Trends Shaping Education 2013

Centre for Educational Research and Innovation

OECD

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Foreword

This book is designed to give policy makers, researchers, educational leaders, administrators and teachers a robust, non-specialist source of international comparative trends that have the potential to shape the future of education. Its aim is to inform strategic thinking and stimulate reflection on the challenges facing education, whether in schools, universities or in programmes for older adults. It will also be of interest to students and the wider public, including parents.

Trends Shaping Education 2013 provides an overview of key economic, social, demographic and technological trends and raises pertinent questions about their potential impact on education. This compilation makes use of a variety of robust international sources of data, including the OECD, the World Bank and the United Nations.

The first edition of this book was published in 2008, and the second in 2010. In preparation for this 2013 edition the content was significantly updated and extended to new countries, with a special emphasis on the emerging economies of Brazil, China, India, and the Russian Federation, which are included whenever the data are available. The 2013 edition also extended its coverage to new themes, and as a result a great number of completely new indicators (on security, skills, and emerging technologies) were added. The process of identifying and compiling relevant trends and data on such disparate subjects was necessarily a collaborative one, and this volume benefits enormously from the support and suggestions from the following OECD Directorates and Units: Employment, Labour, and Social Affairs; Environment, the International Transport Forum; the Local Economic and Employment Development (LEED) Programme; Science, Technology, and Industry; Statistics; and Trade and Agriculture.

The authors would also like to thank the many, many members of the Education Directorate who gave their time and expert ideas throughout the process, from the first brainstorming of "bright minds" to providing feedback and comments on specific areas of expertise to those who attended the last brainstorming on generating questions for education. We would especially like to thank those individuals who took part in all three of those steps – your time and support is very much appreciated. Lastly, we thank Dirk Van Damme, Head of CERI, for his comments on the draft.

Within the OECD Centre for Educational Research and Innovation (CERI), this publication was written by Tracey Burns and Kelly Roberts, with assistance from Anna Barnet, Elodie de Oliveira and Julie Sonnemann. Lynda Hawe, Anne-Lise Prigent, Peter Vogelpoel and Therese Walsh contributed to the final stages of preparation for publication.

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Executive Summary

What does it mean for education that our societies are becoming more diverse? What role do new technologies play in our lives, and how can they be best exploited by our schools? What skills should education provide for our increasingly knowledge-intensive societies?

This book examines major trends that are affecting the future of education and setting challenges for policy makers and education providers alike. It does not give conclusive answers: it is not an analytical report nor is it a statistical compendium, and it is certainly not a statement of OECD policy on these different developments. It is instead a stimulus for discussion about major tendencies that have the potential to influence education. While the trends are robust, the questions raised for education in this book are intended to be illustrative and suggestive. We invite users to look further and include examples of developments from their own countries or regions in their discussions.

WHAT CAN BE FOUND IN THIS PUBLICATION?

This resource contains 35 subjects each illustrated by two figures on specific trends. The material is organised in five main chapters focusing on globalisation, well-being and lifestyle, skills and the labour market, modern families, and new technologies. In each section a series of questions are posed linking the trend to education, from the level of early childhood education and care through to tertiary education and lifelong learning. While all the trends included are relevant to education, not all relevant trends are in this resource – it is necessarily highly selective. As well as relevance for education, the criterion for selecting trends was the availability of internationally comparable, long-term evidence. The diversity of the topics covered means that in some cases the trends are charted over a short decade; in others, longer-term trends are available. The trends that cover the shortest amount of time look at emerging trends in new technologies.

The focus is primarily on OECD countries and emerging economies identified as a priority for OECD work: Brazil, China, India, and the Russian Federation. Where they are available, broader global data are used that include, for example, Indonesia and South Africa. The recent global financial crisis is largely outside the scope of this book, given our focus on trends over a longer time frame. We refer, however, to the crisis when it is likely to have had an impact on particular figures under discussion such as those related to economic growth, poverty, or household income data.

This book has been written in a deliberately accessible manner with a broad audience in mind. This resource is relevant for anyone active in the field of education, including policy makers, officials, advisors, researchers and policy analysts; leaders of educational institutions and other stakeholders; teacher educators; teachers; and parents and students.

TRENDS SHAPING EDUCATION 2013

The trends in this book start with "big picture" global changes before honing in on societies and labour markets, and then turn to the more "micro" level of families and children. New technologies affect all these different layers but are presented in a stand-alone separate chapter.

The dynamics of globalisation: New economic balances, more diverse populations, and environmental challenges including climate change

Chapter One looks at the important and pervasive trend of globalisation. In essence, globalisation is the widening, deepening and speeding up of connections across national borders. One of the key areas where this occurs is trade: ever greater quantities of goods, services and capital are bought and sold around the globe. People are moving more freely across borders and continents, bringing greater ethnic and cultural diversity to OECD countries. Facilitated by fast-changing technology and decreasing transport costs, individuals and information flow more freely across the globe than ever before.

The global economic balance is also changing. The emerging economies of China, India, and the Russian Federation now sit comfortably among the world's eight largest economies. These countries have large and quickly developing economies and play an increasingly important political role in global affairs, for example, through the G20. These changes are not just cosmetic, but rather a fundamental transformation in the balance of economic power and world finance. Despite this, the magnitude of global inequality – the gap between richer and poorer world regions – is still increasing.

Global challenges – for example, climate change – call for global solutions. *Trends Shaping Education 2013* examines evidence of increasing numbers of natural disasters and decreasing biodiversity in the last 20 to 30 years. It also looks at promising national initiatives to preserve natural resources, for example, protecting increasingly large marine and terrestrial areas and the push to invest in renewable energy. Education can and does play a key role in raising awareness of environmental challenges, while also shaping the attitudes and behaviours that make a difference.

Transforming our societies: The rise of the megacity, improving security and safety, and reinforcing democracy

At the same time as globalisation is transforming the world at large, societies are also experiencing significant change. **Chapter Two** investigates this, firstly through the lens of urban living and the rise of the megacity. By the year 2050 around 85% of the OECD's population is expected to live in cities. Just as the global economic balance is shifting, so too is the profile of the megacity: in 1950, six of the ten largest world cities were located in current OECD countries. By 2025, only three of the top ten will be in current OECD countries, with the rest coming from Brazil, China, and South Asia (Bangladesh, India, and Pakistan).

City life has a distinct quality compared with rural life in that cities in two very different countries, such as New York City and Shanghai, will tend to have more in common than each would have with rural communities in their own country. People flock

to cities because they are the powerhouses of the economy, the places where jobs and wealth are created. They are also associated, however, with the potential for increased alienation, and high traffic density is linked to higher pollution, which in turn creates challenges, including risks for respiratory health. Well-being in an urban landscape is thus a pressing concern, and our urban schools are taking a more active role in promoting mental and physical health for their students.

In many OECD countries, one of the most significant negative trends is rising obesity among adults and children, which threatens to grow into a severe public health crisis in many OECD countries. In 2008, the majority of OECD countries had an average Body Mass Index (BMI) that fell in the "overweight" range, and given current estimates of daily caloric consumption, this trend does not look like it will slow down anytime soon. From an economic perspective, these figures are especially alarming in light of increasing health and pension expenditures, already on the rise due to ageing populations and increased longevity. These issues also raise questions about the role of the elderly in societies more generally.

What sort of society and community do we live in? Do we feel safe going about our daily lives and social interactions? In many OECD countries, improving safety and security by being tough on crime and encouraging road safety are high on the political agenda. Ensuring national security in an era of increasing globalisation, shifting community structures, and the development of new technologies also has an impact on the quality of life. Yet in many countries across the OECD, measures of democracy and civic engagement, such as voter turnout, have fallen throughout the last half-century. What role can education and schools play in improving civic participation and well-being in our modern societies?

The changing world of skills and work: Reconciling family and work, embracing the knowledge intensity of our economies, and continuing income inequality

Chapter Three examines one of the most profound long-term trends in OECD societies in the last century: the changing role of women. The number of women active in the labour market has risen considerably since the 1960s. However, there are persistent challenges: the continuing difficulty of reconciling family and working life, unequal representation of women in higher level jobs, and a persistent gender wage gap. Although traditionally it has seemed that women have had to choose between career and children, one of the most interesting recent trends across OECD countries challenges that trade-off: in 2010, those with higher female employment rates were also more likely to have higher fertility rates on average.

Skills have become the global currency of twenty-first century economies. Without sufficient investment in skills, people languish on the margins of society, technological progress does not translate into productivity growth, and countries can no longer compete in an increasingly knowledge-based global economy. As transport prices have fallen and trade barriers are lifted, a substantial share of the production of basic goods has been taken over by developing countries with lower wage costs. This has tended to drive OECD countries seeking to maintain their competitive edge towards the production of goods and services that require high levels of knowledge and skill, creativity and innovation. Growing investment in research and development, increasing numbers of patents filed, as well as the increasing numbers of researchers across the OECD area all reflect this shift.

Despite these advances, income inequality is rising across most (but not all) OECD countries. This is not due to a growing divide between the poor and middle class, but rather a growing divide in many OECD countries between the middle class and the rich. At the same time, spending on social programmes has increased in every OECD member country. Increased inequality is associated with social exclusion and vulnerability in the labour market. Education can stimulate social mobility by providing opportunities, but it also plays a role in reproducing inequalities when, for example, the already privileged have better access to top tertiary institutions. Can education be designed in such a way that it does not reinforce inequalities?

Modern families: The transformation of childhood, balancing household budgets, and the resilience of childhood expectations

The dominant family model in the twentieth century – characterised by a breadwinning father and a mother taking care of the household and a number of children – has changed. **Chapter Four** takes a look at this transformation over the past fifty years: families have become smaller, parents are older, and, on average, more prosperous. At the same time, however, both parents are more likely to be active in the labour market, further increasing family resources, but potentially reducing the amount of time available for children. Individuals are getting married less often while the prevalence of divorce grows. Women are having babies at a later age than ever before, in part driving an increase in the numbers of children in early education and care.

Modern families also face risks. In general across OECD countries, the average family budget has increased since the 1980s. The recent financial crisis heavily damaged banks and some national economies, but it also affected the everyday spending and income of families and households. Across the OECD area, the rate of teenage pregnancy is decreasing, due to a number of factors including changing expectations about the ideal age for motherhood, improved access to contraception, as well as the impact of campaigns to reduce teenage pregnancy. However, the numbers of babies born with low birth weights are increasing. Advances in medical technology and awareness of risky behaviours during pregnancy both need additional attention from policy makers and health sector workers.

Children's life chances are shaped and influenced by the conditions into which they are born and develop. On average across OECD countries, child poverty has continued to rise slightly. Despite this, children's expectations of success – their hopes and dreams for school and career – are rather resilient. As measured by the OECD's Programme for International Student Assessment (PISA), students from more disadvantaged backgrounds are more likely than before to expect to earn a university degree. The importance of social background in shaping attainment remains one of the most well-charted relationships in educational and social research.

Infinite connection: Universal Internet access, the rise of portable devices and social media, and the dark side of cyber space – bullying and fraud

In contrast with many of the trends in this book that are relatively gradual and often linear, the pace of technological development is exponential and its influence often

unpredictable. **Chapter Five** looks at how the Internet has transformed our lives. More and more people use it on a daily basis to find information; communicate via email, audio or visual conferencing; make use of online services such as banking and shopping; and take advantage of the massive amount of multi-media entertainment on offer. With the emergence of platforms built to enable user-generated content, Internet users increasingly interact, collaborate and create their own materials online. The growth in the availability of portable devices means that access to a computer and the Internet is no longer restricted to a location but is available almost everywhere. The Internet is increasingly a truly global phenomenon: content can now be found in over 250 languages.

The full potential of information and communication technologies – from computers to mobile phones to user-generated content online – will continue to evolve. Most recently, with the combination of these technologies, increasing numbers of users have the ability to engage with *Twitter, Facebook,* and other online social applications. Two of the most interesting recent changes are the rise of downloadable applications, or "apps", and the emergence of cloud computing, or the use of hardware and software services delivered over the Internet. Recent global events demonstrate the impact that new technologies can have: during the spring of 2011, for instance, the use of social media more than doubled in Arab countries during the Arab Spring uprisings. These technologies played a key role in organising times and meeting points for demonstrations, publishing crackdowns and abuses on citizens, and raising awareness throughout the world by providing constantly updated information.

Despite the enormous potential of the Internet to reshape our world and communities, there is a downside to infinite connectivity and universal access. New challenges, for example, the rise of Internet fraud, online privacy concerns and identity theft, and the transmission of false or misleading information are all part of a new global online world. For parents and children, there are also specific concerns: cyber bullying and worries about protecting our young from explicit content and virtual predators. Today's students, willingly or unwillingly, are exposed to a whole new set of dangers, and parents and educators are not always sure how best to protect them. Guides to monitoring and protecting Internet users – of all ages – make it clear that the best preventive strategies involve awareness, constant vigilance, and, in terms of protecting children, an open dialogue about their concerns and online lives.

Trends Shaping Education 2013 covers a rich set of topics related to globalisation, society and well-being, work and skills, modern families, and new technologies. In each section, a series of questions are put forward linking the trend to education, from the level of early childhood education and care through to tertiary education and lifelong learning. But it is important to remember that these trends are themselves shaped by education and manifest within it. This publication is intended to complement the educational indicators that measure the developments taking place within education and training systems themselves. For policy makers, teacher educators, practitioners, and any others interested in education, we hope that this publication of *Trends Shaping Education 2013* can act as an inspiring and stimulating resource to inform thinking about the future of education. We invite all readers to ask themselves: "What does this trend mean for my education system and my work?"

Reader's Guide

What does it mean for education that our societies are becoming more diverse? What does it mean that information and communication technology (ICT) is playing an ever larger role in our lives? Does it matter for higher education providers that the share of national wealth spent on research and development is increasing? This book is about major developments that are affecting the future of education and setting challenges for policy makers and education providers alike. It does not give conclusive answers: it is not an analytical report, nor is it a statistical compendium, and it is certainly not a statement of OECD policy on these different developments. It is instead a stimulus for thinking about major trends with the potential to influence education. While the trends are robust, the questions raised for education in this book are illustrative and suggestive. We invite users to ask the question: "What might this trend mean for my education system and my work?"

WHAT CAN BE FOUND IN THIS PUBLICATION?

This resource contains 35 trend areas, each illustrated by two figures on specific trends. The material is organised in five main chapters focusing on globalisation, well-being and lifestyle, skills and the labour market, modern families, and new technologies. While all the trends included are relevant to education, not all relevant trends are in this resource – it is necessarily highly selective. As well as relevance for education, the criterion for selection has been the availability of internationally comparable, through-time evidence. The diversity of the topics covered means that there is no single time frame: in some cases, the trends are charted over a short decade; in others, longer-term trends are available. We have made an exception to the length of time covered in some cases where long-term trends were not realistic, for example in looking at emerging trends in new technologies.

The focus is primarily on OECD countries and emerging economies identified as a priority for OECD work: Brazil, China, India, and the Russian Federation. Where they are available, broader global data are used that include, for example, Indonesia and South Africa. The recent global financial crisis is largely outside the scope of this book given our focus on trends over a longer time frame. We do refer to it when it is likely to have an impact on developments such as economic growth, poverty, or household income data.

FOR WHOM IS THIS TOOL RELEVANT?

This tool is relevant for everyone in the field of education. We have sought to avoid jargon and technical terminology, and the data are presented in an accessible format. Users interested in further reading or in the precise definitions of terms used in the figures and the text are referred to the "Find out more" sections at the end of each chapter. Users interested in the data underlying the figures, as well as more technical details of

the data, are referred to the Excel files that can be accessed by using the StatLinks feature below each figure.

Among those for whom this tool will be most relevant are:

- **Policy makers, officials, advisors, researchers and policy analysts** needing robust trends to reflect on the long-term development of education.
- **Leaders of educational institutions and other stakeholders** setting strategy who may refer to the trends that are pertinent to the choices they face.
- **Teacher educators** searching trends to use as material for teacher education or professional development programmes or to help student teachers consider their futures and professional practice.
- **Teachers** seeking aid for professional development, a starting point for reflection on practice and curriculum issues, or a classroom resource to inspire debate and discussion by their students.

There are doubtless others who will find this book relevant; the choice of trends and the treatment given to them in the text, however, are designed especially for those working in the educational field.

HOW TO USE THIS RESOURCE

The future is inherently unpredictable. Yet, everyone – including policy makers and managers in education – needs to make plans that take the future into account. Looking at trends informs our ideas about what might happen as we better understand what is already changing in education's wider environment.

Using trends is not straightforward. Opinions differ on historical developments and, even when there is agreement, the future is rarely just a smooth continuation of past patterns. Moreover, we do not know in advance which will continue as in the recent past and which will change course.

"Stocks have reached what looks like a permanently high plateau"
– Irving Fisher, Economics Professor at Yale University, 1929

Similarly, it is not guaranteed that the trends that were important in the past or seem so now will remain influential; emerging trends, barely visible at the moment, may become of central importance in the future. For example, in 1946, when television was first emerging as a major technology, the head of one of the most influential Hollywood movie studios declared:

"Television won't be able to hold onto any market it captures after the first six months. People will soon get tired of staring at a plywood box every night"
– Daryl F. Zanuck, Head of Twentieth Century Fox movie studio, 1946

Hence, bringing an awareness of trends to bear on our professional lives in education is not so much a science as a means of broadening our horizons and informing the base of decision-making. This book is a starting point for consideration about what is setting directions for the future. The following questions are intended to help draw out how the trends may be addressed and interpreted.

Is this trend relevant in my context?

Trends may differ both in size and direction in different countries, regions, districts or even schools. Ageing populations, for example, may be a bigger problem in rural than in urban areas or concentrated in certain parts of the county or districts in a city. International trends may have different impacts in different places according to geographical, historical, political or cultural circumstances.

Are there other trends to take into account?

The trends in this resource are certainly not the only relevant ones, and not all of them apply equally in each location or context. There may be other, perhaps local, trends that will be just as important to consider.

How predictable is this trend?

Trends differ as to the predictability of their continuation. Some trends, for instance, to do with population growth or environment, lend themselves more easily to long-term planning. Others are less predictable, such as those to do with youth culture or international conflict. For these, devising scenarios of what would happen if a particular trend would develop in a certain way may well be more appropriate than extrapolation.

What is the pace of this trend?

Some trends develop slowly (global temperatures went up around 0.8˚C in the last 100 years) while other trends are more dynamic (the number of active Facebook users went from zero to 955 million in eight years). Slow trends allow more time to think about what they mean and how to respond but they may also be relatively impervious to change.

What is the impact of the trend?

Climate change may be slow but its potential impact is enormous, threatening life on our planet. Other trends like changing fashion move very quickly, but have less impact on education. Generally, the more impact the trend has, the more important it is to anticipate it.

Can we anticipate this trend?

When trends are predictable, long-term planning is greatly facilitated. For example, with fairly accurate demographic forecasts, the capacity needed in primary education over the coming ten years is open to calculation.

Can we influence this trend?

If trends are not predictable it may still be possible to influence them. Universities have great difficulty in predicting the number of students who will choose a certain study programme. However, they can attempt to influence the numbers of students applying through advertising campaigns and funding arrangements (for example, targeted scholarship programmes).

Can we react to this trend?

If both predicting and influencing are impossible, creating the flexibility to be able to react after events occur may be the best option. For example, someone starting a business who does not know how it will take off is better advised to lease offices than buy them.

