

Education at a Glance 2011

OECD INDICATORS



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FOREWORD

Governments are paying increasing attention to international comparisons as they search for effective policies that enhance individuals' social and economic prospects, provide incentives for greater efficiency in schooling, and help to mobilise resources to meet rising demands. As part of its response, the OECD Directorate for Education devotes a major effort to the development and analysis of the quantitative, internationally comparable indicators that it publishes annually in *Education at a Glance*. These indicators enable educational policy makers and practitioners alike to see their education systems in the light of other countries' performances and, together with OECD's country policy reviews, are designed to support and review the efforts that governments are making towards policy reform.

Education at a Glance addresses the needs of a range of users, from governments seeking to learn policy lessons to academics requiring data for further analysis to the general public wanting to monitor how its nation's schools are progressing in producing world-class students. The publication examines the quality of learning outcomes, the policy levers and contextual factors that shape these outcomes, and the broader private and social returns that accrue to investments in education.

Education at a Glance is the product of a long-standing, collaborative effort between OECD governments, the experts and institutions working within the framework of the OECD's Indicators of Education Systems (INES) programme and the OECD Secretariat. The publication was prepared by the Indicators and Analysis Division of the OECD Directorate for Education with input from the Centre for Educational Research and Innovation, under the responsibility of Andreas Schleicher, in co-operation with Etienne Albiser, Eric Charbonnier, Pedro Lenin Garcia de Léon, Bo Hansson, Corinne Heckmann, Estelle Herbaut, Karinne Logez, Koji Miyamoto and Jean Yip. Administrative support was provided by Sandrine Meireles and Rebecca Tessier, editing of the report was undertaken by Marilyn Achiron and additional advice as well as analytical and editorial support were provided by Marika Boiron, Ji Eun Chung, Anaïs Dubreucq-Le Bouffant, Maciej Jakubowski, Manal Quota, Giannina Rech and Elisabeth Villoutreix. Production of the report was co-ordinated by Corinne Heckmann and Elisabeth Villoutreix. The development of the publication was steered by member countries through the INES Working Party and facilitated by the INES Networks. The members of the various bodies as well as the individual experts who have contributed to this publication and to OECD INES more generally are listed at the end of the book.

While much progress has been accomplished in recent years, member countries and the OECD continue to strive to strengthen the link between policy needs and the best available internationally comparable data. In doing so, various challenges and trade-offs are faced. First, the indicators need to respond to educational issues that are high on national policy agendas, and where the international comparative perspective can offer important added value to what can be accomplished through national analysis and evaluation. Second, while the indicators need to be as comparable as possible, they also need to be as country-specific as is necessary to allow for historical, systemic and cultural differences between countries. Third, the indicators need to be presented in as straightforward a manner as possible, while remaining sufficiently complex to reflect multi-faceted educational realities. Fourth, there is a general desire to keep the indicator set as small as possible, but it needs to be large enough to be useful to policy makers across countries that face different educational challenges.

The OECD will continue to address these challenges vigorously and to pursue not just the development of indicators in areas where it is feasible and promising to develop data, but also to advance in areas where a considerable investment still needs to be made in conceptual work. The further development of the OECD Programme for International Student Assessment (PISA) and its extension through the OECD Programme for the International Assessment of Adult Competencies (PIAAC), as well as OECD's Teaching and Learning International Survey (TALIS) are major efforts to this end.

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This book has...



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EDITORIAL

Fifty years of change in education

Since its early days, the OECD has emphasised the role of education and human capital in driving economic and social development; and in the half century since its founding, the pool of human capital in its member countries has developed dramatically. Access to education has expanded to the extent that the majority of people in OECD countries is now enrolled in education beyond basic, compulsory schooling. At the same time, countries have transformed the ways they look at educational outcomes, moving beyond a simplistic “more is better” perspective that simply measures investment and participation in education to one that encompasses the quality of the competencies that students ultimately acquire. In an increasingly global economy, in which the benchmark for educational success is no longer improvement by national standards alone, but the best performing education systems internationally, the role of the OECD has become central, providing indicators of educational performance that not only evaluate but also help shape public policy.

Growth in educational attainment from the 1950s to the 2000s

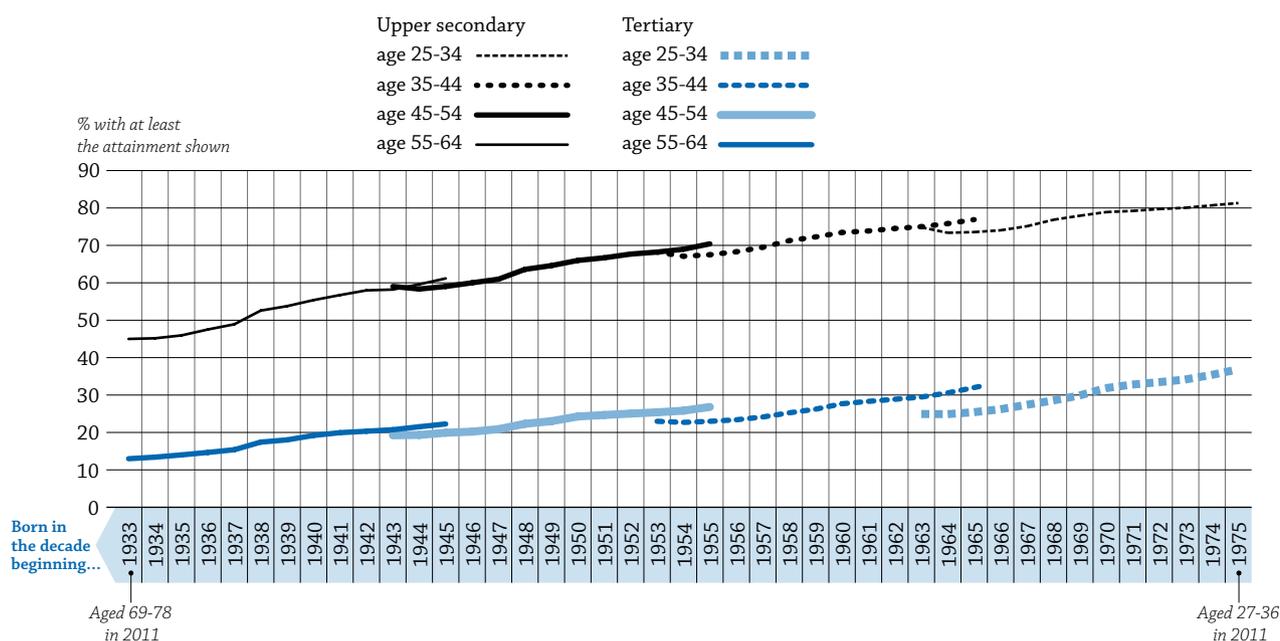
During the past 50 years, the expansion of education has contributed to a fundamental transformation of societies in OECD countries. In 1961, higher education was the privilege of the few, and even upper secondary education was denied to the majority of young people in many countries. Today, the great majority of the population completes secondary education, one in three young adults has a tertiary degree and, in some countries, half of the population could soon hold a tertiary degree.

It hasn't always been possible to quantify such changes over time: for most of the past half-century, a lack of consistent data made it virtually impossible to track the pace of change. Data on educational attainment was not sufficiently standardised until the 1990s. However, age-based attainment levels can be used to estimate how many people earned education qualifications over their lifetimes. For example, the number of people aged 55-64 who have a degree is a proxy for the number of people who graduated three or four decades ago. This method somewhat overestimates the qualification rates among older compared to younger groups of people, because it measures the attainment of the latter group after those individuals have had a chance to acquire qualifications later in life. However, now that consistent attainment data have been around for over a decade, we can also chart this “lifelong learning” effect by comparing the qualifications held by the same cohort at different times during their lives.

