic background than others. Differences in the civic knowledge scores were also large between students from native families and those with an immigrant background, but this effect becomes smaller when the family background is controlled for. Students reporting that their parents were more interested in political and social issues display high civic skills. In most countries, this association is evident even after controlling for the effects of other student characteristics.

7. Existing indicators of early educational attainment may not be equally relevant for assessing young children's well-being, as there is ambiguous evidence on the impact of pre-school participation on children's later development (OECD, 2009a).

8. See the "Education for all" initiatives by the World Bank and UNESCO (http://www.unesco.org/education/efa/ed_for_all).

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