Finally

Above all, we hope that the different users to whom this report is targeted will ask the question: "What might this trend mean for my work?" or better still, "How do these trends, taken in combination, redefine the context in which I am making decisions?" A large body of CERI work has been founded on the need for educational decision-making to be better informed by evidence, by awareness of what is taking place in other countries, and by the need to consider the bigger, long-term picture. This volume follows proudly in that tradition.

Chapter 1

A global world

Migration and mobility: *brings together trends on migration to and from OECD countries and the resulting growing share of those born in a foreign country.*

Pushing the boundaries: *discusses the exponential rise in populations' air travel mobility and air freight practices, as well as their road and rails alternatives.*

Undeniably global: *the globalisation of economies, as shown through growing trade and levels of foreign investment.*

A changing balance: *the emerging economic powers and the changing global landscape.*

Is our natural world at risk?: *focuses on biodiversity loss as measured through deforestation and the incidence of natural disasters to illustrate human impact on the environment.*

Think green: *a population effort in the preservation of the natural environment and nations' long-term commitment to renewable energies.*

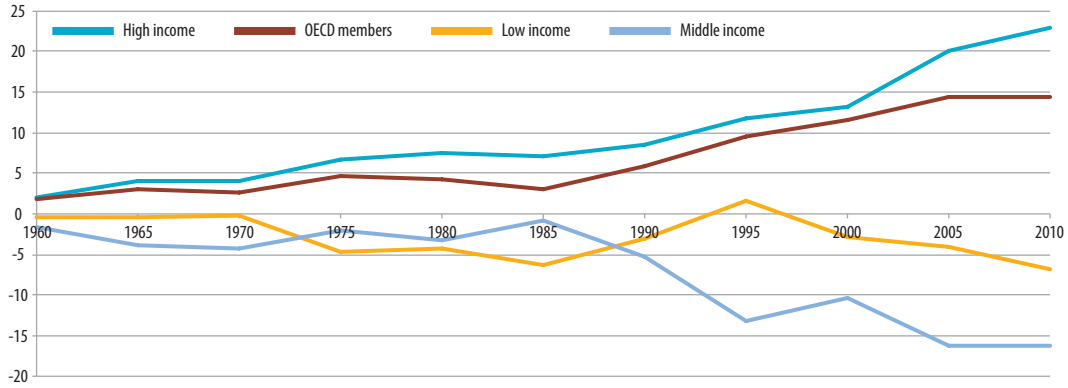
International divides of affluence and poverty: *the widening divide between the richer and the poorer regions in the world, as well as the world regional differences in declining child mortality.*

MIGRATION AND MOBILITY

Migration has become more and more prevalent, particularly towards more affluent countries. Globalisation, in terms of the mobility of individuals, families, and human capital, is facilitated by technological advances and driven by trade and skill imperatives. Transport – of goods but also of people – is more affordable, more accessible, and opens up new markets and new ways of being. Communities are changing, reflecting the increasing diversity of their citizens in many ways. Greater cultural and linguistic diversity continues to have a strong impact on our schools and classrooms. It pushes us to rethink the roles of classrooms, teachers, parents, and others within schools, and in the community as a whole.

Figure 1.1. **Increasing migration towards the developed world**

Net migration (in millions of people) into regions, with countries grouped by income level and OECD members, 1960-2010



StatLink http://dx.doi.org/10.1787/888932757580

Note: Net migration is calculated as the inflow of people minus the outflow of people to a country; with a positive net migration indicating that more people are entering than leaving the country.

Source: World Bank (2012), *World Databank: Net Migration*.

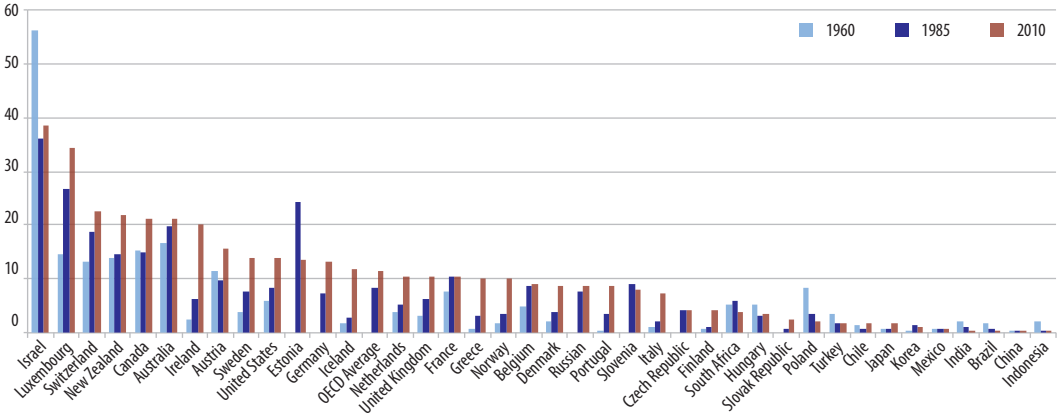
Migration to developed countries has generally increased in the last 50 years. The number of immigrants to high-income countries increased steadily since 1960, from receiving just below 2 million immigrants, to as many as 23 million in 2010. Similarly, as a group of relatively high-income countries, the OECD region steadily increased its intake of migrants during this period. It is important to note that there are sizeable variations between countries, with several remaining centres of emigration, rather than immigration. Still, the profile is evolving. Traditional OECD countries of immigration, such as Australia and Canada, have been joined in recent years by countries that have experienced little immigration until recently, like Japan.

Throughout the 1980s and 1990s, migration trends between countries of differing income levels began to diverge. Net migration in low-income countries remains essentially static. However, there is a noticeable and steady decline in migration to middle-income countries. These countries have gone from effectively no migration to losing more than 16 million people each year.

These changes in net immigration clearly demonstrate that our communities are changing. There are substantial populations of international migrants living in OECD societies. Many are immigrants who intend to stay for the long term: they are people who may update their skills or qualifications through local educational offerings, whose children will be attending schools, and in turn universities, in their communities. Traditional immigration countries such as Australia, Canada, New Zealand and the United States continue to increase their numbers of foreign-born citizens, and are joined by such European countries as Germany, Luxembourg, and Switzerland. In 2010, Finland, Iceland, Ireland, Greece, and Italy all marked a dramatic increase in international migrants relative to 1985 figures. For education, new immigrants pose particular issues for integration and language instruction, for example. However, even students whose parents – or grandparents – immigrated to a particular country can face particular challenges. This increased diversity in classrooms raises questions as to whether schools, teachers, and students are sufficiently prepared for the new challenges this creates.

Figure 1.2. **More diverse communities with increasing numbers of international migrants**

Stock of international migrants as a percentage of the total population, 1960, 1985 and 2010



StatLink http://dx.doi.org/10.1787/888932757599

Note: International migrants are defined as individuals whose country of birth is not that in which they reside. Due to availability of data, 1990 figures are given in place of 1985 for the Czech Republic, Estonia, Germany, the Russian Federation, Slovak Republic, and Slovenia.

Source: World Bank (2012), *World Databank: International Migrant Stock*.

And education?

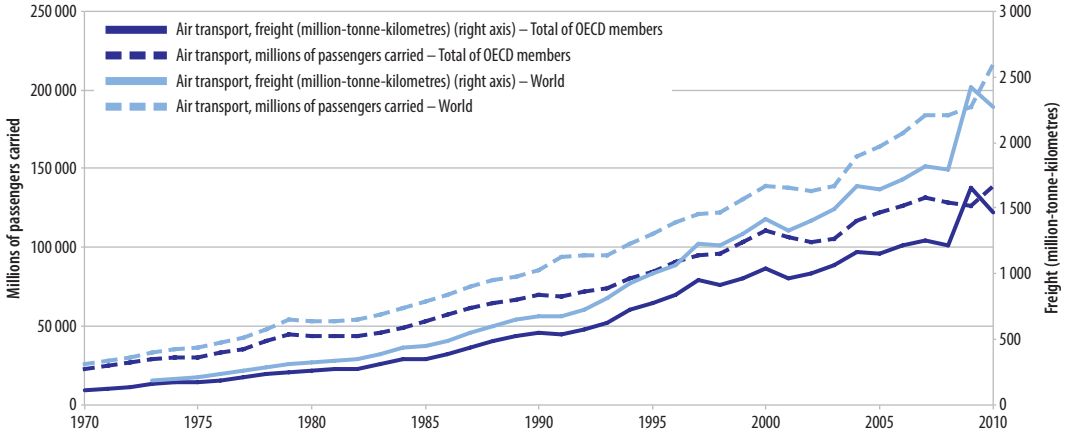
- Transferability of skills and experience is one of the big challenges for classrooms containing students from all over the world. Are our systems able to adequately recognise prior learning and qualifications? How should this be accomplished?
- Newly migrated families are among those most likely to face precariousness and exclusion. Are educators equipped to deal with the inequality of educational opportunity that greater numbers of immigrants may cause?
- Migrants typically move from lower income regions to higher income countries. To what extent should high-income countries be concerned about skimming off the best and brightest from low-income countries? Do OECD countries have a role in partnering with low-income countries to improve and support skill development in the areas that need it most?

PUSHING THE BOUNDARIES

Globalisation brings people together and allows them to share new cultures, ideas, and goods. Decreasing costs of transport and technological advances in communication have allowed more people to travel to new places – or return to old homes – than ever before. Of course, this mobility extends to goods and services, as well as people and communities. More affordable transport and advanced communication technology have created a world where far-flung places and people are accessible in a relatively short time or even instantaneously, paving the way for a global exchange of skills and goods. For education, this translates into an increasingly competitive global market in higher education, as well as into more diverse communities and classrooms.

Figure 1.3. **Moving around more: Increasing air transport of people and freight**

Transport of passengers (left axis) and freight (right axis) by air, total of OECD members and world, 1970-2010



StatLink http://dx.doi.org/10.1787/888932757618

Note: Tonne-kilometres (tkm) are a unit of measurement of goods transported, which represents the transport of one tonne of goods over a distance of one kilometre. The distance to be covered is the distance actually run.

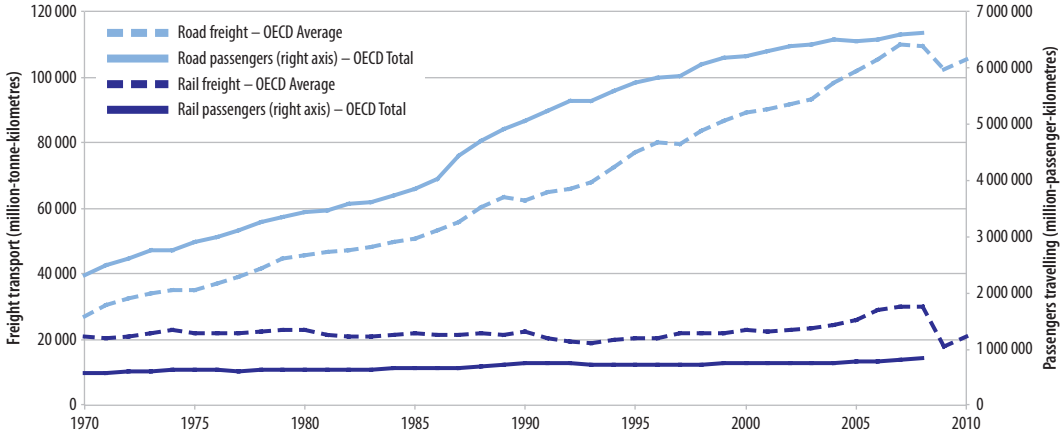
Source: World Bank (2012), *World Databank: Air Transport*.

Air transportation, once the costly refuge of the rich or desperate, has undergone a renaissance of sorts since the 1970s, in OECD countries and the world more generally. The rise of low cost airlines, and the easing of restrictions on which markets carriers can serve, have combined to make air transport an affordable and safe choice. As a result, the numbers of people choosing to travel by plane world wide each year steadily rose from just 300 million in 1970, to nearly 2.6 billion in 2010. Air freight (the transport of goods by plane) has followed the same pattern, increasing more than 12 times during this period. Interestingly, although OECD countries still account for the majority of air transport, non-OECD countries represent a growing share of the total since the 1990s. As might be expected, much of the increase in non-OECD countries can be accounted for by an exponential growth in the air transport of passengers and freight by the BRIC countries: Brazil, China, India, and the Russian Federation.

A similar story can be told for road passengers and freight, which have also increased steadily since the 1970s in OECD countries. The one exception to these transportation trends is the rail network, which has remained at steady levels of passengers and freight on average across OECD countries. For education, the general trends of increased passenger and freight mobility signal an increased ease of access to different markets and countries, for both basic and higher education. The internationalisation of tertiary education is a good example, with this sector growing substantially in many countries since the 1970s. More recently, new competition has begun to emerge from universities in China, India and Singapore, countries which are attracting increasing numbers of students from OECD countries to study at their tertiary institutions.

Figure 1.4. **Increasing passenger and freight transport by road and rail**

Road and rail passenger movement (million-passenger-kilometres) and freight movement (million-ton-kilometres), 1970-2008



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Note: A tonne-kilometre is a unit of measurement representing the transport of one tonne of goods over a distance of one kilometre. The distance to be covered is the distance the goods are actually moved. Passenger-kilometres (pkm) are a unit of measurement representing the transport of one passenger over a distance of one kilometre. The distance taken into consideration is the distance actually travelled by the passenger. Passenger data is unavailable for 2009 and 2010. Freight figures for 2010 are estimates for Australia and Canada.

Source: OECD (2012), *OECD Stat: Inland Passenger Transport and Inland Freight Transport Databases*.

And education?

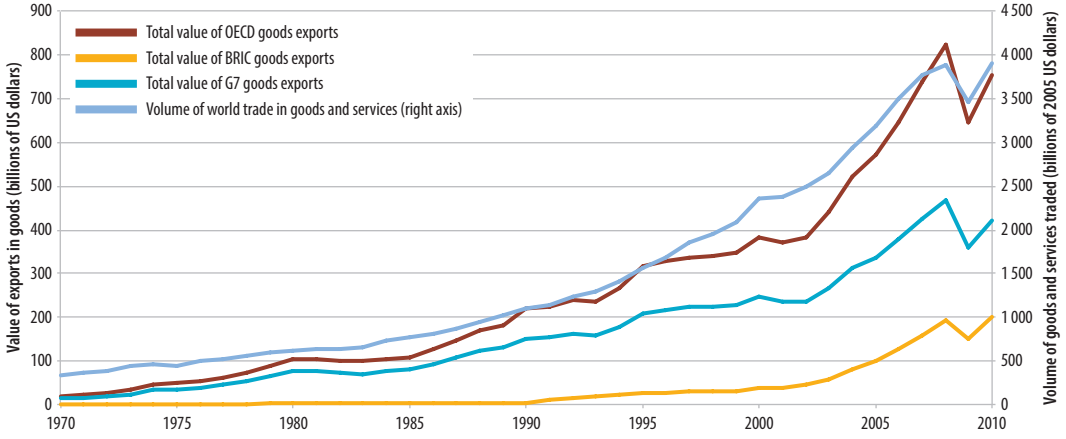
- Mobility is part of the context of students' lives. Does student first-hand experience of far-flung places challenge traditional teacher-student roles in the classroom?
- Young people have increasingly broad experiences of working or studying abroad or in different regions within their own country. Do schools have a role in complementing this experience by encouraging engagement at the local community level as well?
- In what ways can tertiary educators most effectively engage with, and make use of, the diversity of students in their courses? What kind of support services should universities provide for students who have travelled from abroad?

UNDENIABLY GLOBAL

Economic activity has become globally interconnected on an unprecedented scale. The global character of markets has become stronger through international agreements and technological advances that bring people, goods, and services together ever more quickly and less expensively. Multinational firms work across national boundaries to manufacture goods – increasingly assembled with geographically disperse component pieces – which are then sold in multiple markets. This growing integration of economies has an impact on strategies for national competitiveness, innovation, employment and skills. It can also play a role in shaping the attitudes and expertise that drive international trade and collaboration. For education, this global economic integration may create a need and opportunity for the development of new and different skills in vocational and higher education programmes.

Figure 1.5. **Growing importance of international trade**

Total value of goods exported by OECD members, BRIC countries and the G7 (in billions of USD) (left axis), and the total amount of world trade in goods and services (in billions of 2005 USD) (right axis), 1970-2010



StatLink http://dx.doi.org/10.1787/888932757656

Note: The export of goods and services here is a measure of global economic integration and shows the total value of goods leaving a country. Figures for both sets of data are seasonally adjusted to smooth the quarterly data. World goods and services data is calculated in 2005 USD, rather than simply USD, to make the annual volumes comparable, whereas the value of goods is simply the value in USD of each particular year.

Source: OECD (2012), *OECD Stat: International Trade (MEI)*.

The total volume of world trade has been increasing steadily since the 1970s, with particularly strong growth apparent from the mid-1990s onwards. The total value of goods exported has also increased during this time, except for a brief dip in 2009 due to the financial crisis. The figure above shows that OECD member countries account for a large proportion of the total value of goods exported. The share from the BRIC countries also increased markedly since 2000 to match growth in more developed countries.

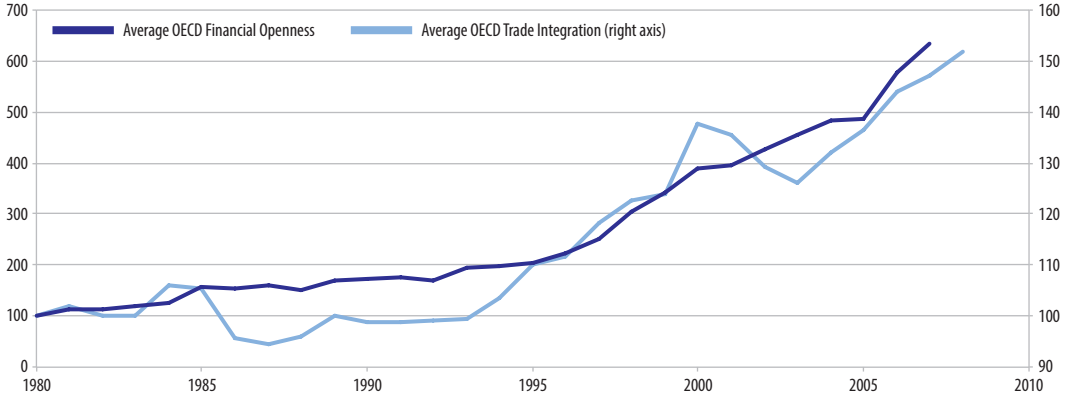
Companies increasingly rely on outsourced and offshore production. The organisation of this more intense, multinational production of goods is referred to as a global value chain (GVC), in which the various stages of the process occur in different countries. Apple's iPad and iPhone, for example, are designed and developed in the United States, but assembled in China using parts manufactured in Japan, Korea and Chinese Taipei

(among others). GVCs increasingly heighten the connections between firms and countries and are expected to result in more efficient allocation of resources around the world. However, they also provide a pertinent example of the relationship between economic interdependence and global systemic risk.

A key measure of a country's "openness" or "integration" in the world economy is the ratio of trade (the sum of exports and imports) to GDP. This ratio represents the importance of trade in the economy of each country. Trade integration and financial openness have increased dramatically on average across all OECD countries in recent decades, especially since the early 1990s, notwithstanding some volatility created by larger economic events. These cross border interconnections have an impact on national innovation and competitiveness agendas, and also on skill forecasts and emerging occupations. For education, national priorities for skills development have a direct impact on subjects taught in basic and higher education; for example, encouraging the study of science and mathematics, or harnessing the power of creativity and the arts to drive innovation.