Chart 1 offers a broad estimate based on this method. It provides information on qualifications held by adults born as far apart as 1933 (now aged 78) and 1984 (now aged 27). The oldest among them completed their initial education in the 1950s, the youngest in the 2000s. These data show clearly that the rise in attainment both at upper secondary and tertiary levels has not only been large but it has been continuous over the entire half-century, spurred by strong and generally rising economic and social outcomes for the better qualified. Among the 34 OECD countries, most of those in which college enrolment expanded the most over the past decades still see rising earnings differentials for college graduates, suggesting that an increase in the supply of highly educated workers does not lead to a decrease in their pay, as is the case among low-skilled workers.

On average across OECD countries, the proportion of people with at least an upper secondary education has risen from 45% to 81%, and the proportion of those with tertiary qualifications has risen from 13% to 37%. The chart suggests that about 7% of the cohort now aged 35-44 have gained tertiary qualifications that they did not have at age of 25-34, and that 4% of individuals have these qualifications at age 45-54 but did not have them at age 35-44. If people now aged 25-34, 37% of whom already have tertiary qualifications, make similar progress in the next two decades, half of this cohort could have tertiary qualifications by the time they reach their middle age.

Chart 1. Educational attainment, by age and birth cohort (OECD average)



Source: OECD. See Annex 3 for notes (www.oecd.org/edu/eag2011).
 StatLink <http://dx.doi.org/10.1787/888932478964>

How to read this chart

This chart shows the percentage of adults born during a certain time period who have attained a given level of attainment by a particular age – based on reported attainment between 1997 and 2009. Each year shown represents an age cohort in a ten-year period starting with that year: for example 1933 represents people born from 1933 to 1942, inclusive. As a result, the age cohorts shown for successive starting years overlap.

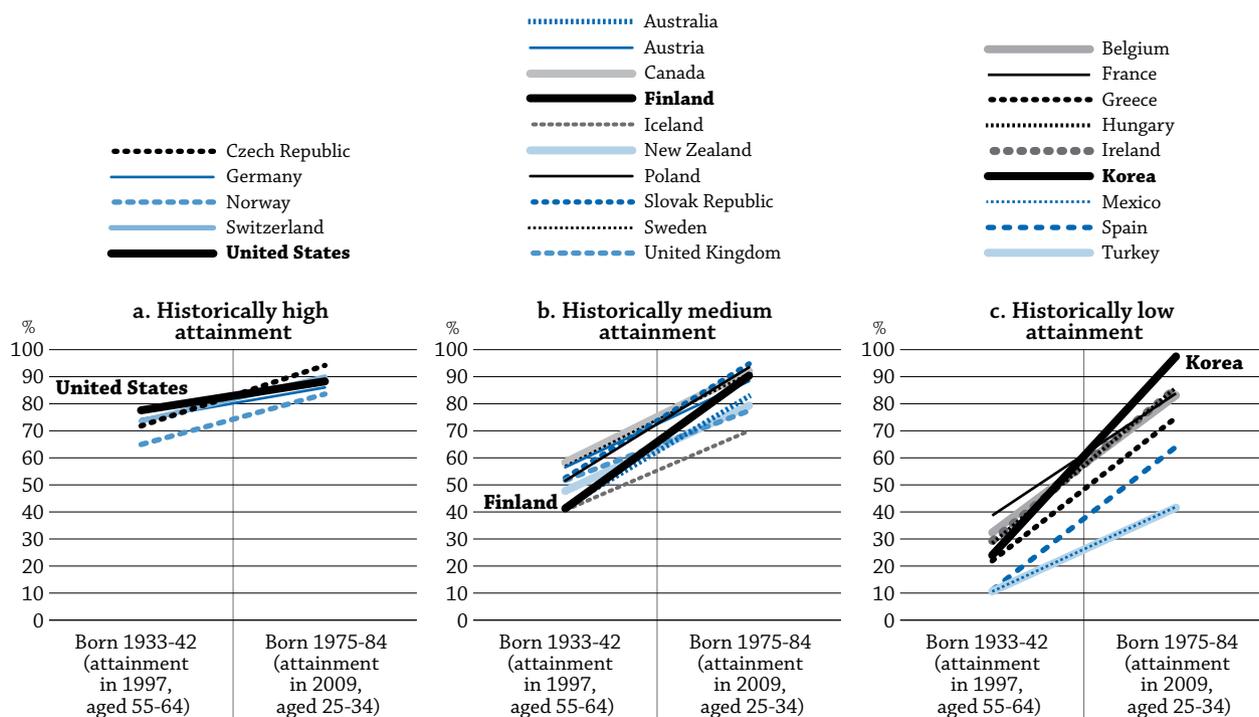
The chart shows that cohorts born in later years have progressively higher levels of attainment, regardless of the age at which this is measured. Measuring attainment at a later age allows for the acquisition of qualifications later in life. However, in most cases where the same cohort reports attainment at different ages (i.e. where the lines overlap), the result is similar. The greatest apparent increase is shown on the bottom right of the chart, for the cohort born in the decade starting in 1965 (now aged 37-46). Of this cohort, 25% reported having a tertiary education in 1999 when they were 25-34, but 32% had this level of education in 2009, when they were ten years older.

(Note, however, that these results do not measure the educational progress of cohorts precisely, because the composition of the age groups changed due to migration and mortality.)

These data also tell us that rates of educational expansion have varied greatly among countries over recent decades. Charts 2 and 3 show the attainment rates for the oldest and youngest cohorts of those shown in Chart 1, by individual countries. Chart 2 shows a general increase in upper secondary education, with those countries that had low attainment levels “catching up” with those that had higher levels of attainment. Now, at least 80% of young adults in all OECD countries complete an upper secondary education. Within this general pattern, the United States has seen only a small improvement, having started out from the highest high-school completion rate, while Finland and Korea transformed themselves from countries where only a minority of students graduated from secondary school to those where virtually all students do.

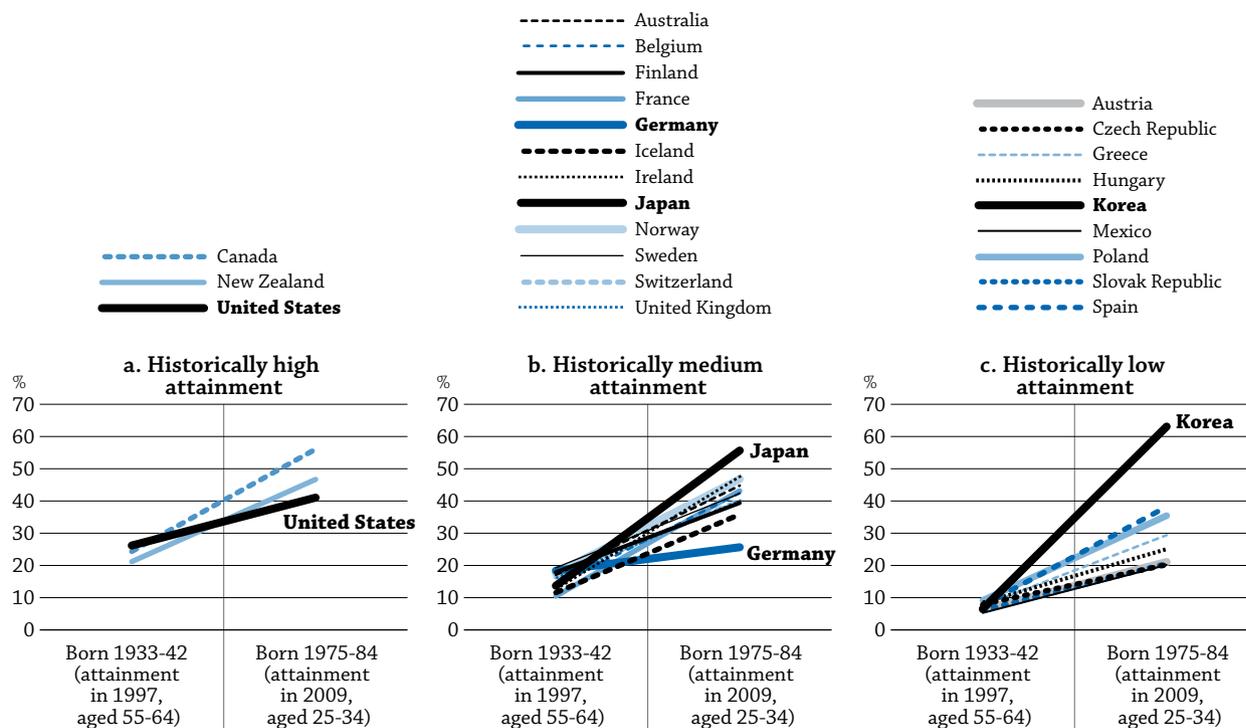
Attainment at the tertiary level varies more by country (Chart 3). The growth rate has been relatively slow in the United States, for example, where attainment was originally relatively high, and in Germany, which had lower levels of attainment. In contrast, Japan and Korea have made higher education dramatically more accessible. In both countries, among the cohort who were of graduation age in the late 1950s and early 1960s (born 1933-42), only about one in ten had tertiary qualifications by late in their working lives. Among younger Japanese and Koreans, who reached graduation age around the turn of the millennium, most now have tertiary degrees. On this measure, Korea has moved from the 21st to the first rank among 25 OECD countries with comparable data.