Figure 1.6. **Increasing integration of trade and financial markets**

Developments in financial openness (left axis) and trade integration (right axis) as index of OECD average, 1980-2008



StatLink http://dx.doi.org/10.1787/888932757675

Note: Data normalised, where 1980/1981=100, and then presented as an annual index. Trade integration is a sum of imports and exports expressed as a percentage of GDP. Financial openness is a measure of international investment, and is calculated by adding the assets and liabilities held abroad and similarly expressed as a percentage of GDP.

Source: OECD (2011), *Divided We Stand: Why Inequality Keeps Rising.*

And education?

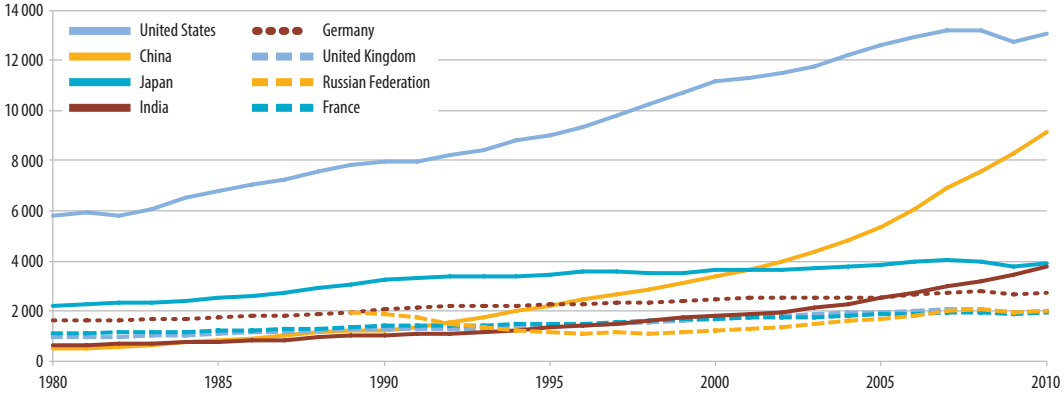
- Education and training systems have traditionally been bastions of national decision-making. Do these systems provide students with the necessary outlook and skills, including language skills, for successful international co-operation?
- Economies are increasingly intertwined and interdependent. How might education nurture the kind of transferable skills to cope and adapt to economic uncertainty and change?
- Increasing competition on global markets has promoted the widespread notion that countries need constant innovation to maintain position. Does education foster and value the creativity necessary to be innovative?

A CHANGING BALANCE

The global economy is changing, with traditionally larger economies increasingly challenged by new players entering the scene. The emerging economies of China, India and Russia now place comfortably among the world's eight largest economies. The G20, has replaced a smaller group of mostly Western countries as the major forum for international economic co-operation, incorporating countries previously labelled as "developing". These changes are not just cosmetic, but rather a fundamental transformation in the balance of economic power and world finance. For education, this may provoke change in the languages studied at school, or even the rethinking of higher education. It also challenges underlying assumptions about cultures, language and behaviours that are present in our classrooms.

Figure 1.7. **China and India catching up**

Size of GDP of the world's eight largest economies, 1980-2010



StatLink http://dx.doi.org/10.1787/888932757694

Note: Data presented in billions of purchasing power parity (PPP) constant 2005 international dollars. An international dollar would buy in the cited country a comparable amount of goods and services a US dollar would buy in the United States.

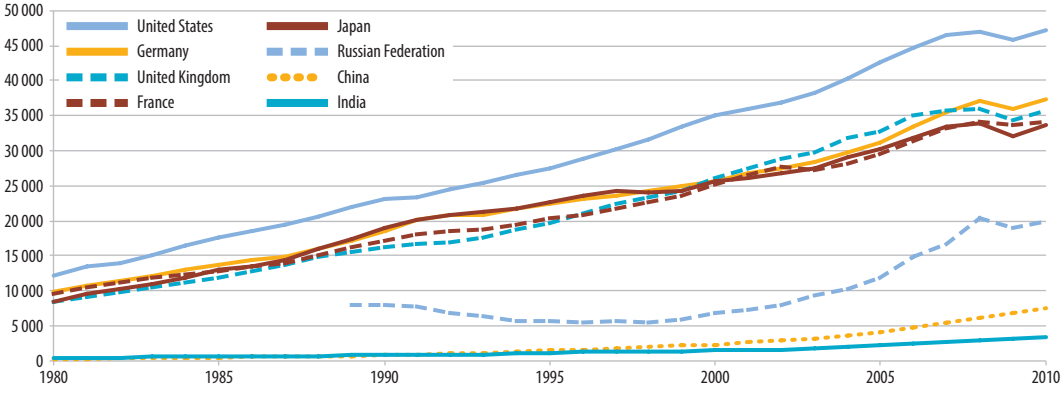
Source: World Bank (2012), *World Databank: GDP, PPP.*

The transformation of global economic power is clearly demonstrated by the relative importance of the economies of China and India on the world stage. The figure is based on comparisons of the gross domestic product (GDP) of major world economies, corrected for purchasing power parity (PPP). The United States is still the leading world economy, despite having suffered a dip in growth due to the economic crisis of 2009. However, China is rapidly closing this gap. The substantial growth of China's economy from the early 2000s continues with little impact from the economic crisis. India has also experienced rapid growth with GDP equivalent to that of Japan, one of the traditional global economic powerhouses. It should be noted that the correction for purchasing power increases the relative size of these economies because an international dollar still buys a lot more in China and India than in the other countries in the figure. Nevertheless, the trend is clear, and is expected to continue.

The strength of these new economies is partly fuelled by the size of their populations and continuing strong birth rates. One way to take these factors into account is to look at GDP as a function of the size of a country's population, that is, GDP per capita. When this calculation is done, a different story emerges: the wealth of the traditionally strong economies, such as France, Germany, Japan, the United Kingdom and of course the United States, is clearly apparent. Of the emerging economies, it is the Russian Federation that is closest to their levels, although the difference is still substantial. China and India, despite their explosive economic growth, have enormous populations and so both fall well behind these other large economies. One important qualification regarding this data: the per capita analysis does not attempt to reflect the distribution of income or wealth. There is thus an important discussion to be had, in our classrooms and out of them, about what the growth of economies means in real terms for an individual family or student.

Figure 1.8. **Traditional economic powers are still strong**

GDP per capita for the world's eight largest economies, 1980-2010



StatLink http://dx.doi.org/10.1787/888932757713

Note: Data presented in billions of purchasing power parity (PPP) current international dollars.

Source: World Bank (2012), *World Databank: GDP Per Capita, PPP.*

And education?

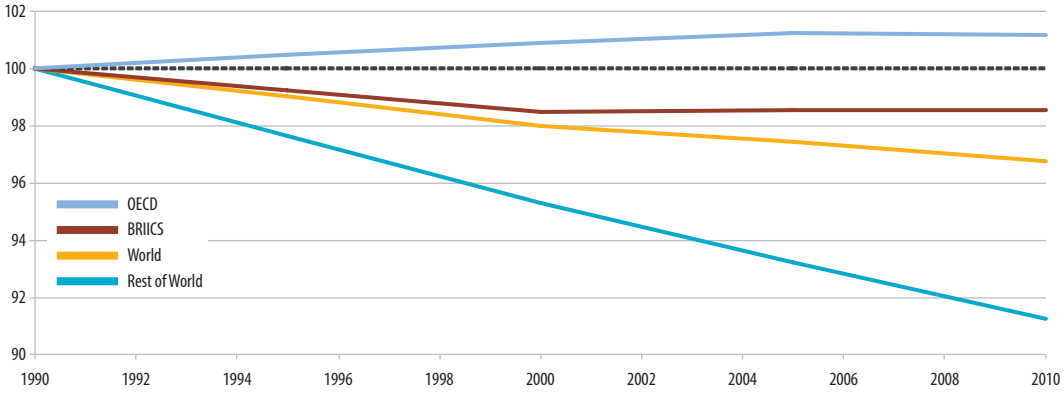
- Does the changing global landscape argue for change in the curricula of OECD countries, whether for science, language learning or other subjects such as history and geography?
- The rise of emerging economies challenges our educators to adequately prepare graduates to be internationally competitive. Are teachers being given the tools and support they need to achieve this?
- Is there a role for exchange programs in assisting the development of greater cultural sensitivity?

IS OUR NATURAL WORLD AT RISK?

Economic growth, increasing disposable income and globalisation have had, over the last decades, an incremental impact in the way our societies produce and consume. Natural resources are being harvested in more intensive ways and there is ever-growing demand for energy to fuel our lives. As a global community, we are beginning to ask ourselves: What impact do our choices have on our current environment, and the environment we are leaving behind to our children? Do we have a responsibility to do something to change our behaviour? This has become a highly politicised debate and it is important to focus on the evidence available when making decisions and changing behaviours. Here we look at this issue through two trends: deforestation and resulting loss in biodiversity and the increasing numbers of natural disasters related to human-induced climate change.

Figure 1.9. **Biodiversity decreasing through ongoing deforestation world wide**

Change in forest cover (Index 1990 = 100), 1990-2010



StatLink http://dx.doi.org/10.1787/888932757732

Note: The BRIICS countries are the emerging economies of Brazil, the Russian Federation, India, Indonesia, China and South Africa.

Source: OECD (2012), *OECD Environmental Outlook to 2050.*

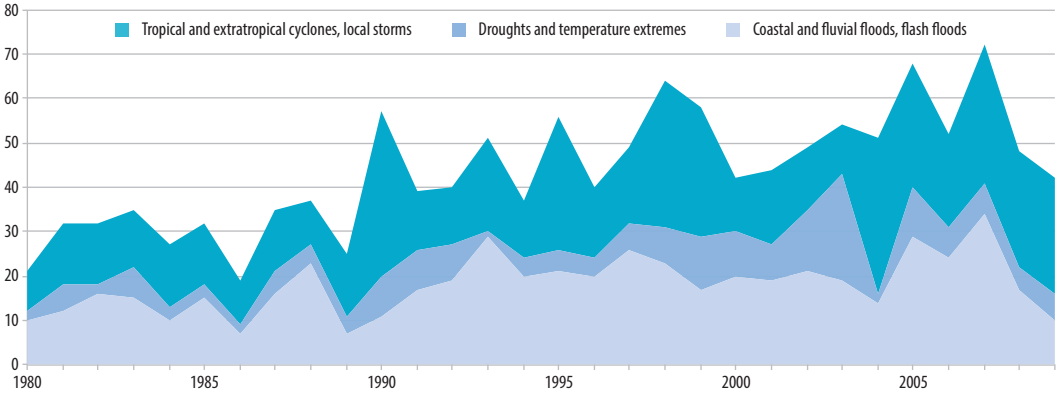
There is a myriad of different indicators that could be used to illustrate human impact on the environment. The extent of forest cover is an important indicator of biodiversity. Forests provide diverse ecosystems and habitats, and work to regulate the water cycle and prevent erosion. The first figure illustrates that between 1990 and 2010, global forest cover decreased from about 42 million km^2 to 40 million km^2. The loss of forest cover is particularly marked in developing countries that contain an important proportion of primary (or untouched) forests. Although the amount of forest cover is slightly increasing on average across the OECD, much of this growth is due to an increase in planted forests. This does not necessarily ease concerns of threats to biodiversity, as these forests are often planted with only one species of tree and so support less biodiversity than natural forests. They may also replace other, more diverse habitats, such as natural grasslands.

Another measure is the number of weather-related natural disasters, such as cyclones, droughts, and floods. This number has increased world wide over the last three decades,

from 21 recorded disasters in 1980 to 42 in 2009. Storms made up nearly 45% of all weather-related disasters in this time period, followed by floods (over 40%) and droughts (15%). These disasters occurred in a relatively equal pattern across the globe, with 40% recorded in OECD countries and another 30% in BRIICS. Due to the quality of infrastructure and services, however, the impact of these events is quite different between regions, with 80% of victims (affected or killed) in BRIICS countries compared to only about 5% in OECD countries. These trends are part of a broader series of environmental challenges that make it clear that urgent and holistic action is needed to restore our natural world upon which all life depends. Education can play a positive role in this, by shaping attitudes and awareness, modelling sustainable behaviours and lifestyles, and producing the scientists whose work provides solutions to urgent problems and identifies strategies for action.

Figure 1.10. **Natural disasters becoming more commonplace**

Number of natural disasters by type, 1980-2009



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Note: Trends in weather-related disasters are compiled using information from the Emergency Events database of the Centre for Research on the Epidemiology of Disasters. This database also monitors direct economic losses and the number of victims.

Source: OECD (2012), *OECD Environmental Outlook to 2050.*

And education?

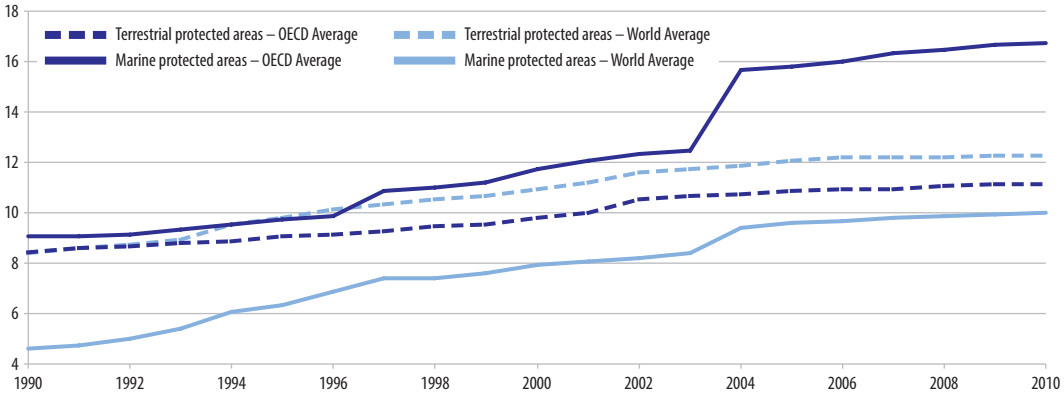
- Students with a poorer understanding of environmental science are more likely to have overly optimistic views of the ability of technology to solve environmental problems. Is there a need for education to include greater focus on geosciences, chemistry, biology, ecology and the environmental sciences, particularly at the lower secondary level?
- Environmental challenges are fundamentally global in nature. How can education foster the necessary attributes and knowledge for the international co-operation required to address them and to devise a plan for local, national, and international action?
- What is the role of formal education in raising awareness and creating responsible citizens with civic values, critical thinking skills and sustainable consumption habits?

THINK GREEN

The environment is a hot topic in the press and classrooms around the world, and much has been said about the need for action to protect our biosphere for future generations. Happily, some action has already been taken, with a number of OECD countries moving ahead to conserve and protect their scarce natural resources. This section looks at two such trends: the preservation of fragile land and marine areas, and investment in renewable energy. In the context of education, these actions can influence the beliefs and aspirations of our students, as well as provide inspiration for both ways of being and career choices. Further, education can and does play a key role in raising awareness of environmental challenges, while also shaping the attitudes and behaviours that make a difference.

Figure 1.11. **Greater efforts to conserve and protect natural resources**

Marine and terrestrial protected areas as a percentage of territorial waters or land area, 1990-2010



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Note: Terrestrial protected areas must be at least 1 000 hectares in size, and either totally or partially designated by national authorities as scientific reserves with limited public access, or areas managed for sustainable use (such as national parks or wildlife sanctuaries). Marine protected areas must be of intertidal or sub-tidal terrain with overlying water reserved by national law or other effective means to protect part or all of the enclosed area.

Source: World Bank (2012), *World Databank: Terrestrial Protected Areas and Marine Protected Areas*.

Since 1990, OECD countries have been steadily increasing the area of their territory – both marine and terrestrial – that is legally protected. In particular, France, Italy, and New Zealand have made significant progress, from protecting less than 1% of their territorial waters in 1990, to between 11% (New Zealand) and 21% (France) by 2010. Germany, at 40% in 2010, protected the highest percentage of its territorial waters throughout this entire period. Protected terrestrial areas have similarly increased across the OECD. A threefold increase was recorded for Belgium, Italy, and Mexico. Further, at 25% and above, New Zealand, Switzerland, and the United Kingdom all protect a larger proportion of their total land mass than other OECD countries.

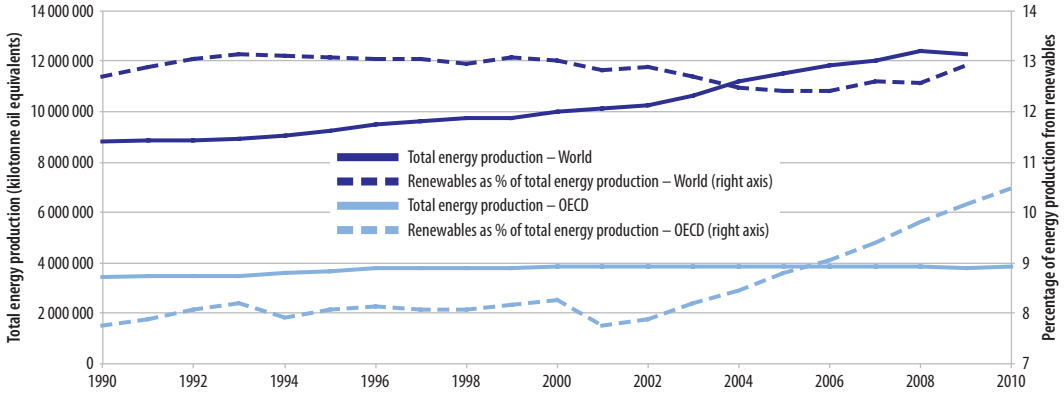
Fossil fuel derived energy is well known to be contributing to several of the most significant challenges humans currently face to both public health and ongoing quality of life. Governments, companies and concerned groups of people the world over are working

to protect the environment through researching and promoting the use of renewable sources of energy. The figure below illustrates both the overall energy production globally, and the proportion of this production from renewable sources since 1990. While energy production increased world wide during this period, it remained stable in OECD countries. In contrast, since 1990 the proportion of energy production from renewable sources (for example, geothermal, hydro, solar, and wind energy) increased from 7.7% to 10.5% on average across all OECD countries. Although modest, this average hides a dramatic increase in countries such as Denmark, Germany and Spain.

These pro-active strategies make a vital contribution to the reduction of humanity's ecological footprint. Like education, this behaviour on the part of communities and governments has the power to shape attitudes and raise awareness about sustainability and environmental concerns. Education also opens opportunities for careers in emerging trade sectors, such as the green industry, as well as providing the foundation for environmental science and research.

Figure 1.12. **Investing in renewable energies**

Total energy production (left axis) and percentage from renewables (right axis) for OECD members and world, 1990-2010



StatLink http://dx.doi.org/10.1787/888932757789

Note: Kilotonne oil equivalents is a calculation of the amount of energy produced from the renewables in terms of the energy produced from burning 1 000 tonnes of oil. The percentage of renewables is calculated here from the total energy production from renewables and the total energy production from all sources.

Source: OECD (2012), *OECD Stat: OECD Renewables Balance.*

And education?