Chart 2. Progress in attainment of upper secondary education over half a century, by country



Source: OECD. See Annex 3 for notes (www.oecd.org/edu/eag2011).
 StatLink <http://dx.doi.org/10.1787/888932478983>

Chart 3. Progress in attainment of tertiary education over half a century, by country



Source: OECD. See Annex 3 for notes (www.oecd.org/edu/eag2011).
 StatLink <http://dx.doi.org/10.1787/888932479002>

Half a century ago, employers in the United States and Canada recruited their workforce from a pool of young adults, most of whom had high school diplomas and one in four of whom had degrees – far more than in most European and Asian countries. Today, while North American graduation rates have increased, those of some other countries have done so much faster, to the extent that the United States now shows just over the average proportion of tertiary-level graduates at age 25-34. In Europe, Germany stands out as the country that has made the least progress: it has a population of tertiary graduates only around half the size, relative to its total population, of many of its neighbours’.

The OECD and education: An evolving narrative of human capital

From its inception, the OECD has stressed the importance of human competencies for economic and social development. At the new organisation’s Policy Conference on Economic Growth and Investment in Education, held in Washington, DC in 1961, emerging theories of human capital then being developed by Gary Becker, Theodore Schultz and others were brought centre-stage in the international dialogue. Hard evidence to substantiate these theories did not emerge, however, until the 1980s, with the work on endogenous growth theories by economists such as Paul Romer, Robert Lucas and Robert Barro. They formulated and tested models measuring positive associations between growth at the national level and crude indicators of human capital, especially educational attainment.

The fact that these measured associations remained weak did not surprise analysts of educational outcomes. The level of education that an adult has completed may be a proxy for the competencies that contribute to economic success, but it is a highly imperfect measure. First, each country has its own different processes and standards for accrediting completion of secondary or tertiary education. Second, the knowledge and skills acquired in education are by no means identical to those that enhance economic potential. And third, it has become increasingly evident that to realise human potential in today’s societies and economies, lifelong learning is required, not just an initial period of formal schooling.

Once the association between education and development was made, countries were keen to better understand the nature of education outcomes and to compare them internationally. From the 1970s onwards, the OECD has been in the vanguard of those promoting lifelong learning as a paradigm. More recently, it has formulated broad interpretations of what comprises human capital and the related concept of social capital. It has also developed a comprehensive framework for defining and selecting necessary competencies.

The development of indicators has been central to this process of improved understanding about the outcomes of education, and to the ability of countries to learn from each other about what works. By the mid-1980s, it was evident that the lack of internationally comparable education data was greatly hindering the ability to make valid comparisons or to develop policy conclusions from the experiences of countries with successful education systems. This was a time when national governments were starting to ask themselves new questions about the direction and outcomes of their education systems. The idea that simply getting more people through high school or university was an end in itself was being challenged. Issues of quality and value-for-money arose during periods of shrinking public budgets, when early international tests were starting to show markedly different levels of performance between students in different countries.

These concerns contributed to the 1988 launch of OECD’s Indicators of Education Systems (INES) project – a major effort, managed through a series of OECD networks of national experts, to produce reliable international indicators on a broad range of educational topics. Initially, INES involved standardising existing data on the resources, organisation and participation rates of education systems to make them internationally comparable. Its more ambitious objective of producing new, internationally comparable measures of educational performance was realised more gradually.

The first indicators to emerge from INES were internationally standardised measures of participation in education, such as students enrolled at different levels of education, graduation rates and resources invested per student. But it was only when more direct measures of educational outcomes were developed, which involved testing students and adults, that the effectiveness of investment in education and educational processes could start to be evaluated.

The International Adult Literacy Survey (IALS) in the mid-1990s showed that although adults who have attained higher levels of education have, on average, greater levels of literacy, those with a given level of educational attainment have very different ranges of literacy skills from one country to another. This showed that direct measures of human capital could produce different results from proxy measures based on people's educational experiences and qualifications. Subsequently, IALS was analysed to consider the economic effect of countries' stock of human capital, and identified a substantially stronger relationship between measured literacy levels and economic growth than previous studies had found (Coulombe, *et al.*, *Literacy scores, human capital and growth across fourteen OECD countries*, Statistics Canada, 2004). This confirmed that the effectiveness of education systems should not just be considered in terms of the rate at which they award qualifications, but could be related to the acquisition of measurable competencies.

But it is the OECD's Programme for International Student Assessment (PISA) survey, which tests young people's acquisition of knowledge and skills for life, that is the most powerful and extensive tool for considering educational outcomes and transforming public policy. The triennial PISA surveys, which began in 2000, have shown large differences between what students know and can do in different countries as they near the end of compulsory education.

One of the most common ways of comparing educational quality before PISA existed, spending per student, is shown to be positively associated with outcomes, but explains only about a quarter of the differences among countries. PISA results show that no single aspect of the educational process provides the key to success; but a combination of a range of policies and practices measured in PISA can jointly account for 80% of the variation in school performance among countries. Such findings, combined with existing research in education, have begun to shape policy development. Indeed, the world of education has moved a long way from 1961, when the standards guiding education policy relied principally on national beliefs, based only on precedent and tradition, about what constituted a good education.

Indicators as a catalyst for change

As the quality of international indicators improves, so does their potential for influencing the development of education systems. At one level, indicators are no more than a metric for gauging progress towards goals. Yet increasingly, they are performing a more influential role. Indicators can prompt change by raising national concern over weak educational outcomes compared to international benchmarks; sometimes, they can even encourage stronger countries to consolidate their positions. When indicators build a profile of high-performing education systems, they can also inform the design of improvements for weaker systems.

The "shock" effect of international comparisons on educational reform is nothing new. Reforms in the United States following the publication of *A Nation at Risk* in 1983 were partly triggered by evidence from international tests showing that American students were lagging behind. However, while such early international comparisons acted as a "wake-up call", they offered few clues about solutions, and reforms were designed mainly against national analyses of what was wrong with the education system. In contrast, when PISA published its first results in 2001 showing that German students were performing below the OECD average, the initial shock in Germany was swiftly followed by an outward-looking response: a determination to emulate successful practices that work elsewhere. The education system was reviewed in light of internationally comparable data, internationally benchmarked national standards were introduced, and evidence-based practices were emphasised.