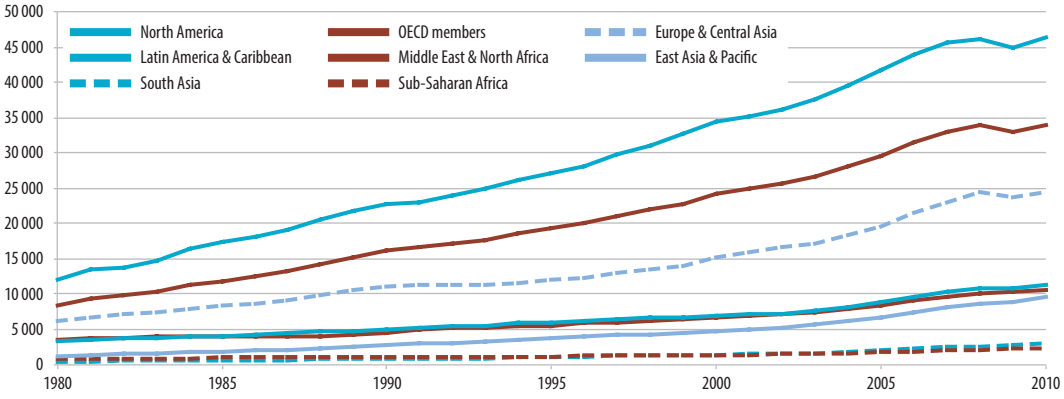
- What kind of tertiary and post-secondary training might provide the skills and expertise needed for a green economy?
- Despite the progress shown here, there is an ongoing need to protect natural resources and biodiversity. What role does education have in shaping the knowledge, attitudes and behaviour of young people on this issue?
- How well do young people develop an awareness of the connections between their daily decisions and possible long-term consequences, not just for themselves as individuals but for society as a whole? How can education systems support this awareness?

INTERNATIONAL DIVIDES OF AFFLUENCE AND POVERTY

Affluence has increased in OECD countries since the 1980s, but so has the magnitude of global inequality. There is a widening gap between richer and poorer regions, despite the rapid growth of the emerging economies of the BRIC countries. Life expectancy at birth is a revealing measure of inequality and, while overall life expectancy is improving all over the world, there is still a substantial gap between the average of OECD countries and other regions. One of the key means to promote equity and decrease inequality is through education, but for regions still struggling with building schools or ensuring the security of their children in the classroom, ensuring that quality education is accessible for all is a difficult goal.

Figure 1.13. **The widening gap between richer and poorer regions**

GDP per capita by region, 1980-2010



StatLink http://dx.doi.org/10.1787/888932757808

Note: Data presented in purchasing power parity (PPP) current international dollars. An international dollar would buy in the cited country a comparable amount of goods and services a US dollar would buy in the United States.

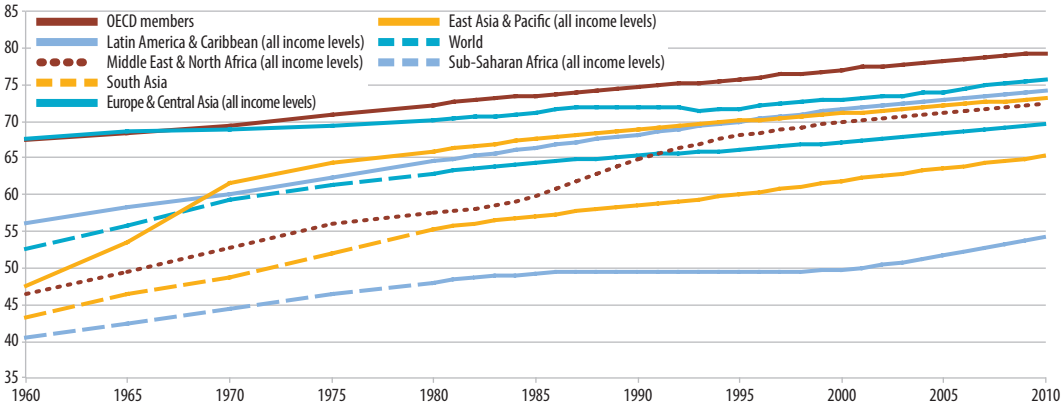
Source: World Bank (2012), *World Databank: GDP Per Capita, PPP.*

Regional economic inequality has existed for decades. However, since the 1980s, the regional disparity in affluence has grown ever more marked between the developed countries of the OECD and many countries in the rest of the world. OECD member countries, particularly those in North America, have seen steadily increasing prosperity despite a small dip during the financial crisis of 2008/09. While countries from other regions have not enjoyed the same increase in wealth, they were more insulated from the consequences of the financial crisis than their wealthier counterparts. The ongoing tragedy is in the poorest regions of South Asia and Sub-Saharan Africa, which have experienced very little growth over recent decades. Indeed, the gap between the richest and poorest regions in terms of GDP per capita has widened on average from 8 000 international dollars in 1980 (North America compared to South Asia) to 44 000 international dollars in 2010 (North America compared to Sub-Saharan Africa).

Life expectancy trends tell more or less the same story: while overall almost all countries have experienced an increase in life expectancy between 1960 and 2010, there is still a gap between figures in OECD countries and much of the rest of the world. In particular, Sub-Saharan Africa not only had the lowest life expectancy at birth in 2010, they have also experienced a much slower increase in life expectancy over time. For example, both South Asia and Sub-Saharan Africa had low life expectancies of 43 and 41 years, respectively, in 1960. But, by 2010, life expectancy in South Asia increased to 65 years whereas Sub-Saharan Africa only reached 54 years. These patterns have implications for economic growth and development, and for human and social capital.

Figure 1.14. **Life expectancy on the rise but regional differences remain**

Life expectancy at birth (total in years) by geographical region and OECD members, 1960-2010



StatLink http://dx.doi.org/10.1787/888932757827

Note: Life expectancy at birth indicates the number of years a newborn infant would live if prevailing patterns of mortality at the time of its birth were to stay the same throughout its life.

Source: World Bank (2012), *World Databank: Life expectancy at Birth*.

And education?

- Initial education and lifelong learning play a role in lifting people out of poverty by, for example, providing them with the right skills for the labour market. What kinds of programmes or incentives would strengthen this function of education?
- Economic and social disparity persists between the OECD and other regions. How aware are students in OECD countries of these larger global problems and should they know more about inequity and poverty world wide?
- OECD countries provide tertiary scholarship opportunities for students from poorer regions. To address continuing inequality, should these programmes be expanded? Could greater emphasis be placed on supporting tertiary offerings in the poorer regions and countries themselves?

FIND OUT MORE

Relevant sources

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- World Bank (2012), *World Databank: Life expectancy at Birth*, online, *http://data.worldbank.org/indicator/SP.DYN.LE00.IN*, accessed July 2012.

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.

Definitions and measurement

- **BRIC countries:** The BRIC grouping of countries includes Brazil, the Russian Federation, India and China. The acronym BRIICS also includes Indonesia and South Africa.
- **Economic integration:** Several indicators are presented in this chapter that highlight the overall integration of a country or region into the world economy, providing information about the dependency of producers in the country on foreign markets and foreign demand and international financial connectedness. Four key measures of this integration are presented: value of exported goods, trade in goods and services, trade integration and financial openness. Exported goods are presented as the total value of all goods that leave a country, while the total amount of trade in goods and services in the world is represented by a dollar value. Trade integration is the sum of imports and exports as a percentage of GDP, and financial openness is a measure of international investment, is calculated by adding the assets and liabilities held abroad and expressing this as a percentage of Gross Domestic Product (GDP).
- **Export of goods and services:** See "Economic integration" below.
- **Financial openness:** See "Economic integration" above.
- **Global value chain:** This term refers to the full range of activities that take place to bring a product from its conception to its end use and beyond. A value chain can include a single firm or be divided among different firms, can produce goods or services, and can be in a single geographical location or spread over wider areas (hence the term "global").
- **Gross Domestic Product (GDP):** The GDP is a standard measure of the value of the goods and services produced by a country during a period. Gross means that no deduction has been made for the depreciation of machinery, buildings and other capital products used in production. Domestic means that it is production by the residents of the country. As many products in a country are used to produce other products, GDP is calculated by summing the value added for each product.
- **International dollar:** An international dollar would buy in the cited country a comparable amount of goods and services a US dollar would buy in the United States. This term is often used in conjunction with Purchasing Power Parity (PPP) data (see definition below).
- **International migrants:** International migrants are defined as individuals whose country of birth is not that in which they reside.
- **Kilotonne oil:** Kilotonne oil equivalents refers to the amount of energy produced from the renewables by comparing it with a conventional and standardised unit of energy, which is based on the energy produced from burning 1 000 tonnes of oil.
- **Life expectancy at birth:** Life expectancy at birth indicates the number of years a newborn infant would live if prevailing patterns of mortality at the time of its birth were to stay the same throughout its life.
- **Marine protected area:** To qualify as a marine protected area, the area must be of intertidal or sub-tidal terrain with overlying water reserved by national law or other effective means to protect part or all of the enclosed area.
- **Net migration:** Net migration means the inflow of people minus the outflow of people to a country, and so a positive net migration means more people are entering than leaving the country.

- **One-person household:** A one-person household refers to a household in which a person makes provision for his or her own food or other essentials for living without combining with any other person to form part of a multi-person household.
- **Passenger-kilometres (pkm):** Passenger-kilometres are a unit of measurement representing the transport of one passenger over a distance of one kilometre. The distance taken into consideration is the distance actually travelled by the passenger.
- **Purchasing Power Parity (PPP):** Data shown in PPP terms is a different concept than data derived using market exchange rates. Because exchange rates do not always reflect international differences in relative prices, PPP rates provide a standard measure allowing the comparison of real price levels between countries.
- **Terrestrial protected area:** To qualify as a terrestrial protected area, the land must be at least 1 000 hectares in size, and either totally or partially designated by national authorities as scientific reserves with limited public access or areas managed for sustainable use (such as national parks or wildlife sanctuaries).
- **Tonne-kilometres (tkm):** A tonne-kilometre is a unit of measurement representing the transport of one tonne of goods over a distance of one kilometre. The distance to be covered is the distance the goods are actually moved.
- **Trade integration:** See "Economic integration" above.

Chapter 2

Living well

Urban life and the rise of the megacity: *trends and forecasts of continuing growth in urbanisation and the resulting rise of megacities.*

Well-being in an urban landscape: *presents data on changing household structures and improved air quality in large residential areas.*

Towards safer communities: *examines incarceration rates and road accidents in OECD countries.*

War and peace: *illustrates the military's activity through the lenses of expenditure and proportion of the workers in the armed forces.*

Body and society: *The weight of nations: tackles health and nutrition as obesity becomes an epidemic in the developed world.*

Investing in health: *considers health expenditure data in conjunction with premature death through the indicator called Potential Years of Life Lost.*

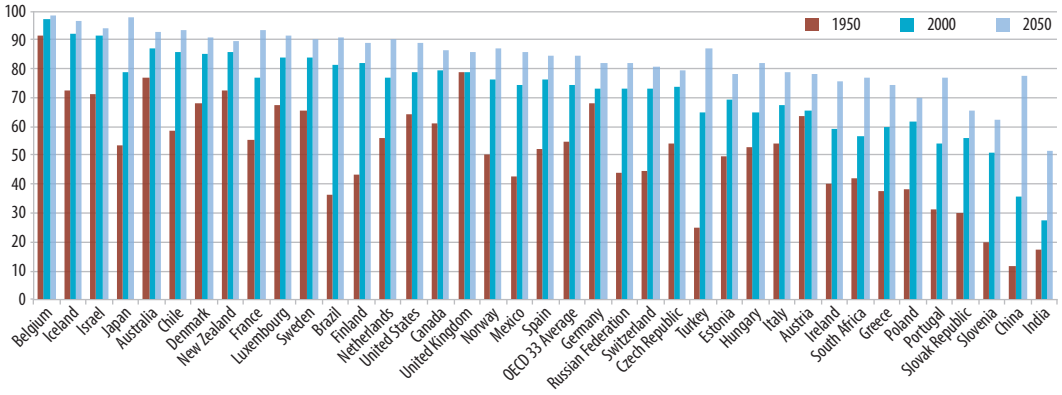
The ballot box: *looks at civic engagement as measured through voter turnout and voter registration, basic pillars of a healthy democracy.*

URBAN LIFE AND THE RISE OF THE MEGACITY

Our world is becoming more and more urban, with an ever-increasing proportion of the world's population living in cities. The 20th century saw the rise of megacities, or cities with populations that number in the tens of millions. The shift from rural to urban living has consequences for how we live, work, and build communities and families. Increasing urbanisation provides more career and educational opportunities and a host of other positive prospects. However, it can also give rise to a loss neighbourhood connection and an increase in perceived alienation. This can have consequences for families and children, and, by extension, education. Schools and vocational and tertiary education increasingly provide a sense of belonging and play the role of the immediate community and neighbourhood in urban areas.

Figure 2.1. **More people living in cities**

Percentage of people living in areas classified as "urban" by national authorities, 1950-2100



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Source: United Nations Population Division (2012), *World Urbanization Prospects: The 2011 Revision*.

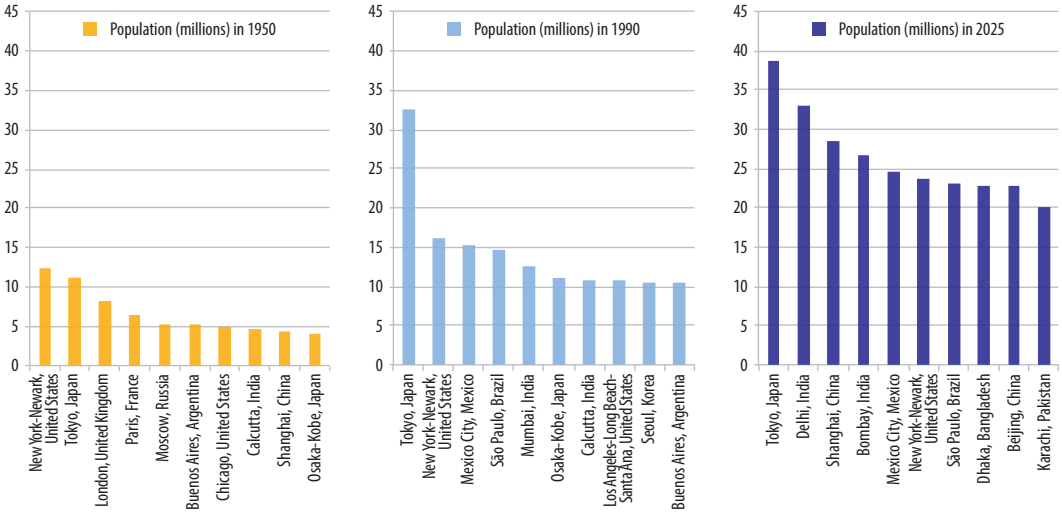
Between 1950 and 2000, the percentage of the population living in urban environments increased on average from 52% to 75% across all OECD countries. Even countries with the lowest percentage of urban dwellers in 1950 (Slovenia and Turkey) experienced substantial increases in the proportion of their population living in urban areas by 2000. This pattern is expected to continue across the OECD and BRIC countries, with a forecasted OECD average of 85% in 2050. In fact, Belgium, Iceland, and Japan are all expected to have as many as over 95% of their population living in urban areas by this time. Urbanisation poses a social challenge to educators, in terms of possible alienation and loss of a sense of community. Notwithstanding, this phenomenon also has the potential to provide a richer cultural environment and better, more diverse job prospects that can motivate students in their studies.

In 1950, only two cities in the world had over 10 million inhabitants: New York-Newark and Tokyo. By 2000, each of the world's ten largest cities had over ten million inhabitants, with Tokyo well ahead with almost 33 million people. The growth of megacities is expected to continue, although the geographical distribution of the top ten is changing. In 1950, six of the ten largest world cities were located in current OECD countries. By

2025, only three of the top ten will come from current OECD countries. In particular, the marked increase in the size of cities in Brazil, China, and South Asia (Bangladesh, India, and Pakistan) is projected to continue. For education, these data raise a number of questions about the role of the school in building community and social capital in large urban societies. The evidence from student performance suggests that urbanisation can influence achievement at school. For example, PISA 2009 data indicate that for some countries, living in large urban areas is linked to improved student performance.[1]

Figure 2.2. **Redefining the megacity**

Population (in millions) of the top 10 largest cities world wide in 1950, 1990 and a projection to 2025



StatLink http://dx.doi.org/10.1787/888932757865

Source: United Nations Population Division (2012), *World Urbanization Prospects: The 2011 Revision – Cities and Urban Agglomerations*.

And education?

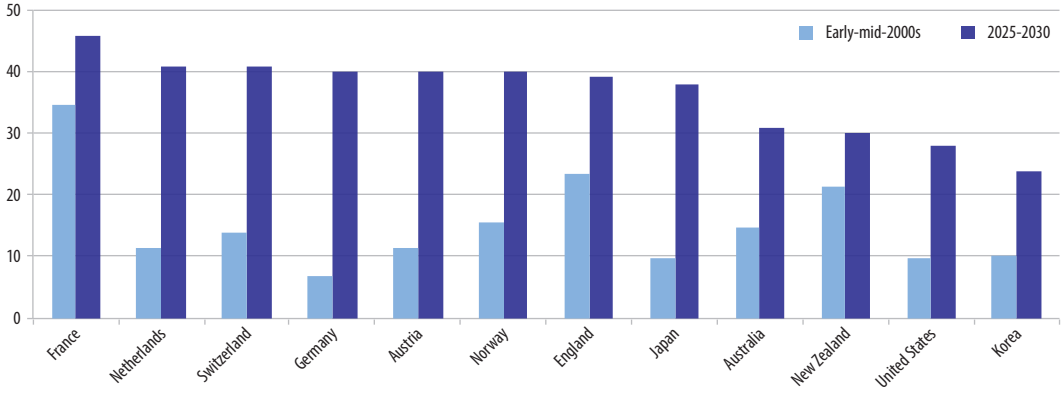
- Very rapid rates of urbanisation place services, including education, under strain. How can school, vocational and tertiary education cope with problems of overcrowding and overstretched infrastructure in quickly growing urban areas?
- In what ways might densely populated and diverse local communities be creatively used as a learning environment (for example, creativity though street art, or local elderly reading to primary age youth)?
- Greater urbanisation means that fewer children have experienced rural or farm life. Does education have a role to play in raising awareness of different types of communities? Is there a place for educational exchange between urban and rural schools?

WELL-BEING IN AN URBAN LANDSCAPE

Does living in a city have an impact on well-being? Large urban environments provide more educational and career opportunities, better access to high quality health and emergency services, and a number of other positives. However, a lack of green space and intensity of both traffic and industry are linked to higher pollution, which in turn creates risks for respiratory health. This section examines well-being in cities through two quite disparate trends: the number of people living alone, and the rates of air pollution in urban environments. These are important issues for education, with schools taking a more active role in promoting mental and physical health as well as reinforcing social ties and encouraging community engagement. Teachers are increasingly relied upon to detect students showing signs of withdrawal and alienation, and to effectively model positive social behaviours.

Figure 2.3. **Home alone: The rise in single-person households**

Number of one-person households, in the early to mid-2000s and projected to 2025-2030



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Note: A one-person household refers to a household in which a person makes provision for his or her own food or other essentials for living without combining with any other person to form part of a multi-person household.