More systematic analysis suggests that the uses and impact of the OECD's education indicators are varied:

- By showing what is possible in education, the indicators have helped countries not just to optimise existing policies but also to reflect on what lies behind them. This involves questioning, and sometimes changing, the paradigms and beliefs that underlie current policies.
- The indicators have helped countries to set policy targets as measurable goals achieved by other systems, identify policy levers and establish trajectories for reform.
- Using the indicators as a reference, countries can better gauge the pace of progress in education and review how education is delivered at the classroom level. The indicators show that while educational reform may be politically difficult to initiate, the benefits almost inevitably accrue to successive governments if not generations.

Opening eyes and minds to new possibilities

Indicators have a particularly powerful impact when they contradict the self-perception of a national education system, and therefore challenge the beliefs and assumptions that guide it. The impact of the PISA survey in Germany was strong not just because the country's initial performance in the survey was below average, but also because those results prompted a rethink of the assumption that the system produced socially equitable outcomes (Box 1). Governments in a number of countries have used PISA results showing their relative standing internationally as a starting point for a peer review to study the policies and practices of countries in similar circumstances that achieve better results.

Box 1. Germany rethinks its assumptions about education and social equity

Before PISA, equity in learning opportunities across schools in Germany had often been taken for granted, as significant efforts were devoted to ensuring that schools were adequately and equitably resourced. The PISA 2000 results, however, revealed large socio-economic disparities in educational outcomes between schools. Further analysis linked this in large part to the tendency for students from more privileged social backgrounds to attend more prestigious academic schools and those from less privileged social backgrounds to attend less prestigious vocational schools, even when their performance on the PISA assessment was similar. This raised concern that the education system was reinforcing rather than moderating the influence of socio-economic background on student performance. These results, and the ensuing public debate, inspired a wide range of equity-related reform efforts in Germany, some of which have been transformational in nature. These include: giving an educational orientation to early childhood education, which had hitherto been considered largely an aspect of social welfare; establishing national educational standards in a country where regional and local autonomy had long been the overriding paradigm; and enhancing support for disadvantaged students, such as students from immigrant backgrounds.

For many educators and experts in Germany, the socio-economic disparities that PISA had revealed had not been surprising. That disadvantaged children would do less well in school was often taken for granted and outside the scope of public policy discussions. The fact that PISA revealed that the influence of socio-economic background on students and school performance varies so considerably across countries, and that other countries appeared to moderate socio-economic disparities so much more effectively, showed that improvement was possible and provided the momentum for policy change.

As international benchmarks, such as PISA, are disseminated more widely, the debate about improving education moves from a circle of specialised experts to a larger public. Indicators make international comparisons both accessible and powerful. As students will now compete in a global economy, people realise that their country's educational performance must exceed average levels if their children are to earn above-average wages later on.

Putting national targets into a broader perspective

The OECD education indicators have also played an important role in putting national performance targets into perspective. If the percentage of students who perform well in school increases, some will claim that the school system has improved; others will claim that standards must have been lowered. Behind the suspicion that better results reflect lowered standards is often a belief that overall performance in education cannot be improved. International benchmarks enable countries to relate those perceptions to a wider reference framework by allowing schools and education systems to look at themselves through the prism of the performance of schools and education systems in other countries. Some countries have actively embraced this perspective and, for example, established PISA-based performance targets for their education systems.

Assessing the pace of change in educational improvement

International comparisons also provide a frame of reference to assess the pace of change in educational development. While a national framework allows countries to assess progress in features such as expanded

participation in absolute terms, the OECD's education indicators have allowed countries to assess whether that progress matches the pace of change observed elsewhere. Indeed, as noted earlier, all education systems in the OECD area have seen quantitative growth in attainment over past decades; but international comparisons reveal that the pace of change in educational output has varied markedly, such that the relative standing of countries on many indicators is now very different from that two decades ago.

Helping to make reform happen

Last but not least, international benchmarks can help make reform happen. At its most straightforward, this can take the form of creating a public clamour for improved standards that politicians and administrators cannot ignore. However, the pressure to improve systems does not always come via public opinion. In Mexico, the PISA results contradicted the view of parents that the education system was serving their children well, by showing how far standards lag behind OECD norms (Box 2). In Japan, PISA has shown weaknesses in a generally strong system, and thus helped justify to parents and the public why the existing style of education in Japan needs to be adapted (Box 3).

Box 2. Mexican reform based on PISA benchmarks

In the 2007 Mexican national survey of parents, 77% of those interviewed reported that the quality of education services provided by their children's school was good or very good even though, measured by OECD's PISA 2006 assessment, roughly half of the Mexican 15-year-olds who were then enrolled in school performed at or below the lowest level of proficiency established by PISA (IFIE-ALDUCIN, 2007; OECD, 2007a). There may be many reasons for such a discrepancy between perceived educational quality and performance on international benchmarks. For example, the education services that Mexican children receive are significantly better than those that their parents received. Still, justifying the investment of public resources into areas for which there seems no public demand poses challenges to reform. One response by the Mexican President has been to include a "PISA performance target" in the new Mexican reform plan. This internationally benchmarked performance target, which is to be reached by 2012, will highlight the gap between national performance and international standards and monitor how educational improvement can help close that gap. It is associated with the introduction of support systems, incentive structures and improved access to professional development to assist school leaders and teachers in meeting the target. Much of the reform draws on the experience of other countries. Brazil has taken a similar route, providing each secondary school with information on the amount of progress that is needed to perform at the OECD average level on PISA by 2021.

Box 3. Japan adapts assessment style to mirror PISA

Japan is one of the best-performing education systems. However, PISA revealed that while students tended to do very well on tasks that require reproducing subject content, they did much less well on open-ended tasks requiring them to demonstrate their capacity to extrapolate from what they know and apply their knowledge in novel settings. Convincing parents and a general public who are used to certain types of tests is difficult. One policy response in Japan has been to incorporate "PISA-type" open-constructed tasks into the national assessment, coupled with corresponding changes in curriculum and instructional practices. The aim of doing so is to ensure that skills that are considered important become valued in the education system. And indeed, a decade later, PISA outcomes in these areas had improved markedly. Like Japan, Korea has made PISA tasks part of national assessments, incorporating them into university entrance examinations, in order to build the capacity of its students to access, manage, integrate and evaluate written material. In both countries, these are fundamental changes that would have been much harder to imagine, much less achieve, without evidence from PISA.

Unfinished business

The OECD education indicators and related analyses cannot provide a blueprint for educational reform: the OECD's analysis is always careful not to imply that any one factor associated with strong performance can provide the single key to improvement. However, as the evidence base grows, the combination of factors indicative of strong education systems is becoming clearer. More fundamentally, the emergence of international standards has stopped education from being delivered in largely "closed" national systems. International indicators have made education systems more outward-looking. Moreover, as countries compete to excel in a knowledge-oriented global economy, international benchmarks allow them to track the evolution of the level of skills and knowledge of their own populations compared to those of their competitors.

As a result, the past 50 years have brought a fundamental transformation, not just in the level of educational activity but in how educational outcomes are monitored. The size of the investment in education is now too big, and its benefits too central to the success of economies and societies, for the design of effective education systems to take place in the dark. With economic competition now global, countries can no longer afford to measure their education systems against national standards. The OECD has recognised from the outset that education plays a central role in economic development; today, the Organisation is better equipped than ever to both track and support that role.



Angel Gurría
OECD Secretary-General

Further references

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INTRODUCTION: THE INDICATORS AND THEIR FRAMEWORK

■ The organising framework

Education at a Glance: OECD Indicators 2011 offers a rich, comparable and up-to-date array of indicators that reflect a consensus among professionals on how to measure the current state of education internationally. The indicators provide information on the human and financial resources invested in education, on how education and learning systems operate and evolve, and on the returns to educational investments. The indicators are organised thematically, and each is accompanied by information on the policy context and the interpretation of the data. The education indicators are presented within an organising framework that:

- distinguishes between the actors in education systems: individual learners and teachers, instructional settings and learning environments, educational service providers, and the education system as a whole;
- groups the indicators according to whether they speak to learning outcomes for individuals or countries, policy levers or circumstances that shape these outcomes, or to antecedents or constraints that set policy choices into context; and
- identifies the policy issues to which the indicators relate, with three major categories distinguishing between the quality of educational outcomes and educational provision, issues of equity in educational outcomes and educational opportunities, and the adequacy and effectiveness of resource management.

The following matrix describes the first two dimensions:

	1. Education and learning outputs and outcomes	2. Policy levers and contexts shaping educational outcomes	3. Antecedents or constraints that contextualise policy
I. Individual participants in education and learning	1.I. The quality and distribution of individual educational outcomes	2.I. Individual attitudes, engagement, and behaviour to teaching and learning	3.I. Background characteristics of the individual learners and teachers
II. Instructional settings	1.II. The quality of instructional delivery	2.II. Pedagogy, learning practices and classroom climate	3.II. Student learning conditions and teacher working conditions
III. Providers of educational services	1.III. The output of educational institutions and institutional performance	2.III. School environment and organisation	3.III. Characteristics of the service providers and their communities
IV. The education system as a whole	1.IV. The overall performance of the education system	2.IV. System-wide institutional settings, resource allocations, and policies	3.IV. The national educational, social, economic, and demographic contexts

The following sections discuss the matrix dimensions in more detail:

■ **Actors in education systems**

The OECD Indicators of Education Systems (INES) programme seeks to gauge the performance of national education systems as a whole, rather than to compare individual institutional or other sub-national entities. However, there is increasing recognition that many important features of the development, functioning and impact of education systems can only be assessed through an understanding of learning outcomes and their relationships to inputs and processes at the level of individuals and institutions. To account for this, the indicator framework distinguishes between a macro level, two meso-levels and a micro-level of education systems. These relate to:

- the education system as a whole;
- the educational institutions and providers of educational services;
- the instructional setting and the learning environment within the institutions; and
- the individual participants in education and learning.

To some extent, these levels correspond to the entities from which data are being collected but their importance mainly centres on the fact that many features of the education system play out quite differently at different levels of the system, which needs to be taken into account when interpreting the indicators. For example, at the level of students within a classroom, the relationship between student achievement and class size may be negative, if students in small classes benefit from improved contact with teachers. At the class or school level, however, students are often intentionally grouped such that weaker or disadvantaged students are placed in smaller classes so that they receive more individual attention. At the school level, therefore, the observed relationship between class size and student achievement is often positive (suggesting that students in larger classes perform better than students in smaller classes). At higher aggregated levels of education systems, the relationship between student achievement and class size is further confounded, e.g. by the socio-economic intake of schools or by factors relating to the learning culture in different countries. Past analyses which have relied on macro-level data alone have therefore sometimes led to misleading conclusions.

■ **Outcomes, policy levers and antecedents**

The second dimension in the organising framework further groups the indicators at each of the above levels:

- indicators on observed outputs of education systems, as well as indicators related to the impact of knowledge and skills for individuals, societies and economies, are grouped under the sub-heading *output and outcomes of education and learning*;
- the sub-heading *policy levers and contexts* groups activities seeking information on the policy levers or circumstances which shape the outputs and outcomes at each level; and
- these policy levers and contexts typically have *antecedents* – factors that define or constrain policy. These are represented by the sub-heading antecedents and constraints. It should be noted that the antecedents or constraints are usually specific for a given level of the education system and that antecedents at a lower level of the system may well be policy levers at a higher level. For teachers and students in a school, for example, teacher qualifications are a given constraint while, at the level of the education system, professional development of teachers is a key policy lever.

■ **Policy issues**

Each of the resulting cells in the framework can then be used to address a variety of issues from different policy perspectives. For the purpose of this framework, policy perspectives are grouped into three classes that constitute the third dimension in the organising framework for INES:

- quality of educational outcomes and educational provision;
- equality of educational outcomes and equity in educational opportunities; and
- adequacy, effectiveness and efficiency of resource management.

In addition to the dimensions mentioned above, the time perspective as an additional dimension in the framework also allows dynamic aspects in the development of education systems to be modelled.

The indicators that are published in *Education at a Glance 2011* fit within this framework, though often they speak to more than one cell.

Most of the indicators in **Chapter A** *The output of educational institutions and the impact of learning* relate to the first column of the matrix describing outputs and outcomes of education. Even so, indicators in **Chapter A** measuring educational attainment for different generations, for instance, not only provide a measure of the output of the educational system, but also provide context for current educational policies, helping to shape policies on, for example, lifelong learning.

Chapter B *Financial and human resources invested in education* provides indicators that are either policy levers or antecedents to policy, or sometimes both. For example, expenditure per student is a key policy measure which most directly impacts on the individual learner as it acts as a constraint on the learning environment in schools and student learning conditions in the classroom.

Chapter C *Access to education, participation and progression* provides indicators that are a mixture of outcome indicators, policy levers and context indicators. Internationalisation of education and progression rates are, for instance, outcome measures to the extent that they indicate the results of policies and practices in the classroom, school and system levels. But they can also provide contexts for establishing policy by identifying areas where policy intervention is necessary to, for instance, address issues of inequity.

Chapter D *The learning environment and organisation of schools* provides indicators on instruction time, teachers' working time and teachers' salaries that not only represent policy levers which can be manipulated but also provide contexts for the quality of instruction in instructional settings and for the outcomes of learners at the individual level. This chapter also presents data on school accountability and educational equality and equity.

The reader should note that, for the first time, *Education at a Glance* covers a significant amount of data from China, India and Indonesia (please refer to the Reader's Guide for details).

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 who owns or sponsors the institutions concerned and regardless of how education is delivered. With one exception (described below), all types of students and all age groups are included: children (including students with special needs), adults, nationals, foreigners, and students in open-distance learning, in special education programmes or in educational programmes organised by ministries other than the Ministry of Education, provided that the main aim of the programme is to broaden or deepen an individual's knowledge. However, children below the age of 3 are only included if they participate in programmes that typically cater to children who are at least 3 years old. 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 the same or similar content as “regular” education studies, or that the programmes of which they are a part lead to qualifications similar to those awarded in regular educational programmes. Courses for adults that are primarily for general interest, personal enrichment, leisure or recreation are excluded (except in the indicator on adult learning, C5).

■ Country coverage

This publication features data on education from the 34 OECD member countries, two non-OECD countries that participate in the OECD Indicators of Education Systems programme (INES), namely Brazil and the Russian Federation, and the other G20 countries that do not participate in INES (Argentina, China, India, Indonesia, Saudi Arabia and South Africa). When data for these latter six countries are available, data sources are specified below the tables and charts.

The statistical data for Israel are supplied by and under the responsibility of the relevant Israeli authorities. The use of such data by the OECD is without prejudice to the status of the Golan Heights, East Jerusalem and Israeli settlements in the West Bank under the terms of international law.

■ Calculation of international means

For many indicators, an OECD average is presented; for some, an OECD total is shown.

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.