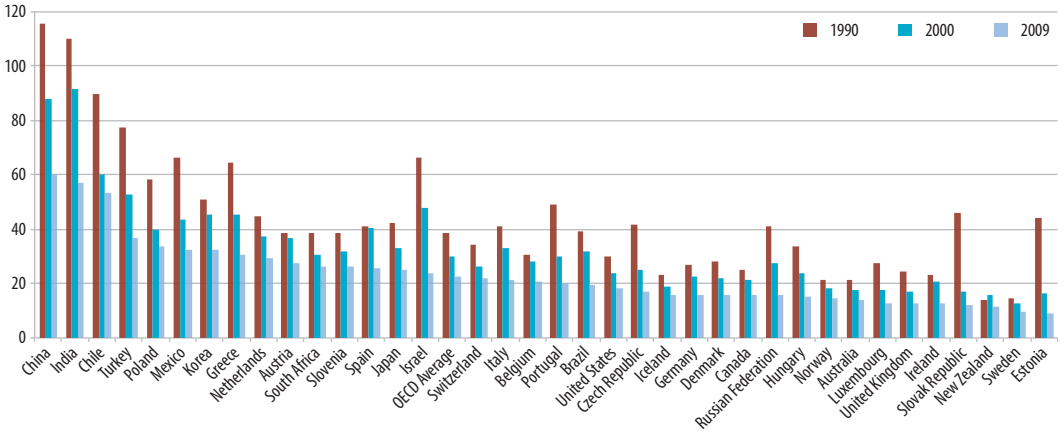
Source: OECD (2011), *The Future of Families to 2030*.

Traditional household structures are changing, with one of the most significant shifts being an increase in single-person households, particularly in urban areas. In the early to mid-2000s, England, France and New Zealand had the largest number of people living alone. By 2025-30, those countries are forecast to be joined by a number of other OECD countries, including Austria, Germany, The Netherlands, Norway, and Switzerland. A number of social and demographic trends are pushing this increase: a rise in divorce rates, elderly women living longer, and the increasing mobility of young professionals. Although the financial crisis has slowed this trend in the short term, with young people delaying moving out from their childhood home until they are on a stronger economic footing, the overall rise in single-person households is expected to continue. In the medium to long term, this trend raises questions about increasing alienation, which has been linked to higher levels of depression and ensuing health challenges, especially for the middle-aged and elderly.

On a more positive note, the level of air pollution in large residential areas consistently decreased from 1990-2009 across all OECD and BRIC countries. Poor air quality and pollution is related to a number of health risks, including respiratory ailments and premature death. In 1990 Chile, Greece, Israel, Mexico, Poland, and Turkey had the highest levels of air pollution among OECD countries, but all had significantly improved by 2009. The economic and social costs of poor air quality are significant. In response to this, all OECD and BRIC countries have set targets for reducing air pollution in residential areas, taking measures such as reducing vehicle and industrial emissions and increasing green spaces in order to reach these goals. The data indicate that these strategies have been at least partially successful. Education can play a role not only in reinforcing positive attitudes to well-being and environmental health; it can also model healthy behaviours and prepare students with the skills they need to attain urban and social well-being.

Figure 2.4. **Air quality improving in residential areas**

Levels of particulate matter in the air of large residential areas by country, 1990-2009



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Note: The particulate matter measured here is known as PM10 and is measured in micrograms per cubic metre in the air of urban residential areas of greater than 100 000 people. Also note that data from 1994 are used in place of 1990 figures for Slovenia.

Source: World Bank (2012), *World Databank: PM10 Country Levels*.

And education?

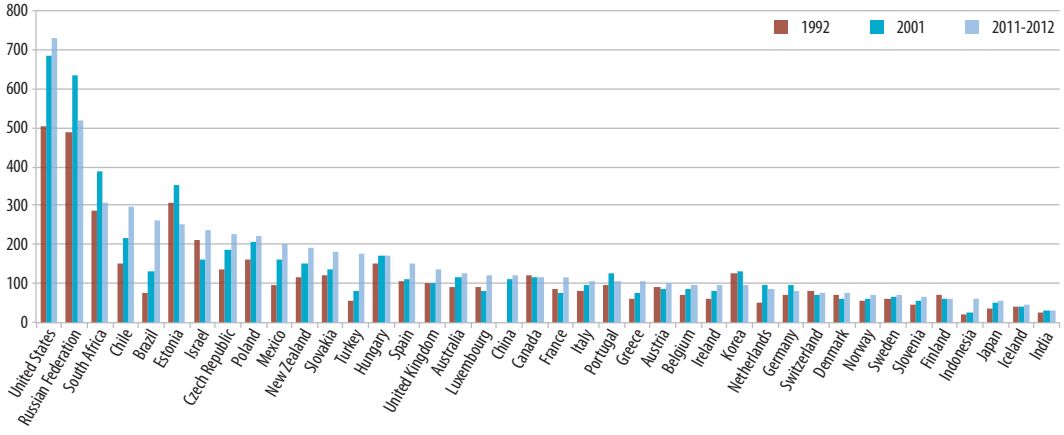
- Increased urbanisation creates both challenges and opportunities for local communities. Which skills are needed to deal with these challenges (for example, civic responsibility, non-cognitive skills), and how can schools develop them?
- The most effective learning can occur by following the example of others. How might educational institutions model the behaviours for positive social and environmental health?
- A potential drawback of urbanisation is the perception of a loss of community and connection to the local neighbourhood. How might schools continue to foster a greater sense of community for their students and families in urban environments?

TOWARDS SAFER COMMUNITIES

Do we feel safe going about our daily lives in our communities? In many OECD countries, improving neighbourhood safety and decreasing the incidence of violent accidents and crimes is high on the political agenda. The push to be tough on crime has led to a rise in the numbers of people in prison, but has it also led to an increase in the perception of safety? Safety and security can also be measured in other ways. As our societies become more urbanised, more and more drivers, cyclists, and pedestrians are sharing the roads. This issue is of such importance that the United Nations has declared 2011-20 the Decade of Action for Road Safety. And, for good reason: nearly 1.3 million people die each year on the world's roads, with up to 50 million injured.[2] *Accident prevention and raising road safety awareness are essential components of many school curricula. Violence, crime, and bullying in schools are also at the top of policy agendas.*

Figure 2.5. **More and more people in prison**

The prison population rate shown as the number of prisoners per 100 000 population, 1992-2012



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Note: Data for Belgium, Canada, India, Israel, Korea, Portugal and the United States are from 2010, rather than 2011 or 2012.

Source: International Centre for Prison Studies (2012), *World Prison Brief*.

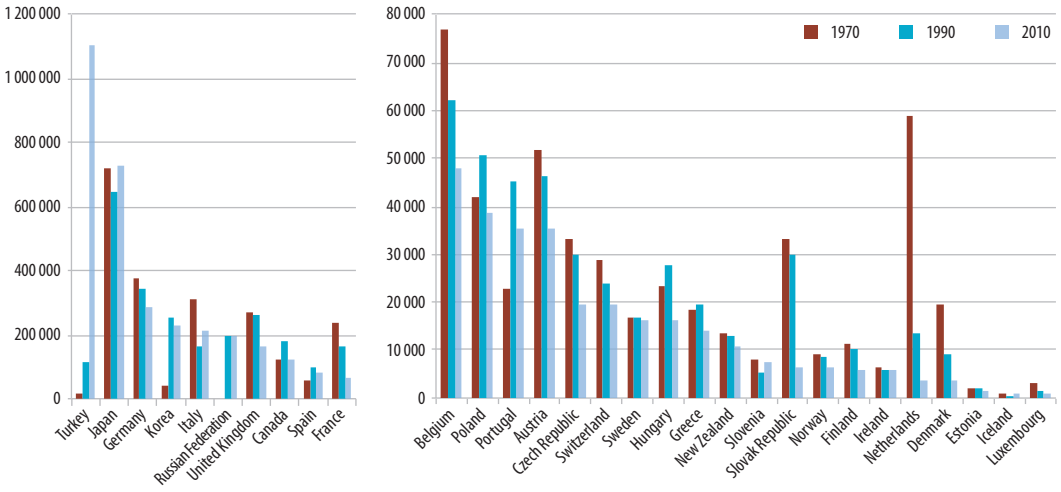
On average across the OECD there are more people being incarcerated in prisons. The United States saw a dramatic rise in the numbers of prisoners in the period between 1992 and 2010, from 501 per 100 000 people in 1992 to 730 per 100 000 people in 2010. The United States also has the highest proportion of the population in prison, well above the next highest rates in the Russian Federation and South Africa, and more than double that of the next OECD country, Chile. The lowest prison population rate among OECD countries is in Iceland, where only 47 people in 100 000 were incarcerated during 2011. While on average the trend is for increasing numbers of prisoners in most countries, there are a number of exceptions. Canada, Estonia, Finland, Germany, Korea, The Netherlands, and Portugal have all seen decreases in the number of people in prison since 2001.

The prevalence of road accidents is another way to measure individual safety in communities. Across the OECD, injury accidents (an accident resulting in at least one person

being injured or killed) steadily declined in most countries between 1970 and 2010. The two biggest exceptions to this are Japan and Turkey. An explosion of injury accidents was seen in Turkey during this time, particularly since 1990. This is likely due to both an increase in the number and coverage of roads, and the dramatic jump in the numbers of vehicles on them. It is important to note that while the number of injury accidents are in decline in some of the countries in the left figure – namely, Canada, France, Germany, Italy, Korea, Spain and the United Kingdom – the relatively large frequency of injury accidents is a continuing cause for concern. Even the lowest number of injury accidents in these countries on the left is very high. For instance, by 2010, there were still more than 67 000 injury accidents recorded in France, well above the almost 48 000 in Belgium, the country with the highest number of injury accidents in 2010 among countries in the graph on the right-hand side.

Figure 2.6. **Safer roads, but are they safe enough?**

Number of injury accidents, in 1970, 1990 and 2010



StatLink http://dx.doi.org/10.1787/888932757941

Note: An injury accident refers to any accident involving at least one road vehicle in motion, resulting in at least one injured or killed person, excluding suicides and terrorist acts. In this figure, data for the Czech Republic and Slovak Republic from 1970 and 1992 are figures of the former Czechoslovakia. Data for Belgium and Canada are from 2009 rather than 2010.

Source: OECD (2012), *OECD Stat Road Injury Accidents*.

And education?

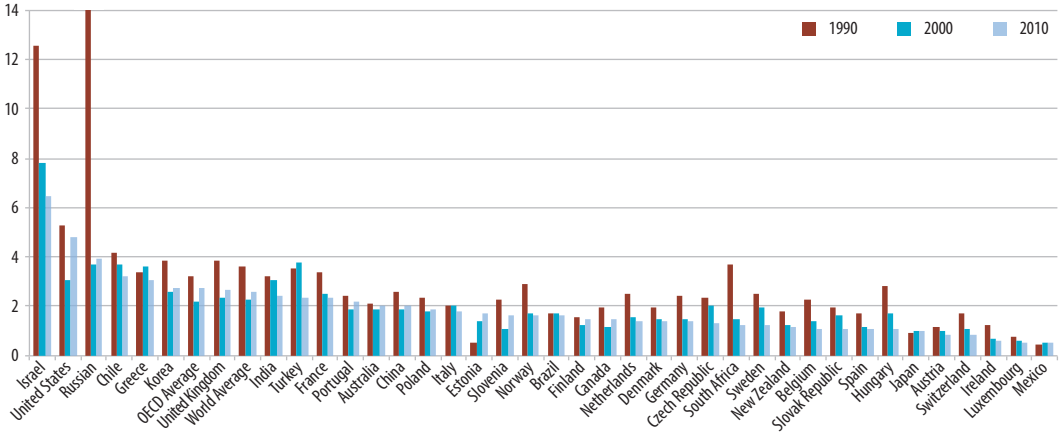
- Road safety is still a prominent issue. What action might educators take to raise student awareness of risks on the road, as well as ensuring safety within the physical proximity of the campus?
- Countries often turn to education to solve social problems. Does education have a role in preventing crime, for example, through keeping at risk youth engaged in the system or providing self-defence training for students? Should it?
- Are there examples of schools that have developed innovative solutions to minimise peer bullying within their student body? If so, how might mainstream schools learn from this?

WAR AND PEACE

National security issues are high on the political agenda in most countries. In an era of increasing globalisation, shifting social and community structures, and the development of new technologies, security, or a perceived lack of it, has an impact on the quality of life. National security is reinforced by strong economic ties and regional co-operation, as well as a strong military. Reductions in military spending and personnel in the armed forces across the OECD indicate increased room for economic trade agreements and regional co-operation to help maintain and improve national and international security. However, the reduction in spending on military-related research and development may have implications for innovation and technological advancement, in terms of funds available for research and development within the tertiary education sector.

Figure 2.7. **Military expenditure**

Military-related expenditure as a percentage of GDP, in 1990, 2000 and 2010



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Note: Data for the Czech Republic and Slovak Republic are shown for 1993, and Estonia and Slovenia for 1992 instead of 1990. Data for Luxembourg are from 2007 instead of 2010.

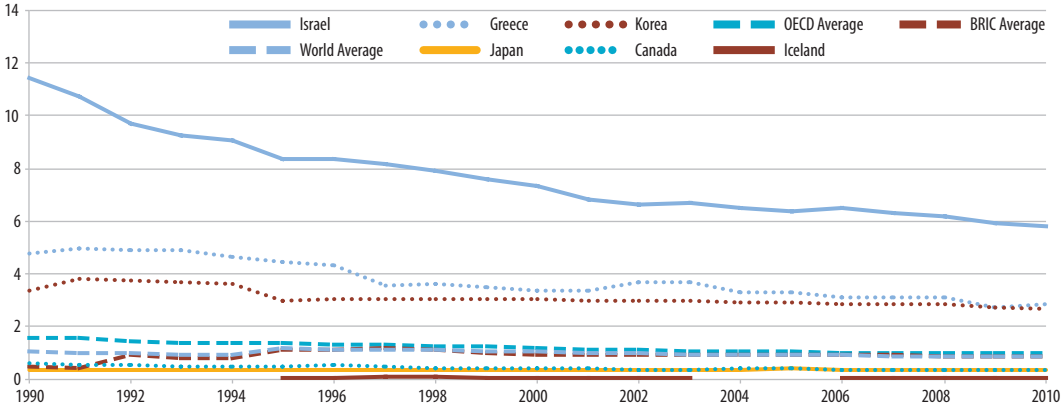
Source: World Bank (2012), *World Databank: Military Expenditure*.

Military spending has been decreasing across most of the OECD and BRIC countries in the last 20 years. For a number of countries, including Chile, Israel and much of Europe, military spending has consistently decreased across that time period. For others, notably the United States, military spending decreased between 1990 and 2000, but then increased again from 2000-10. Continuing uncertainty and global tensions suggest that it is too early to be sure if the reduction in spending is a steady trend that will continue in the future. For the short term, the reduction in military spending has helped ease some of the burden of economic cuts and deficits in overall government spending. However, there is some concern about potential harm to national research and development, and innovation infrastructure, as defence spending has a long history of developing technologies with broad public benefits (for example, the Internet, jet engines and satellite navigation).

The armed forces have traditionally been a stable employer for many OECD countries. However, between 1990 and 2010 the percentage of the labour force employed by the armed forces has seen a slow but steady decline. On average across OECD countries, the military employed 1.6% of the labour force in 1990, a figure which was reduced to less than 1% by the year 2010. Yet, there is large country variation, with the top spender (Israel) seeing a decrease from 11.5% in 1990 to 5.8% in 2010, and the other top spenders (Greece and Korea) posting smaller but consistent decreases throughout this time. In contrast, those countries that have the lowest percentage of the labour force employed by the armed forces (Canada, Iceland, and Japan) have seen little to no change. As the threats faced by the armed forces transform with the modern world, so too do the skills they require of their labour force. Job scarcity in economic downtimes allows the armed forces to choose those candidates with the best qualifications and aptitudes for their work. Conversely, the rise in student enrolment in tertiary education has led to a drop in voluntary applications for service in the armed forces and a rise in concerns about maintaining the quality of military recruits.

Figure 2.8. **Fewer people involved in the armed forces**

Percentage of the labour force employed in the armed forces, 1990-2010



StatLink http://dx.doi.org/10.1787/888932757979

Note: Armed forces personnel are individuals on active duty within the military, including paramilitary and others involved in training and organisation of these personnel and in the provision of equipment.

Source: World Bank (2012), *World Databank: Armed Forces Expenditure*.

And education?

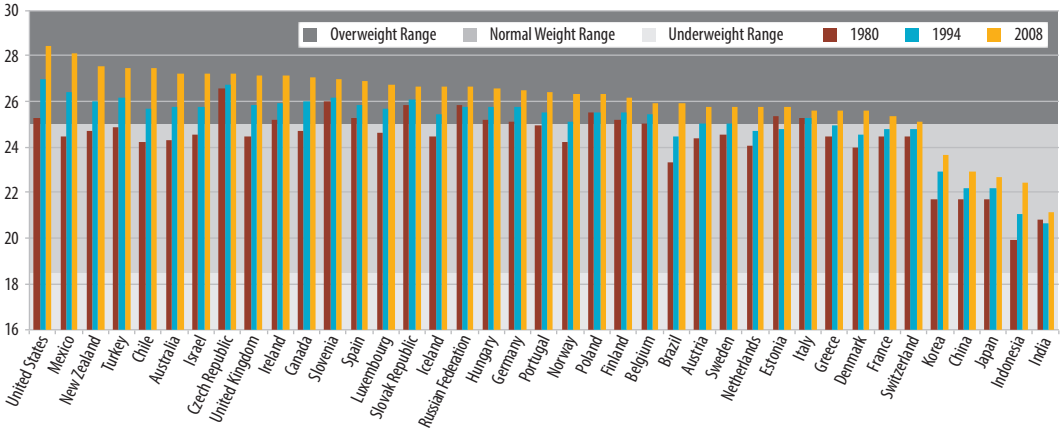
- Defence spending on research and development has produced major technologies (for example, the Internet, jet engines and satellite navigation). Will decreases in defence spending have an impact on national and international innovative capacity? What is the role of the university sector in supporting innovative research, and where will the funds come from?
- Civic education has been linked to increased tolerance, trust, and supporting nation building. Is this potential being fully exploited by our schools? Can we do more?
- Today's security challenges are remarkably different to those of 50 years ago, with growing threats of cyber attacks, biological weapons and international terrorism. Are education systems producing the highly-skilled and flexible workforce with the necessary skills (ICT, problem solving, critical thinking, languages, etc.) for addressing these challenges?

BODY AND SOCIETY: THE WEIGHT OF NATIONS

Growing affluence has had positive influences on the health of OECD citizens. Less premature death and infant mortality, and longer and healthier lives have all been associated with our increased economic well-being. But does affluence lead to indulgence? One of the most significant and widespread lifestyle-related health concerns is the growing obesity epidemic. In many OECD countries, obesity among adults and children threatens to grow into a severe public health crisis. As more "plump" children become obese adults, rates of heart disease, cancer, and especially diabetes will continue to grow. The toll of obesity is not only physical, but also psychological and social: obese people are more likely to suffer from poor self-esteem, anxiety, and depression. There is also evidence that society perceives obese people less positively, which could have an impact on perceived competence for employment, community work, and public office.

Figure 2.9. **Fit or fat?**

Average Body Mass Index of males and females in each country, in 1980, 1994, and 2008



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Note: Body Mass Index (BMI) is a calculated measure to classify adults as underweight, normal weight, overweight or obese, and is expressed as kilograms per square metre. The ranges for each of these classifications used here, consistent with WHO definitions, are underweight (<18.5), normal weight (18.5-24.99), overweight (25-30) or obese (>30).