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 and 2000 data, both the OECD average and OECD total are calculated for countries providing 1995, 2000 and 2008 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 **EU21 average** is also presented. It is calculated as the unweighted mean of the data values of the 21 OECD countries that are members of the European Union for which data are available or can be estimated. These 21 countries are Austria, Belgium, the Czech Republic, Denmark, Estonia, Finland, France, Germany, Greece, Hungary, Ireland, Italy, Luxembourg, the Netherlands, Poland, Portugal, Slovenia, the Slovak Republic, Spain, Sweden and the United Kingdom.

For some indicators, a **G20 average** is presented. The G20 average is calculated as the unweighted mean of the data values of all G20 countries for which data are available or can be estimated (Argentina, Australia, Brazil, Canada, China, France, India, Indonesia, Italy, Japan, Korea, Mexico, the Netherlands, the Russian Federation, Saudi Arabia, South Africa, Spain, Turkey, the United Kingdom and the United States; the European Commission is not included in the calculation). The G20 average is not computed if the data for China or India are not available.

■ Classification of levels of education

The classification of the levels of education is based on the revised International Standard Classification of Education (ISCED 1997). The biggest change between the revised ISCED and the former ISCED (ISCED 1976) 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.

Term used in this publication	ISCED classification (and subcategories)
Pre-primary education The first stage of organised instruction designed to introduce very young children to the school atmosphere. Minimum entry age of 3.	ISCED 0
Primary education Designed to provide a sound basic education in reading, writing and mathematics and a basic understanding of some other subjects. Entry age: between 5 and 7. Duration: 6 years.	ISCED 1
Lower secondary education Completes provision of basic education, usually in a more subject-oriented way with more specialist teachers. Entry follows 6 years of primary education; duration is 3 years. In some countries, the end of this level marks the end of compulsory education.	ISCED 2 (subcategories: 2A prepares students for continuing academic education, leading to 3A; 2B has stronger vocational focus, leading to 3B; 2C offers preparation of entering workforce)
Upper secondary education Stronger subject specialisation than at lower secondary level, with teachers usually more qualified. Students typically expected to have completed 9 years of education or lower secondary schooling before entry and are generally 15 or 16 years old.	ISCED 3 (subcategories: 3A prepares students for university-level education at level 5A; 3B for entry to vocationally oriented tertiary education at level 5B; 3C prepares students for workforce or for post-secondary non-tertiary education at level ISCED 4)

<p>Post-secondary non-tertiary education Internationally, this level straddles the boundary between upper secondary and post-secondary education, even though it might be considered upper secondary or post-secondary in a national context. Programme content may not be significantly more advanced than that in upper secondary, but is not as advanced as that in tertiary programmes. Duration usually the equivalent of between 6 months and 2 years of full-time study. Students tend to be older than those enrolled in upper secondary education.</p>	<p>ISCED 4 (subcategories: 4A may prepare students for entry to tertiary education, both university level and vocationally oriented; 4B typically prepares students to enter the workforce)</p>
<p>Tertiary education</p>	<p>ISCED 5 (subcategories: 5A and 5B; see below)</p>
<p>Tertiary-type A education Largely theory-based programmes designed to provide sufficient qualifications for entry to advanced research programmes and professions with high skill requirements, such as medicine, dentistry or architecture. Duration at least 3 years full-time, though usually four or more years. These programmes are not exclusively offered at universities; and not all programmes nationally recognised as university programmes fulfil the criteria to be classified as tertiary-type A. Tertiary-type A programmes include second-degree programmes, such as the American master's degree.</p>	<p>ISCED 5A</p>
<p>Tertiary-type B education Programmes are typically shorter than those of tertiary-type A and focus on practical, technical or occupational skills for direct entry into the labour market, although some theoretical foundations may be covered in the respective programmes. They have a minimum duration of two years full-time equivalent at the tertiary level.</p>	<p>ISCED 5B</p>
<p>Advanced research programmes Programmes that lead directly to the award of an advanced research qualification, e.g. Ph.D. The theoretical duration of these programmes is 3 years, full-time, in most countries (for a cumulative total of at least seven years full-time equivalent at the tertiary level), although the actual enrolment time is typically longer. Programmes are devoted to advanced study and original research.</p>	<p>ISCED 6</p>

The glossary available at www.oecd.org/edu/eag2011 also describes these levels of education in detail, and Annex 1 shows the typical age of graduates of the main educational programmes, by ISCED level.

■ Symbols for missing data and abbreviations

These symbols and abbreviations are used in the tables and charts:

- a Data is not applicable because the category does not apply.
- c There are too few observations to provide reliable estimates (e.g. in PISA, there are fewer than 30 students or fewer than five schools with valid data). However, these statistics were included in the calculation of cross-country averages.
- m Data is not available.
- n Magnitude is either negligible or zero.
- P.A.R. Population Attributable Risk.
- R.R. Relative Risk.
- S.E. Standard Error.
- 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/eag2011 is a rich source of information on the methods used to calculate the indicators, on the interpretation of the indicators in the respective national contexts, and on the data sources involved. The website also provides access to the data underlying the indicators and to a comprehensive glossary for technical terms used in this publication.

All post-production changes to this publication are listed at www.oecd.org/edu/eag2011.

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 are based.

Education at a Glance uses the OECD's StatLinks service. Below each table and chart in *Education at a Glance 2011* is a URL that 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 throughout the publication, the Flemish Community of Belgium and the French Community of Belgium may be referred to as "Belgium (Fl.)" and "Belgium (Fr.)", respectively.

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

Chapter
A

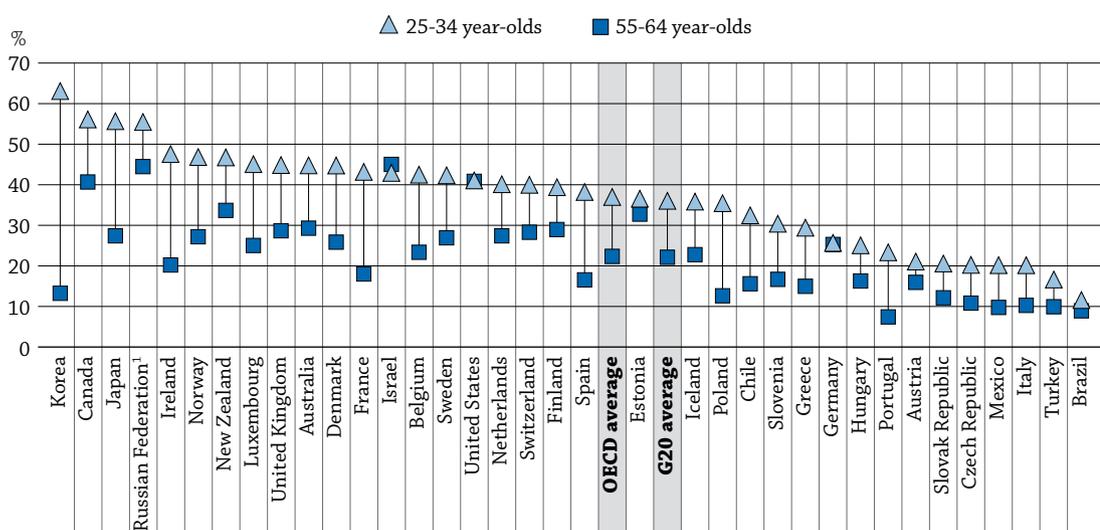
THE OUTPUT OF
EDUCATIONAL INSTITUTIONS
AND THE IMPACT OF LEARNING



TO WHAT LEVEL HAVE ADULTS STUDIED?

- In almost all countries, the proportion of 25-34 year-olds who attained tertiary levels of education is greater than that among the generation about to leave the labour market (55-64 year-olds).
- On average across OECD countries, the proportion of 25-34 year-olds with at least upper secondary education is 20 percentage points higher than that among 55-64 year-olds.

Chart A1.1. Percentage of population that has attained tertiary education, by age group (2009)



1. Year of reference 2002.

Countries are ranked in descending order of the percentage of 25-34 year-olds who have attained tertiary education.

Source: OECD, Table A1.3a. See Annex 3 for notes (www.oecd.org/edu/eag2011).

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■ Context

In this publication, different indicators show the level of education among individuals, groups and countries. Indicator A1 shows the level of attainment, i.e. the percentage of a population that has reached a certain level of education. Graduation rates in Indicators A2 and A3 measure the estimated percentage of young adults who graduate from this level of education during their lifetimes. Successful completion of upper secondary programmes in Indicator A2 estimates the proportion of students who enter a programme and complete it successfully (see Box A2.1). Educational attainment is a commonly used proxy for the stock of human capital – that is, the skills available in the population and the labour force. Following a decline in demand for manual labour and for basic cognitive skills that can be replicated by computers, recent trends show sharp increases in the demand for complex communication and advanced analytical skills. These trends generally favour a more educated labour force, and the demand for education is thus increasing at a rapid pace in many countries. While the economic crisis increased the speed of change, it is also bolstering incentives for individuals to invest in education, as worsening prospects in the labour market lower some of the costs of education, such as earnings foregone while studying.

■ Other findings

- The big change in the educational attainment of the adult population over the past decade has been at the **low and high ends of the attainment distribution**. On average across OECD countries, 27% of adults now have only primary or lower secondary levels of education, 44% have upper secondary education and 30% have a tertiary qualification.
- **Upper secondary education** has become the norm among younger people in almost all OECD countries. The change has been particularly dramatic in Chile, Greece, Ireland, Italy, Korea, Portugal and Spain, all of which have seen an increase of 30 percentage points or more between the younger (25-34 year-olds) and older (55-64 year-olds) age cohorts who have at least an upper secondary education.
- **If current tertiary attainment rates among 25-34 year-olds are maintained**, the proportion of adults in France, Ireland, Japan and Korea who have a tertiary education will grow more than that of other OECD countries, while that proportion in Austria, Brazil and Germany will fall further behind other OECD countries.
- **More than 255 million people in OECD and G20 countries with available data now have a tertiary education**. While the level of tertiary attainment in China is still low, because of the size of its population, China still holds some 12% of all tertiary graduates, compared with 11% in Japan and 26% in the USA.

■ Trends

Efforts to raise people's level of education have led to significant changes in attainment, particularly at the top and bottom ends of the spectrum. In 1998, on average across OECD countries, 37% of 25-64 year-olds had not completed upper secondary education, 42% had completed upper secondary and post-secondary non-tertiary education, and another 21% had completed tertiary education. By 2009, the proportion of adults who had not attained an upper secondary education had fallen by 10 percentage points, the proportion with a tertiary degree had risen by 9 percentage points, and the proportion with upper secondary and post-secondary non-tertiary education had increased marginally, by 2 percentage points.

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Analysis

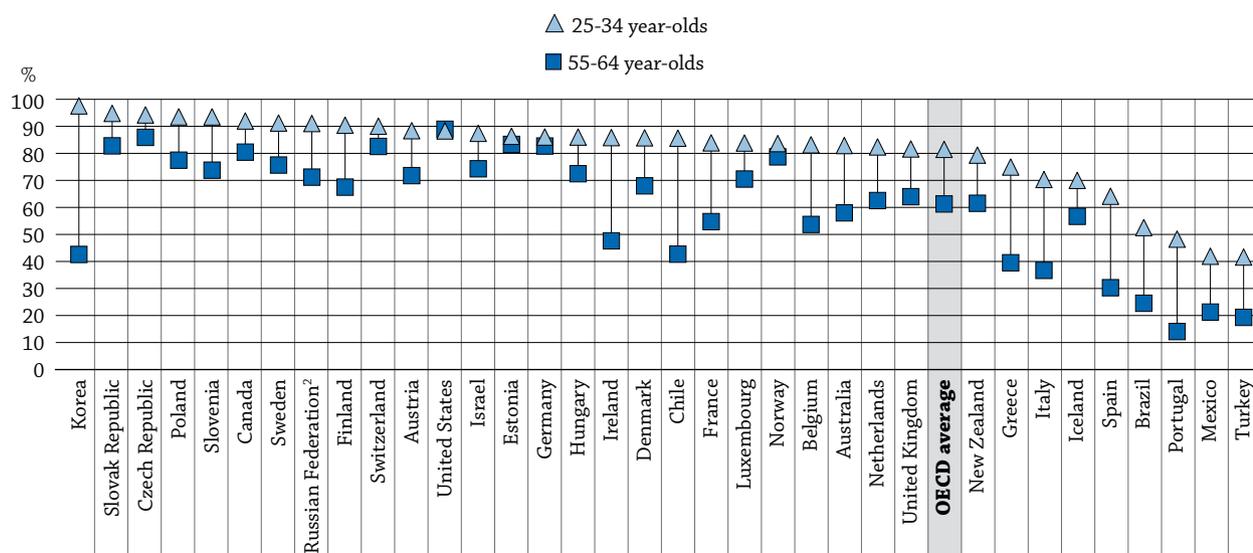
Attainment levels in OECD countries

While, in general, there have been important changes in educational attainment over the past decade, there are wide differences among countries in how educational attainment is distributed across their populations (Table A1.1a).

In 28 out of 33 OECD countries, 60% or more of 25-64 year-olds have completed at least upper secondary education. However, in Brazil, Mexico, Portugal and Turkey, more than half of that age group have not completed upper secondary education (Table A1.2a).

A comparison of educational attainment among younger (25-34 year-olds) and older (55-64 year-olds) age groups indicates marked progress in attaining an upper secondary education in most countries (Chart A1.2).

Chart A1.2. Percentage of population that has attained at least upper secondary education,¹ by age group (2009)



1. Excluding ISCED 3C short programmes.

2. Year of reference 2002.

Countries are ranked in descending order of the percentage of 25-34 year-olds who have attained at least upper secondary education.

Source: OECD. Table A1.2a. See Annex 3 for notes (www.oecd.org/edu/eag2011).

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In countries where the adult population generally has a high level of educational attainment, differences among age groups are less pronounced (Table A1.2a). In the 15 OECD countries in which 80% or more of 25-64 year-olds have at least an upper secondary education, there is an 11 percentage point difference, on average, between 25-34 year-olds and 55-64 year-olds with this level of education.

In Germany and the United States, the proportion of the population with at least an upper secondary education is almost the same for all age groups. For countries where a smaller percentage of the population has attained upper secondary education, the average gain in attainment between age groups is typically large, but differs widely. In Iceland, the difference between 25-34 year-olds and 55-64 year-olds is 13 percentage points; in Korea, the difference is 55 percentage points.