Source: Gapminder (2011), *Data in Gapminder World: List of Indicators*.

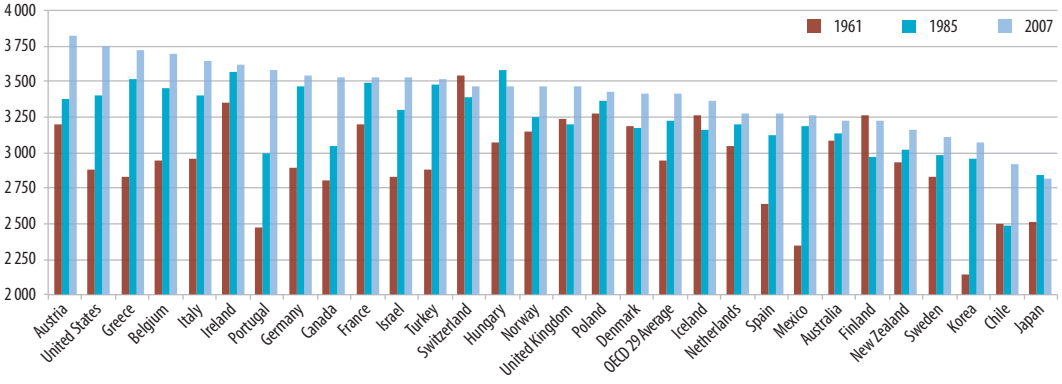
Across all OECD and BRIC countries, the average Body Mass Index (BMI) of the population increased between 1980 and 2008. This trend is universal, and it is swift. By 1980, there were already 14 of the 39 countries shown scoring "overweight" in terms of average calculated BMI, including the former Czechoslovakia, the Russian Federation and Slovenia. In 1994, this figure had grown to 27 countries, with several more hovering on the cusp between "normal" and "overweight". By 2008, 34 of the 39 countries had an average BMI that fell in the "overweight" range on average, with Mexico and the United States at the top of the list. Only China, India, Indonesia, Japan, and Korea still on average fell within the "normal" range of calculated BMI in 2008. But their average is also on the rise and so

these countries are at risk for the future. Given the speed and uniformity of the trend, it is not an exaggeration to label it an epidemic for OECD (and increasingly BRIC) countries.

Combating obesity requires changes in behaviour and improvements in non-cognitive skills such as impulse control. It also requires access to affordable, nutritious foods and opportunities for physical activity. Yet despite the money spent on public health campaigns in schools and workplaces which encourage people to eat more healthily, our intake of calories continues to rise. Korea, Mexico, and Portugal in particular have seen the most rapid rise in caloric intake in the period from 1961 to 2007, well above the recommended caloric intake of 2 250 calories per person per day. In fact, all of the countries in the figure below were well over the recommended daily limit in 2007, with an OECD average of 3 400 calories. This appears to suggest that the obesity epidemic is in full swing and not likely to end anytime soon. Educators have a role in instilling healthy lifestyle patterns early, as well as in promoting greater public awareness, healthy eating, and more physical activity early in life.

Figure 2.10. **Caloric intake is rising as weight rises**

Total caloric intake per person per day, in 1961, 1985 and 2007



StatLink http://dx.doi.org/10.1787/888932758017

Note: Caloric intake is the number of calories ingested; that is, the amount of calories in the foods and fluids an individual consumes.

Source: OECD (2012), *OECD Stat: Non-medical Determinants of Health*.

And education?

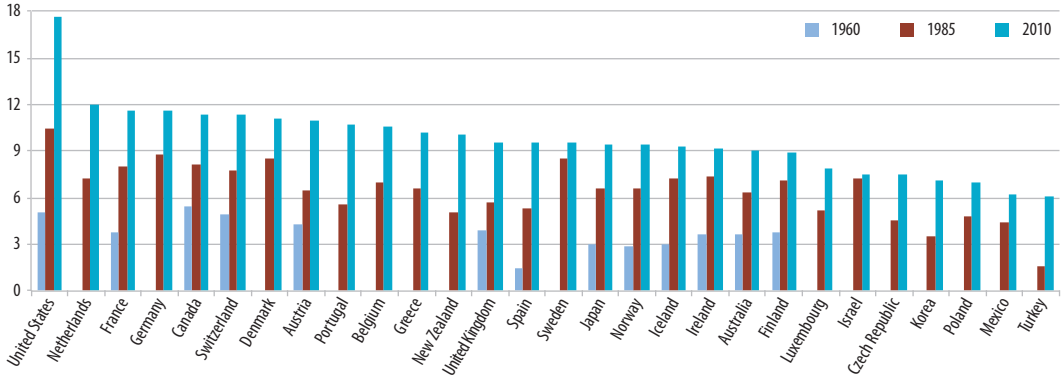
- What can schools do to improve physical health in addition to providing physical activity and nutrition programmes? Can they do more with well-being approaches such as teaching the skills needed to manage one's own body or informing about risks of obesity, without overloading the school curriculum?
- Should schools have vending machines that dispense sugary soft drinks and other snacks, or brand-name fast food outlets in cafeterias? What is the role of schools in encouraging healthy eating, for example, by providing nutritious meals?
- How might increasing rates of obesity impact on school infrastructure, for example, sturdier chairs or gym equipment?

INVESTING IN HEALTH

Our changing demography and lifestyles have profound effects on government expenditure in OECD countries. One of the great policy challenges is how to deal with increased health and pension expenditures while still covering other essential funding, for example for education. This section looks at health expenditure with a focus on one particular element: increasing longevity. Even though most countries are considering mechanisms to limit escalating health and pension costs, serious questions remain regarding the sustainability of present day budgets and strategic planning for the future. How will rising health and pension costs associated with living longer affect budgets available for other spending areas? And how can education partner with other sectors in order to tackle these issues from an intragovernmental perspective?

Figure 2.11. **Rising health expenditure**

Total public and private expenditure on health as a percentage of GDP, in 1960, 1985 and 2010



StatLink http://dx.doi.org/10.1787/888932758036

Note: Data presented for 2010 for Australia, Israel, Japan and Luxembourg are from 2009, while the figure for Turkey is from 2008.

Source: OECD (2012) *OECD Stat – Health Expenditure and Financing*.

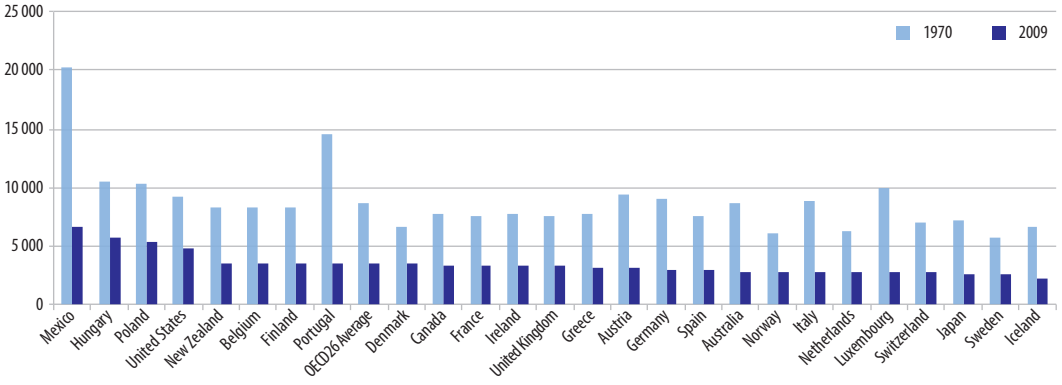
Public and private expenditure on health has increased in all OECD countries since 1960. At that time, health expenditure was on average just over 3% of GDP in the 13 countries for which these data were available. By 1985, this figure had risen to 6%, and by 2010, it had risen again to almost 10%. Except for Luxembourg, health spending has grown more quickly than GDP since 2000, which is in part driving this trend. It is important to note that within the averages, there is considerable country variation. In 2010 for example, the United States spent a total of 17.6% of their GDP on health, while Turkey spent only 6%. In terms of the balance between private and public expenditure, there is again wide country variation. Denmark spends the most on public funding as a percentage of their GDP, while Korea and Mexico have a more even split between public and private financing compared to other OECD countries.[3]

Potential years of life lost (PYLL), is an estimate of the average years a person would have lived if he or she had not died prematurely. These data are useful in setting priorities for health issues in society. In PYLL, deaths that occur at younger ages (e.g. accidents) receive

more weight than deaths that occur later in life. It is thus good news for OECD countries that the average PYLL across the OECD decreased by over 50% in the period between 1970 and 2009. Some countries made enormous gains, with Mexico reducing its PYLL by the biggest margin in this time period, followed by Portugal. However, there is still room for improvement: Mexico in 2009 remained the country with the highest PYLL in the figure below. Countries which had the lowest PYLL were Iceland, Japan, and Sweden. Fewer premature deaths mean more people living longer, which in turn means higher health and pension costs. In difficult economic times, extra pressure on already limited budgets is one of the most serious governmental challenges for the short and medium-term future.

Figure 2.12. **People living longer, fewer premature deaths**

Potential Years of Life Lost (PYLL), in 1970 and 2009



StatLink http://dx.doi.org/10.1787/888932758055

Note: Potential years of life lost (PYLL) is a summary measure of premature mortality, where age specific deaths occurring at each age are added and weighted according to the number of remaining unlived years up to age 70. The data is expressed per 100 000 females and males.

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

And education?

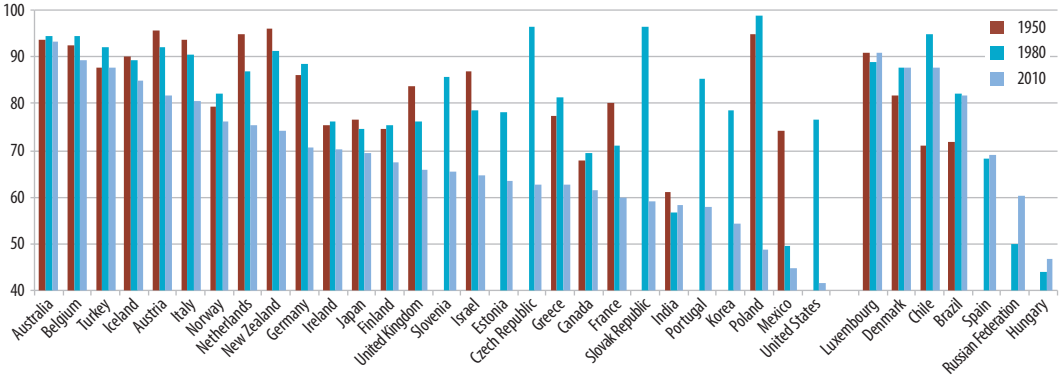
- Given increasingly tight budgets, how might education co-operate with other sectors to tackle these public policy challenges from a cross-governmental perspective?
- Can models of public-private funding on health and pensions be adapted to cover the rising cost of education?
- While the data show fewer premature deaths, the loss of a peer can be one of the most difficult things for a young person to handle. How can schools and teachers be better prepared to help them through such crises?

THE BALLOT BOX

Civic engagement is one way individuals can make a difference in their communities and societies. Measures of civic engagement include both political and non-political processes, such as voting, volunteering, and contributing to philanthropic initiatives. Higher levels of civic and social engagement have been linked to higher levels of trust and tolerance in communities, and are considered a fundamental aspect of a healthy democracy. Yet in many countries across the OECD, measures of civic participation, including voter turnout, have fallen throughout the last half century. Can education and schools play a role in improving civic and social participation? Research suggests that classroom climate and confidence in school participation are positively associated with some of the knowledge, skills and behaviours that underlie civic participation. A pressing question for many OECD countries is: can trust, tolerance, and collaboration be taught?

Figure 2.13. **Fewer people engaged in their democracies**

Parliamentary voter turnout, in 1950, 1980 and 2010 (or nearest available year)



StatLink http://dx.doi.org/10.1787/888932758074

Note: Voter turnout is the total number of votes cast (valid or invalid) divided by the number of people registered to vote, expressed as a percentage. Where the data for countries were not consistently available in the same years, figures from the closest year are used. The year of each data point is provided in a table in the StatLink above.

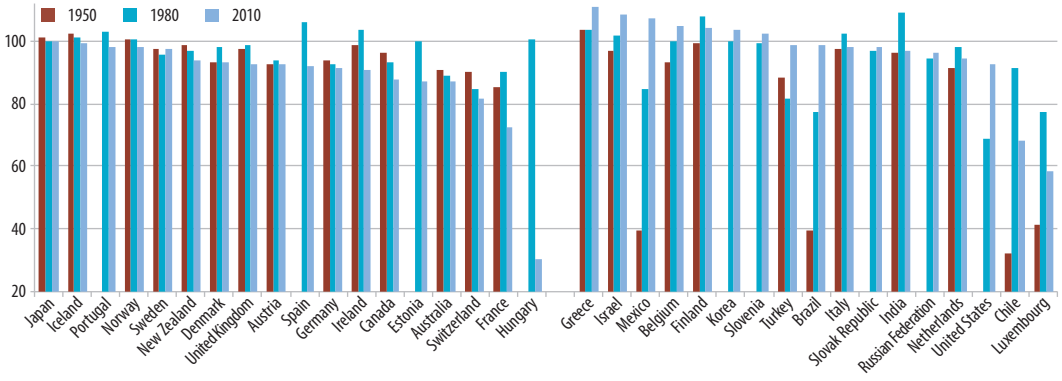
Source: International IDEA (2011), *Voter Turnout Database*.

Voter turnout has declined in most OECD countries since the 1950s. In Austria, Italy, the Netherlands, and New Zealand, for example, the data show voter turnout over 90% in 1950, a figure which had dropped to just over 70% in 2010. In Hungary, Mexico, Poland, and the United States, voter turnout in 2010 was less than 50% of the eligible population, a marked decline from previous years. Some countries are resisting the trend: Australia, Belgium, and Luxembourg, which all have compulsory voting, hover around a 90% voter turnout since 1950. However, this is not necessarily the solution: voting is compulsory in Greece as well, and despite this, the country has seen voter turnout decline from around 80% in 1951 and 1981 to just over 70% in 2012. In contrast, Brazil, Chile, and Denmark all saw increases in voter turnout in the mid 20th century, with more or less stable turnout over the last 30 years.

In contrast to voter turnout, rates of voter registration vary across countries between 1950 and 2010. Voter registration has been declining steadily in that time period in Australia, Canada, and Switzerland. In Hungary, it declined dramatically from 1990 to 2010 (from 100% to only 30%). Other countries show the reverse pattern: voter registration has been increasing steadily in Belgium, Brazil, Greece, Israel, and Mexico. These figures suggest that in many countries more could be done to encourage and support civic participation. Education can play a role in fostering awareness of democratic principles and procedures, as well as highlighting the importance of civic and social participation in society.

Figure 2.14. **Rates of voter registration down in some places, up elsewhere**

Percentage of the voting age population (all persons aged >18 years) who are registered to vote, 1950, 1980 and 2010 (or nearest year available)



StatLink http://dx.doi.org/10.1787/888932758093

Note: The proportion of voting age population in each country who are registered to vote exceeds 100% in some cases due to (inter alia) citizens with voting rights who do not reside in that country, and poor management of voter lists. It is also important to note that voting age population data includes individuals who are not eligible or able to vote, for example those who are residents but not citizens, or who have a prior felony conviction.

Source: International IDEA (2012), *Voter Turnout Database*.

And education?

- Developing responsible, active citizenship is fundamental to any system of education. What should be the specific role of schools and universities in fostering civic literacy?
- Should schools help build the attitudes necessary for student empowerment by giving pupils more opportunities to be heard, participate and collaborate in school decision making?
- How might schools pro-actively provide opportunities for students to take part in democratic exercises, such as student councils, youth parliaments, and model United Nations?

NOTES

1. OECD (2012), "Are Large Cities Educational Assets or Liabilities?", *PISA in Focus*, No. 17, OECD Publishing. *http://dx.doi.org/10.1787/5k962hdqjflr-en*.
2. Road Safety Fund (2011), *UN Decade of Action for Road Safety,* FIA Foundation and the World Health Organisation, online, *http://www.roadsafetyfund.org/TagSymbol/Pages/default.aspx*, accessed October 2012.
3. For more information, see Figure 7.2 in OECD (2011), *Health at a Glance 2011: OECD Indicators,* OECD Publishing. *http://dx.doi.org/10.1787/health_glance-2011-en*.

FIND OUT MORE

Relevant sources

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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.

Definitions and measurement

- **Armed forces personnel:** Armed forces personnel are individuals on active duty within the military, including paramilitary and others involved in training and organisation of these personnel and in the provision of equipment. The total labour force is all economically active persons under the definition of the International Labour Organisation.
- **Body Mass Index (BMI):** Body Mass Index (BMI) is a calculated measure to classify adults as underweight, normal weight, overweight or obese, and is expressed as kilograms per square metre. The ranges for each of these classifications used here, consistent with WHO definitions, are underweight (<18.5), normal weight (18.5-24.99), overweight (25-30) or obese (>30).
- **BRIC countries:** The BRIC grouping of countries includes Brazil, the Russian Federation, India and China. The broader group acronym BRIICS also includes Indonesia and South Africa.
- **Caloric intake:** Caloric intake is the number of calories ingested; that is, the amount of calories in the foods and fluids an individual consumes.
- **Compulsory voting:** Where voting at an election is compulsory for all and has been regulated in constitutions and electoral laws. Some countries go as far as to impose sanctions on non-voters.
- **Health expenditure:** Total expenditure on health measures the final consumption of health goods and services, public health and prevention programmes, health-related administration and capital investment in health care infrastructure. Included are essentially all activities that involve the application of medical, paramedical and nursing knowledge and technology, from curing illness, to palliative care, to health promotion. The funds required to administer public health and health-related programmes are also counted. General public safety measures, such as technical standards monitoring and road safety are not considered part of expenditure on health. Activities such as food and hygiene control and health-related research and development are similarly not included.
- **Injury accident:** An injury accident refers to any accident involving at least one road vehicle in motion on a public road or private road to which the public has right of access, resulting in at least one injured or killed person. Injury accidents exclude accidents incurring only material damage, suicides and terrorist acts.

- **Military expenditure:** Military expenditure refers to all expenditure on the armed forces of a country, including those used for peacekeeping and paramilitary forces, within defense ministries, other government agencies engaged in defense-related projects and other organisations equipped to engage in military operations including in space.
- **One-person household:** Simply the act of providing for yourself alone. One-person households are those people who provide their own food, and other living essentials, without combining these activities or materials with any other person to form part of the alternative structure – namely, a multi-person household.
- **Particulate matter (PM):** The particulate matter is measured in micrograms per cubic metre in the air of urban residential areas of greater than 100 000 people. It is also known as PM10, which refers to fine suspended particulates that measure less than 10 microns in diameter and have the potential to cause significant damage to the respiratory system through deep penetration into the respiratory tract.
- **Potential years of life lost (PYLL):** Potential years of life lost (PYLL) is a summary measure of premature mortality. The calculation of PYLL involves adding age specific deaths occurring at each age and weighting them by the number of remaining unlived years up to a selected age limit, defined here as age 70.
- **Prison population rate:** The prison population rate is the number of people incarcerated in a country per 100 000 people in the population. This correction for the population size enables cross country comparison.
- **Registered voters:** The IDEA provides data for both the number of people in each country who are registered to vote and the number of people in the resident population who are of legal voting age (voting-age population). The proportion of this voting-age population in each country who are registered to vote is calculated from these two indicators. It is important to note that the data does not take into account the existence of people who are citizens with voting rights but who are not part of the resident population in a country. Also, the voting-age population data includes people who are not eligible or able to vote for some reason, including those who are part of resident diasporas in a country but not citizens.
- **Total expenditure on health:** Data for the total expenditure on health is a sum of all public and private health-related expenditure, including the provision of health services (preventive and curative), family planning activities, nutrition activities, and emergency aid designated for health.
- **Urban agglomerations and megacities:** It is difficult to define the boundaries of the population of many cities. Rather than use the word "city", the UN Populations Division refer to "urban agglomerations", and define these as a de facto population contained within the contours of a contiguous territory inhabited at urban density levels, without regard to administrative boundaries. Further, these areas usually include both the city population and the inhabitants of the surrounding or adjacent suburban areas. The growth of city populations world wide over recent decades has led to the common use of the term "megacity" to describe those that are particularly large. In this context, large cities range in size from 5 million to over 20 million inhabitants.
- **Voter turnout:** Voter turnout is the total number of votes cast (valid or invalid) divided by the number of people registered to vote, expressed as a percentage.
- **Voting age population:** the number of people in the resident population who are of legal voting age.

Chapter 3

Labour and skill dynamics

Women in the workplace: *explores trends in female employment and the persisting wage difference between genders.*

The best of both worlds: *examines the trade-off between family and career in women's lives.*

Skills: *A local matter: looks at local levels of skills mismatch and equilibrium and skill loss or decline throughout life.*

Knowledge economies: *the transition towards more knowledge intensive economies through the growing importance of R&D activities and a composite index of indicators.*

New ideas: *Patents and people: illustrates the increasing numbers of people employed as researchers and their output through patents filed around the world.*

Flexible work?: *examines flexibility in the labour market through two trends: the numbers of full-time workers and the numbers of salaried workers compared to those self-employed.*

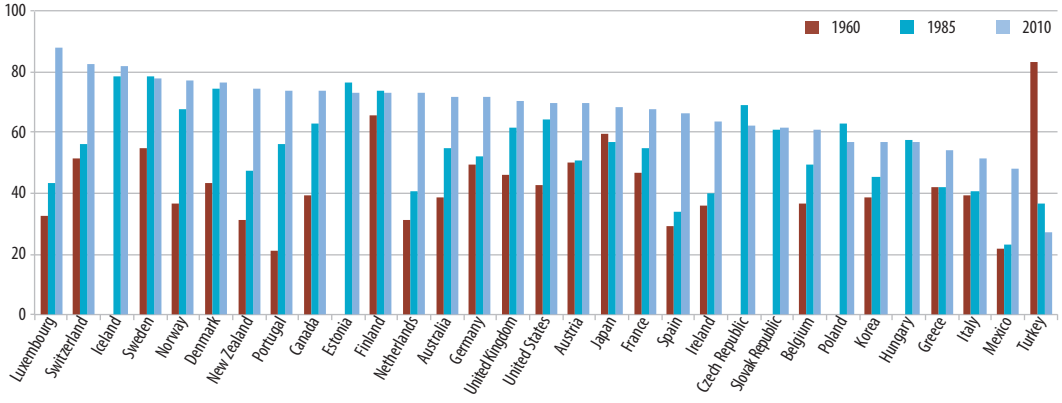
Mind the gap: *highlights the income divide between the haves and have-nots, and also examines the changing shares of national income devoted to social expenditures.*

WOMEN IN THE WORKPLACE

One of the most significant social transformations of the past half century has been the move towards equality of opportunity for women. Since 1960, the world of work has increasingly included women. Increased opportunity for education, the possibility to delay child bearing, and the desire for economic independence have all been a part of this major social shift. However, there are persistent challenges: the continuing difficulty of reconciling family and working life, unequal representation of women in high level jobs, and a persistent gender wage gap. It is now clear, that women will continue to be present in tertiary level education, despite room for improvement particularly in the maths and sciences. For education, the emerging gender concerns raise questions about the effectiveness of current offerings for both younger and older males.

Figure 3.1. **More women at work**

Total female labour force as a percentage of the female population aged 15-64 years, in 1960, 1985 and 2010



StatLink http://dx.doi.org/10.1787/888932758112

Note: Where data were not available for the years shown in a particular country, the closest year available was used. For more detailed information, see StatLink above.

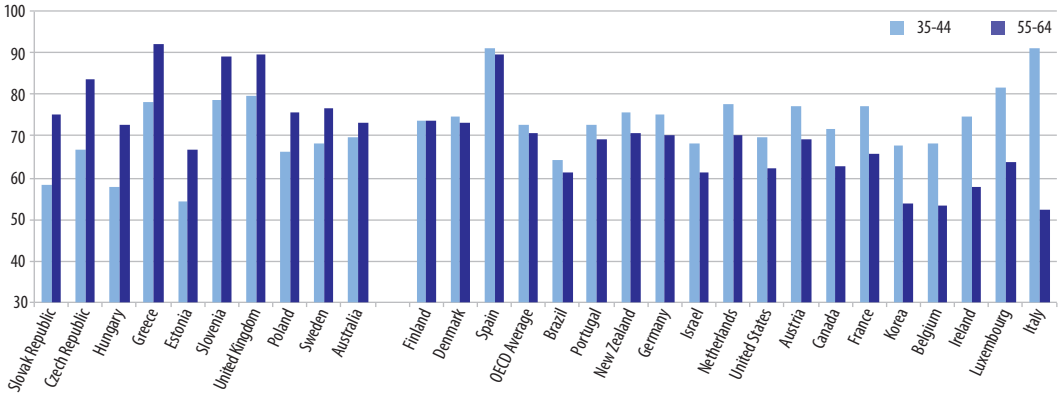
Source: OECD (2012), *OECD Stat: Population and Labour Force*.

Women's participation in the labour market generally increased across the OECD during the latter half of the 20th century. In the period between 1960 and 2010, the number of women in the workforce increased for all OECD countries, except for the Czech Republic, Estonia, Hungary, Sweden, and Turkey. While participation is increasing, it is still lower than the rates for men, despite the inclusion of part-time and flexible work in these figures. In 2010, an average of 82% of men in OECD member countries were active in the labour force, compared to 67% of women. The largest advances since 1960 were achieved in Portugal, which tripled its share of women in the workforce during this period, followed by Luxembourg, the Netherlands, New Zealand, Norway, Mexico and Spain, which all more than doubled the percentage of women in work. Greater participation in paid employment fundamentally influences female independence and in turn their aspirations, both educational and professional.

As the number of women in the workforce rises, the wage gap between females and males is decreasing – at least in some countries. On average across the OECD in 2011, tertiary educated women aged 35-44 years earned 73% of the salary earned by men with the same level of educational attainment. This is a slight increase on the 71% earned by women aged 55-64 years. However, this average hides two different trends: one in which the wage gap is diminishing, in some cases substantially, and one in which it is increasing. (Note that the higher the bars are in the chart below, the smaller the wage gap.) Of the 18 countries where the wage gap is decreasing, Italy has made the greatest strides. Tertiary educated Italian women aged 55-64 years earned only 52% of the earnings of their male peers, while this figure was up to 91% for the younger generation of tertiary educated women aged 35-44 years. This increase sees Italy join Spain as the two countries with the lowest wage gap in this younger age group. In contrast, there are as many as ten countries within the OECD where wage inequality is increasing. Several of these countries are from the former Soviet bloc in Eastern Europe, with some exceptions: Australia, Greece, Sweden and the United Kingdom have all seen wage inequality *increase* for tertiary educated women.

Figure 3.2. **Wage inequalities persist, but improvements in some countries**

Average annual full-time earnings of women who have attained tertiary education as a percentage of the earnings of tertiary educated men, in age groups 35-44 and 55-64, in 2010 or nearest year available



StatLink http://dx.doi.org/10.1787/888932758131

Note: Data are from 2010 or nearest year available. Figures from 2009 are used for Australia, Belgium, Canada, Greece, Portugal and Spain. Figures from 2008 are used for France, Italy and the Netherlands.

Source: OECD (2012), *Education at a Glance 2012: OECD Indicators*.

And education?

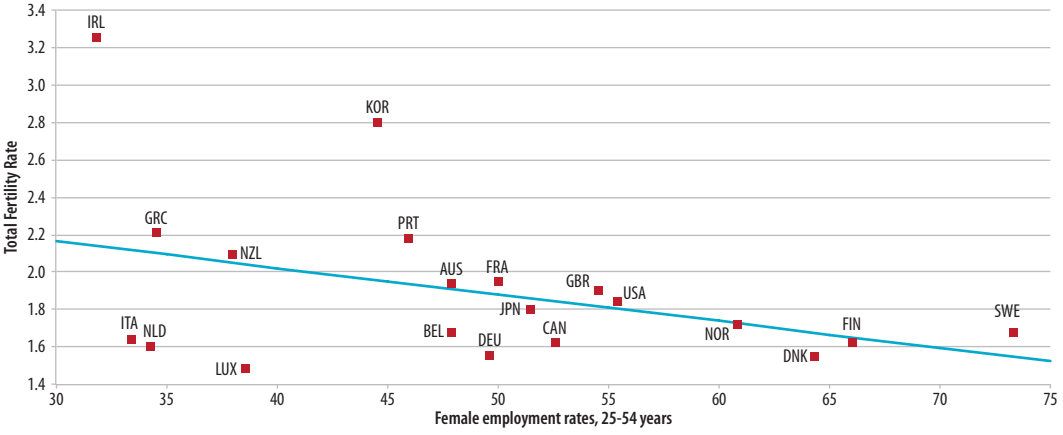
- Given the persistence of wage inequality across the OECD, what are the ways that both male and female students can be supported to develop the behaviours and attitudes they need to succeed in the workplace (for example, critical thinking skills, self-assertiveness etc.)?
- What role does education play, through implicit and explicit guidance, in shaping the professional and educational choices made by males and females? What are the priorities for future change in this respect?
- Social and gender stereotypes can often play out in the workplace. What is the role of education in challenging negative assumptions and behaviours that are part of these stereotypes?

THE BEST OF BOTH WORLDS

Engaging women in the workforce has created a dilemma for families: many young people still face difficult choices regarding the timing and frequency of their childrearing. For decades, many women have felt that there is no ideal time in their career to build a family. Reconciling family and working life has been, and continues to be, one of the most difficult issues for working women, and men, to resolve. On average, women are choosing to actively participate in the working world, which means putting off children until later in life and having less children overall. For education, this trend means that there are more likely to be older parents, better educated parents, and more single child families. These parents might tend to be more active in education, demanding more and pushing schools to cater for the individual needs of their children.

Figure 3.3. **A trade-off between family and career**

Employment rate for women aged 25-64 years versus their total fertility rate (children per woman aged 15-49), in 1980



StatLink http://dx.doi.org/10.1787/888932758150

Note: Employment rates are calculated as the ratio of the employed to the working age population. The total fertility rate is calculated by dividing the number of live births each year to women from each age group by the population of women in the same age group. This calculation assumes no mortality.

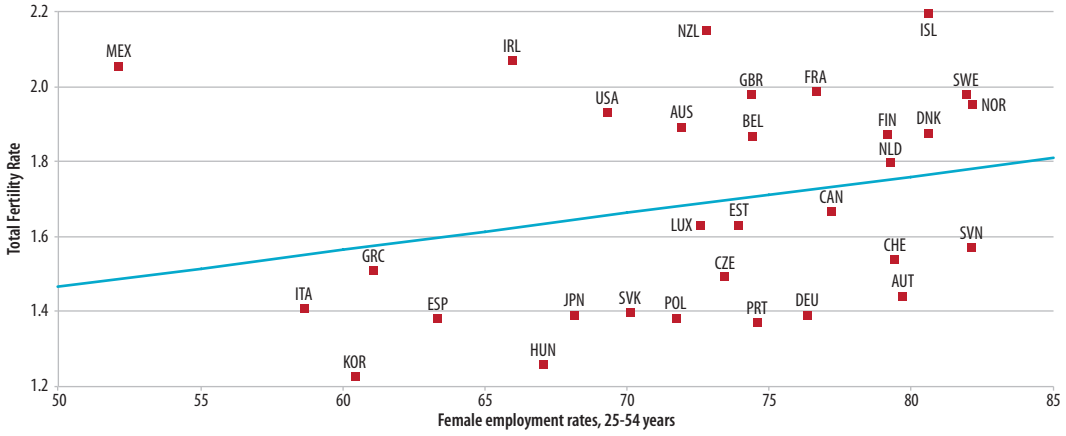
Source: OECD (2011), *OECD Family Database*.

There is a tension between the world of work and the joys and demands of childbearing. There is often a trade-off for women in terms of the timing of their childbirth and the numbers of children they choose to have. This individual choice has played out on the national level across all OECD countries, with women in general choosing to enter the workforce in greater numbers and delay and/ or reduce the size of their families. In 1980, 50% of women were active in the labour market on average across the OECD, and the average fertility rate was two children per woman. This overall average varies across countries, with Ireland at one extreme with an average fertility rate of 3.25 children per woman and only 32% of women in the workforce. This can be contrasted to the Nordic countries, for example Sweden, in which 73% of women were engaged in the workforce in 1980, and an average of 1.7 children were born to each woman.

By 2010, this picture had changed substantially. On average across the OECD, up to 75% of women were active in the labour market, with the OECD average fertility rate falling to 1.7 children per woman. The pattern across individual countries was as complex as the one two decades previously, but with different outcomes. Some countries (for example, Mexico) still have relatively high fertility and low female employment rates, while others have lower fertility and higher labour force participation (for example Germany). There are also a number of countries, including Israel and New Zealand which have both relatively high fertility rates (2.2 children per woman) and over 70% of women active in the workforce (in fact, over 80% for Israel). In 2010, the calculated trend line shows that overall change across countries from 1980 was generally positive, that is, countries with higher female employment rates were also more likely to have higher fertility rates.

Figure 3.4. **More women working and also having a family**

Employment rate for women aged 25-64 years versus their total fertility rate (children per woman aged 15-49), in 2010



StatLink http://dx.doi.org/10.1787/888932758169

Note: Employment rates are calculated as the ratio of the employed to the working age population. The total fertility rate is calculated by dividing the number of live births each year to women from each age group by the population of women in the same age group. This calculation assumes no mortality.

Source: OECD (2011), *OECD Family Database*.

And education?

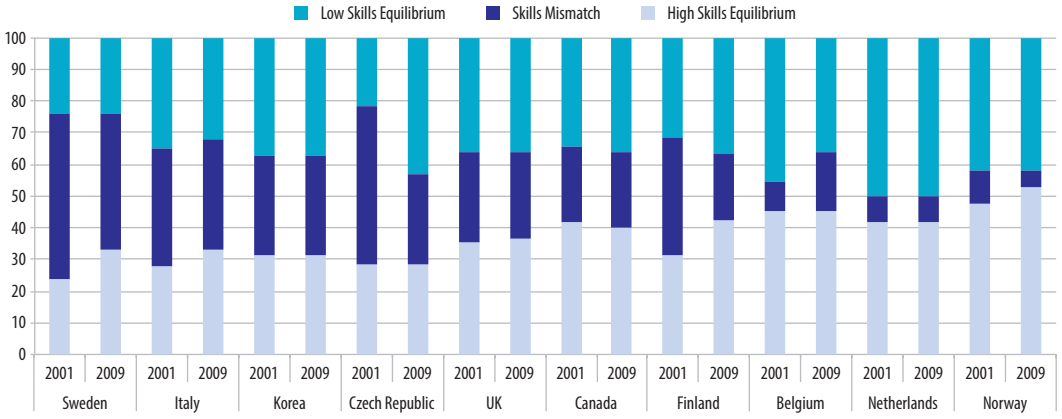
- How are schools experiencing the impact of ever-greater numbers of mothers with full professional careers? What impact will this have on the need for early childhood education and care?
- Has the participation of both parents in the work force changed the balance of responsibilities between schools and families in raising children? And, has it altered interaction with fathers?
- More children than ever are in early childhood education and care. What does this mean for the capacity of the system? How can high quality services and standards in this area be ensured?

SKILL SUPPLY AND DEMAND

Skills have become the global currency of twenty-first century economies. Without sufficient investment in skills, people languish on the margins of society, technological progress does not translate into productivity growth, and countries can no longer compete in an increasingly knowledge-based global economy. Many countries have developed national and local strategies to improve the skill levels of their citizens, but their success in implementing them varies widely. Many continue to struggle with low levels of adult basic skills, problems of skills mismatch, skills shortages and unemployment. This section looks at these issues by examining two trends: the balance of skill demand and supply in local economies, and the risk of unused skills deteriorating throughout life.

Figure 3.5. **Skills mismatch varies across countries**

Proportion of a country's local economies in a state of skills equilibrium and mismatch in selected OECD countries, in 2001 and 2009



StatLink http://dx.doi.org/10.1787/888932758188

Note: The complex balance between skill demand and supply of local economies is presented here as High Skills Equilibrium, Skills Mismatch and Low Skills Equilibrium. Local economies refer to are areas which have a population of 800 000 or less. Data for 2001 are replaced by 2000 figures for the Czech Republic, Finland, Korea and the Netherlands, and by 2007 data for Norway. Data for 2009 are replaced by the 2006 figure for Canada, the 2008 figure for Finland and the 2010 figure for Korea.

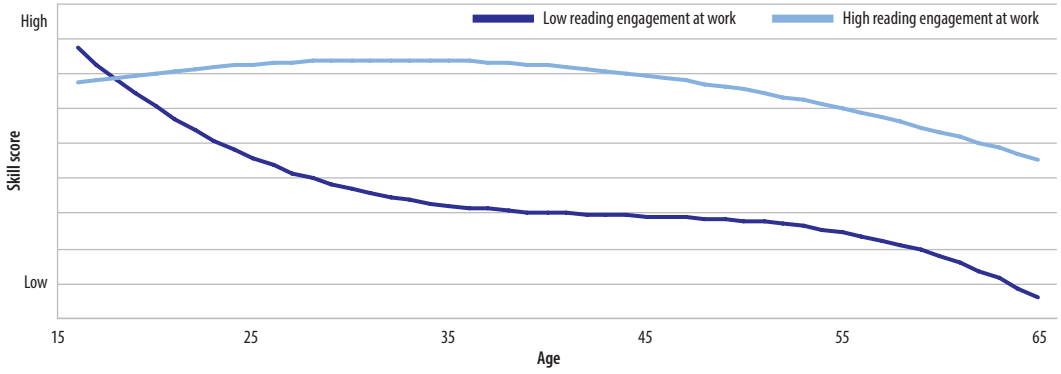
Source: Froy, F., S. Giguère and M. Meghnagi (2012), "Skills for Competitiveness: A Synthesis Report".

Skill supply and demand more often plays out at the local level, rather than nationally, as this is where the matching of skills supply from residents and demand from employers takes place. Figure 3.5 above illustrates the diverse skill profiles of local economies within different countries, through a typology developed by the OECD LEED Programme.[1] For the purpose of this analysis, a skills mismatch includes local economies that are facing either a lack of skills (skills shortage) or an excess of skills (skill surplus). Among the countries represented above, Sweden had the highest proportion of local economies experiencing skills mismatch in 2009. The Czech Republic, which had the highest proportion of local economies in a skills mismatch in 2000, saw this trend reduced substantially by 2009. Norway boasts the smallest proportion of local economies experiencing skills mismatch in 2009.