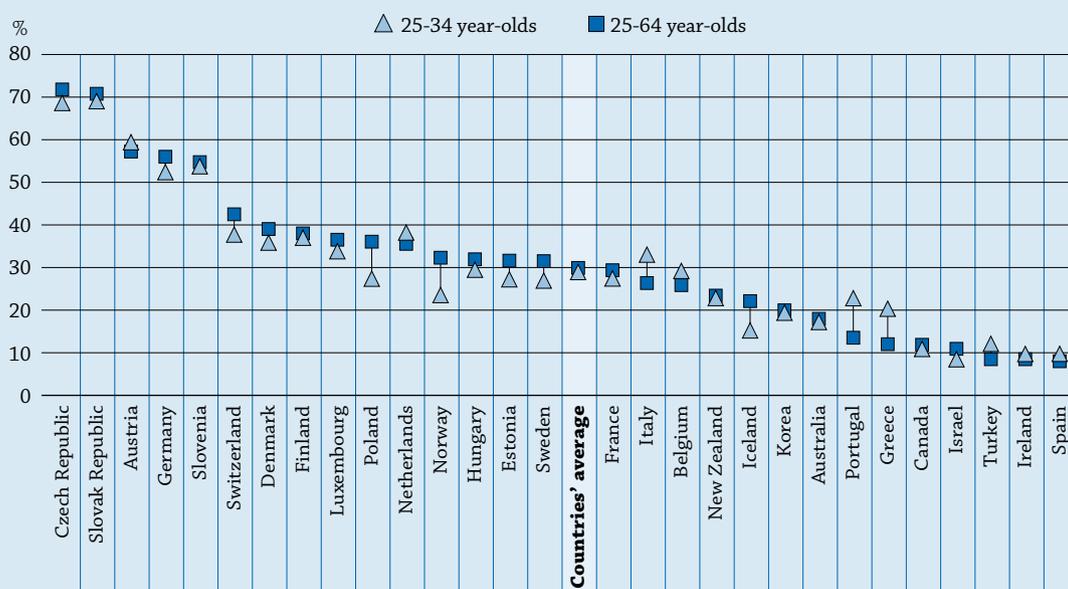
Box A1.1. Vocational education

Being able to distinguish labour market outcomes between general and vocational education can help to identify the supply of and demand for education. To this end, the OECD/INES Network on Labour Market, Economic and Social Outcomes of Learning, together with Eurostat and Cedefop, developed a pilot data-collection at upper secondary and post-secondary non-tertiary levels (ISCED 3/4) of education.

Vocational or **technical education** is defined as education that is mainly designed to offer participants the opportunity to acquire the practical skills, know-how and understanding necessary for employment in a particular occupation or trade, or class of occupations or trades. Successful completion of such programmes leads to a labour market-relevant vocational qualification recognised by the competent authorities in the country in which it is obtained (e.g. Ministry of Education, employers' associations, etc.) (ISCED-97 paragraph 59).

Some countries have used their own national codifications to distinguish between general and vocational education in this pilot, while others have used, to various degrees, aggregated fields of education to derive vocational education. Given these differences in the operational definition of vocational education, some caution is needed in interpreting the results. The chart below shows the proportion of 25-64 year-olds and 25-34 year-olds with an upper secondary vocational education (ISCED 3/4) as their highest level of education.

Percentage of 25-64 year-olds and 25-34 year-olds whose highest level of education is vocational upper secondary and post-secondary non-tertiary, ISCED 3/4 (2009)



Countries are ranked in descending order of the percentage of 25-64 year-olds whose highest level of education is vocational upper secondary and post-secondary non-tertiary, ISCED 3/4.

Source: OECD, LSO network special data collection on vocational education, Learnings and Labour Transitions Working Group, Table A7.6. See Annex 3 for notes (www.oecd.org/edu/eag2011).

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Vocational education appears to be particularly important in those countries where a large proportion of the population has an upper secondary education (ISCED 3/4). In Austria, the Czech Republic, Germany, the Slovak Republic and Slovenia, more than 50% of 25-64 year-olds have an upper secondary education (ISCED 3/4), and over 90% of them have a vocational qualification (Table A1.1a). Vocational education has increased in importance among 25-34 year-olds in Greece, Italy and Portugal, while fewer young people in Iceland, Norway and Poland have chosen a vocational upper secondary education as compared to the population as a whole (the difference exceeds five percentage points). Further analysis of this data collection is provided in Indicator A7.

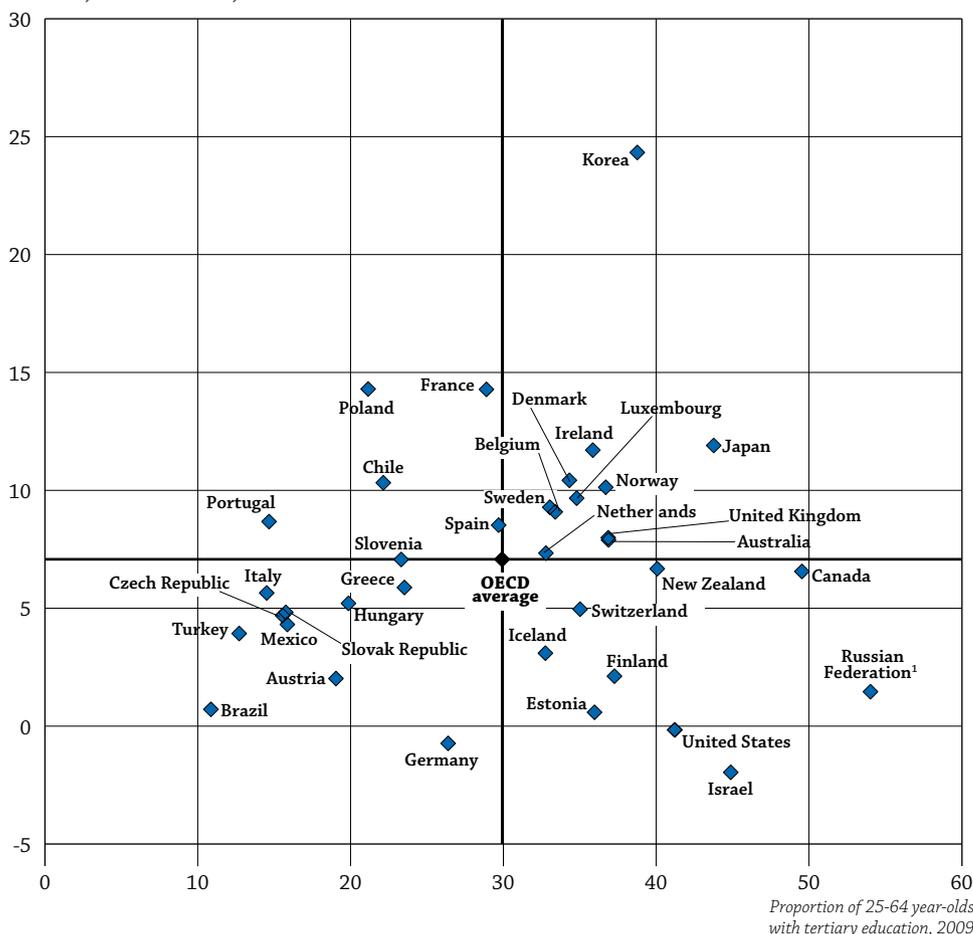
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Tertiary attainment levels have increased considerably over the past 30 years. On average across OECD countries, 37% of 25-34 year-olds have completed tertiary education, compared with 22% of 55-64 year-olds. Japan and Korea, together with Canada and the Russian Federation, have the highest proportion of young adults with a tertiary education. Over 50% of young adults in these countries have attained a tertiary education (Chart A1.1). In France, Ireland, Japan and Korea there is a difference of 25 percentage points or more between the proportion of young adults and older adults who attain this level of education (Table A1.3a).

Chart A1.3 provides an overview of the influence that tertiary education among 25-34 year-olds will have on overall tertiary attainment (25-64 year-olds) if current levels among young people are maintained.

Chart A1.3. Proportion of population with tertiary education and potential growth (2009)

Difference between the populations of 25-34 year-olds and 25-64 year-olds with tertiary education, 2009



1. Year of reference 2002.

Source: OECD, Table A1.3a. See Annex 3 for notes (www.oecd.org/edu/eag2011).

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The upper-right quadrant includes countries with already-high levels of tertiary attainment that may increase their advantage over time. France, Ireland, Japan and Korea belong to this category. The lower-right quadrant of the chart includes countries, such as Estonia, Finland, Iceland, Israel, the Russian Federation, Switzerland and the United States, that have high levels of attainment, but that will find that an increasing number of countries approach or surpass their levels of tertiary attainment in the coming years.