Foundation skills, for example proficiency in reading or mathematics, seem to be a dynamic asset – simply put, "use it or lose it". Findings from the Adult Literacy and Lifeskills Survey demonstrate that older respondents were more likely to have lower literacy skill scores than younger ones, and this was the case even when education levels and immigrant status were taken into account. However, by early adulthood those individuals who read more, both at work and for pleasure, had higher skill scores than those who did not. This advantage was observed even in the eldest respondents surveyed (65 years old). For countries with rapidly ageing populations, such as Poland, Korea, Japan and many more, these data suggest that there might be room to develop approaches to help older individuals support and reinforce their foundation skills through, for example, simple workplace programmes and exercises.

Figure 3.6. **Unused skills may be more likely to atrophy**

Literacy skills proficiency of adults aged 16-65, by reading engagement, adjusted for years of schooling and foreign-born status, 2003-2007



StatLink http://dx.doi.org/10.1787/888932758207

Note: The analysis is based on pooled data of 8 countries: Canada, Hungary, Italy, the Netherlands, New Zealand, Norway, Switzerland and the United States. Results are adjusted for country effects.

Source: Adult Literacy and Lifeskills Survey, 2003-2007.

And education?

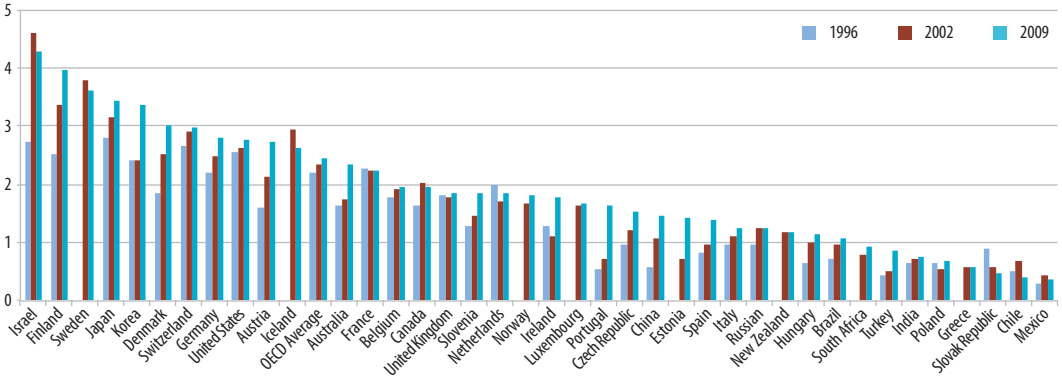
- How connected are employers to education and vocational training systems and to what extent does education ensure that the supply of graduates meets the needs of the economy? Do educators also work with employers to raise the demand for skills to create better quality jobs and contribute to growth?
- Ageing populations and later retirement age in many OECD countries mean that there will be proportion of the population within working age range (15-64 years) will decrease in the future. What is the role of lifelong learning (formal and informal) in reinforcing and supporting skills in the oldest workers?
- The most difficult jobs to fill for many countries are skilled trade and labour positions (for example, plumbers), yet in many OECD countries vocational education and trade is perceived as a second choice for students. How can the status of vocational education and training be raised in those contexts?

KNOWLEDGE ECONOMIES

Are OECD countries becoming more knowledge intensive? One of the big themes in recent years is the increasing importance of knowledge-intensive economies. In measuring the extent of this shift, analysts have turned to numerous indicators, including those that highlight research and development activities, support for entrepreneurship, participation and attainment in tertiary level education, distribution of the labour force in employment across economic sectors, as well as the availability and quality of information and communication technology infrastructure. Educators need to be aware of the growing focus on the advanced skills and qualifications their students will need to flourish within more knowledge-intensive labour markets, without neglecting the development of student capabilities in other important skills. There is also a role for the vocational sector, in addition to universities, in training sufficient numbers of highly skilled graduates.

Figure 3.7. **More investment in research and development**

Total spending on research and development (public and private), as a percentage of GDP, in 1996, 2002 and 2009



StatLink http://dx.doi.org/10.1787/888932758226

Note: Figures from 2003 are presented in place of 2002 data for Greece, Luxembourg, New Zealand, South Africa and Sweden. Similarly 2002 data are replaced by 2004 for Switzerland. Figures from 2008 replace 2009 data for Australia, Brazil, Chile, China, Iceland, the OECD Average and South Africa. Figures from 2007 replace 2009 data for India, Greece, Mexico and New Zealand.

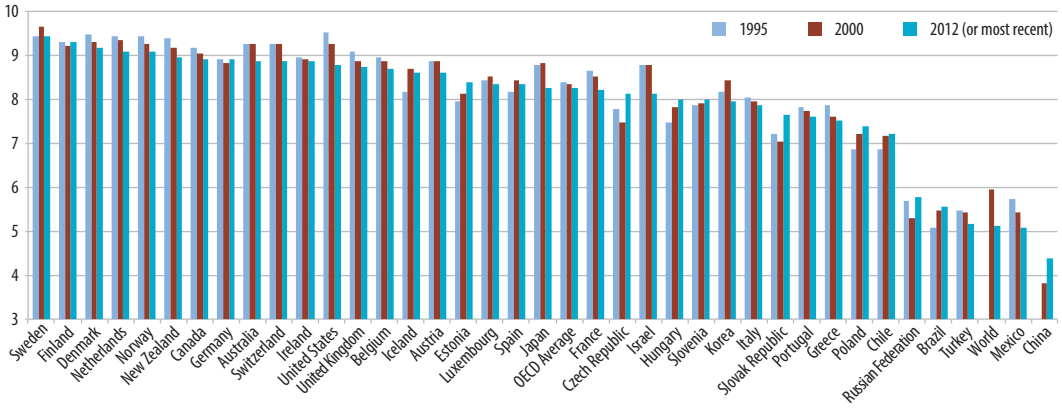
Source: World Bank (2012), *World Databank: Research and Development Expenditure*.

Research and development (R&D) refers to three activities: basic research, applied research, and experimental development. Across the OECD, expenditure on R&D as a percentage of GDP increased in the period 1996-2009. Korea in particular recently increased its spending on R&D by over 70%, from 2.4% in 2002 to 3.4% in 2009. In other countries, this figure has remained stable or decreased slightly. Country differences in levels of investment are wide between those which now spend more than 3% of GDP on R&D (Finland, Israel, Japan, Korea, and Sweden) and those at 1% or less (Chile, Greece, India, Mexico, Poland, the Slovak Republic, South Africa, and Turkey).

The World Bank developed an index through which to measure knowledge intensity. This Knowledge Economy Index (KEI) specifically compares country performance on

four pillars of a knowledge economy: (1) Economic Incentive and Institutional Regime; (2) Education and Human Resources; (3) The Innovation System; and, (4) Information and Communication Technology. Based on this index, countries such as Denmark, Finland, the Netherlands, Norway and Sweden are rated as the most knowledge intensive, while China, Mexico, and Turkey are rated as the least knowledge intensive. The World Bank KEI has only been calculated since 1995. From the presented data, it would seem that economies across the OECD, even those rated most highly, are remaining steady or decreasing in knowledge intensity. However, it is important to note that for many OECD countries the period of time since 1995 may not capture much of their prior transition. Either way, education systems around the world will at varying degrees face the need to provide students with the skills necessary to succeed in a globalised and knowledge-intensive world. This should be done of course, in conjunction with the ongoing need for vocational and other skill sets that will serve economies across time.

Figure 3.8. **Becoming more knowledge intensive?**
World Bank's Knowledge Economy Index, in 1995, 2000 and 2012



StatLink http://dx.doi.org/10.1787/888932758245

Note: The Index is created from around 109 structural and qualitative variables for 146 countries. More information about this Index can be found in the StatLink and online at *http://go.worldbank.org/SDDP3I1T40*.

Source: World Bank (2012), *Knowledge For Development: KEI and KI Over Time Comparisons*.

And education?

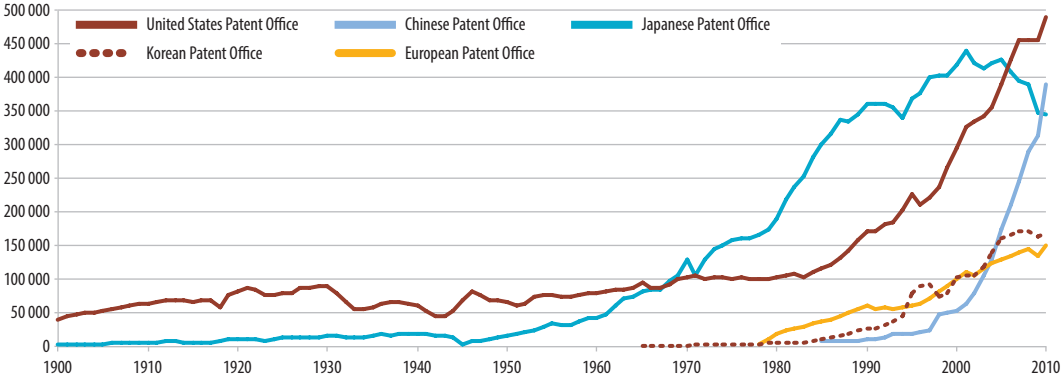
- Increased R&D investment supports the rise of a global market for research. Should governments develop strategies to support targeted areas of research in order to maximise global competitiveness in the higher education sector?
- Is the rhetoric of "creating knowledge-intensive economies" matched by what actually takes place in both the public and private sectors? What are the specific responsibilities of education systems in helping to achieve this goal?
- Are the policies of governments and tertiary institutions sufficiently aligned to provide the funding and training needed to power the knowledge-intensive economies of the future?

NEW IDEAS: PATENTS AND PEOPLE

Trends in research and development (R&D) are a good indicator of innovation in a country or region. This section examines this through two different trends: the number of patent applications filed in patent offices around the world, and the number of people working in R&D. The number of patents and share of the population in research within OECD member countries has increased, as might be expected with a shift towards knowledge intensity. In recent decades, OECD countries have both funded and undertaken a significant proportion of global R&D, but that is now changing. China, in particular, has appeared as a major force in R&D, followed closely by other Asian countries, such as Singapore. We know that increasing knowledge intensity generates the need for advanced skills and qualifications. But, pertinent questions can also be raised about the ideal balance between the roles played by universities and the private sector in research, development and innovation.

Figure 3.9. **Productive research and development**

Patent applications at the top five world patent offices, 1900-2010



StatLink http://dx.doi.org/10.1787/888932758264

Note: A patent is a right granted by a government to an inventor in exchange for the publication of the invention; it entitles the inventor to prevent any third party from using the invention in any way, for an agreed period.

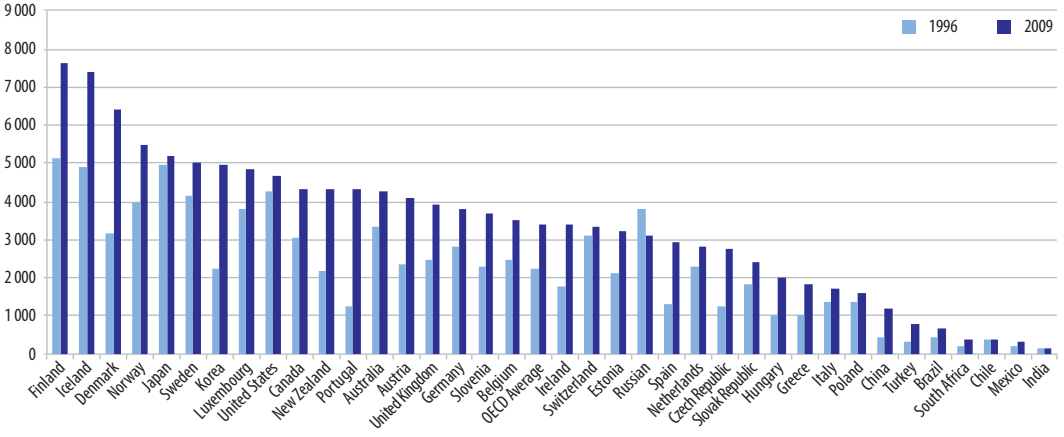
Source: World Intellectual Property Organization (2011), *WIPO Statistics Database: World Intellectual Property Indicators – Tables and Figures*.

The number of patent applications is one way to measure an emphasis on R&D in national economies. Throughout the past century, the majority of patents were filed in the USA and then in Japan from the 1970s. In fact, by 2005, the United States and Japan provided close to 60% of the estimated USD 772 billion OECD expenditures total in 2005, little changed from 61% of the USD 480 billion OECD total in 1995. Since 1980, patents have been increasingly listed in other places, including Europe, but especially China and Korea, where the growth has become particularly rapid. In ten years, the applications for patents in the Chinese Patent office grew from 52 000 (in 2000) to 391 000 (in 2010), surpassing growth everywhere except the United States Patent Office. Of course, R&D measures enable, but do not guarantee, the introduction of new goods or services in the marketplace. The key is the ability to translate patents and innovations into economic and social benefits.

The number of people working as researchers has also grown. The figure below illustrates the upward trend since 1996 in all countries shown, except in the Russian Federation. By 2009, the employment of researchers was at its highest since 1996 in Finland, at over 7 647 per million people. The magnitude of growth has been greatest in Portugal, where the numbers of researchers per million tripled between 1996 and 2010, followed by Denmark and Korea, where the numbers doubled. For education, the demand for highly skilled knowledge workers, including researchers, is one important factor behind the expansion of higher education. Tertiary education systems in OECD countries will increasingly need to compete in this regard with tertiary institutions in countries such as China, India, Malaysia, and Singapore, which are increasingly vying for success in the global market.

Figure 3.10. **Increasing numbers of people working in research and development**

Number of researchers per million people, in 1996 and 2009



StatLink http://dx.doi.org/10.1787/888932758283

Note: Where data was not available for the years shown in a particular country, the closest year available was used. For more detailed information, see StatLink above.

Source: World Bank (2012), *World Databank: Number of Researchers*.

And education?

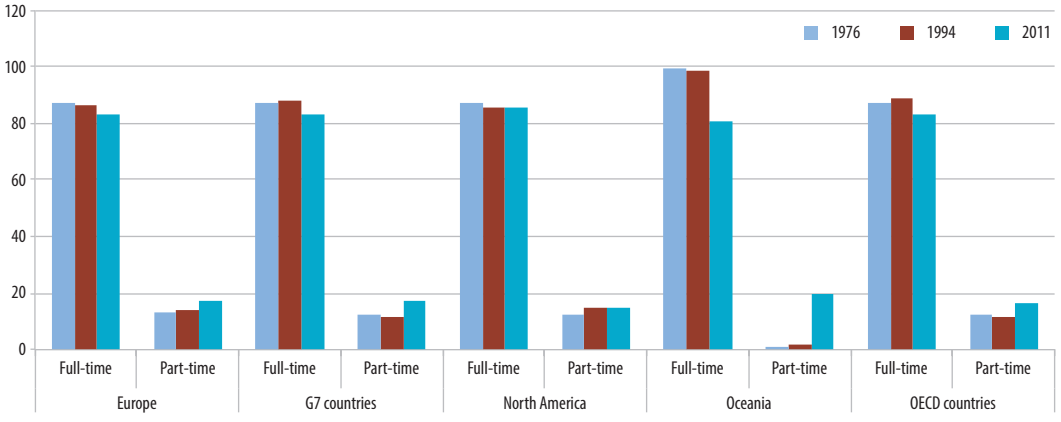
- Should more emphasis be placed on skills such as creativity, decision-making, co-operation, and the availability to find pertinent, reliable information? Are these skills adequately developed through education and training?
- To what extent are tertiary graduates knowledgeable about patents and intellectual property right protection? Should tertiary institutions take a more pro-active stance to combat plagiarism in their classrooms?
- In a global world of research, how do countries attract and retain the best researchers? Does the tertiary sector have a role in providing these incentives?

FLEXIBLE WORK?

"Flexibility" is commonly thought of as characteristic of twenty-first century working life. People are more likely to work for a series of employers, rather than just one for their lifetime. Furthermore, career trajectories can increasingly be redefined and redirected at all stages of life, while technology has provided an opportunity for more individuals to work remotely and yet stay connected to their workplace. This section examines flexibility in the labour market through two trends: the number of full-time workers, and the number of salaried workers compared to those self-employed. An important objective of education and training is to prepare young people for the labour market and to help organise professional development for working adults. These trends form a natural part of education's wider context.

Figure 3.11. **Full-time work decreasing while part-time work rises**

The incidence of full-time and part-time employment by region, in 1976, 1994 and 2011



StatLink http://dx.doi.org/10.1787/888932758302

Note: In place of data for 1976, the figure from 1983 is used for Europe and 1986 for Oceania.

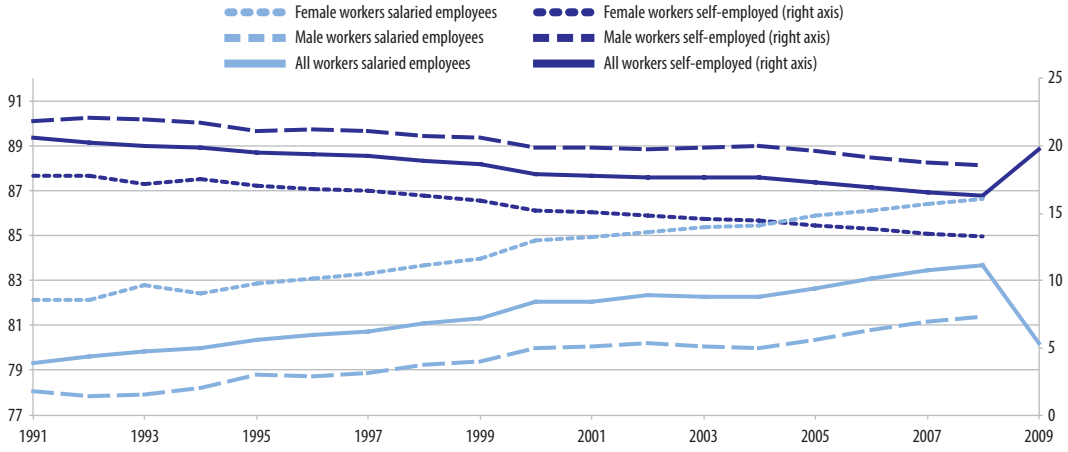
Source: OECD (2012) *OECD.Stat: Dataset Incidence of FTPT Employment.*

Since 1976 the percentage of workers in full-time work has been slowly declining across much of the OECD, even though on the whole they still make up the large majority of the workforce. In Europe, 87% of workers were employed full-time in 1976, a figure that fell to 83% in 2011. Oceania experienced a much bigger change: in 1976 almost 100% of their workers were employed full-time, compared to just over 80% in 2011. In contrast, North America saw a small decrease from 1976 to 1994, but then little to no change between 1994 and 2011. A bigger story is the change in the proportion of part-time workers. While part-time workers still make up only a minority of the workforce (17% on average across the OECD in 2011), their numbers have been slowly but surely rising in the last 35 years in all of the regions portrayed above, except North America. Oceania in particular has seen an increase from essentially no part-time workers in 1976 to almost 20% in 2011. While some of the recent rise in numbers could be driven by the financial crisis and resulting recession in many OECD countries, the steady shape of the trend across this long time period, particularly in Europe, suggests that part-time work is a growing phenomenon for many OECD member countries.

Although workers might be seeking more flexibility in their work, they are increasingly turning towards more security as well. Among OECD countries, the percentage of people in self-employment steadily declined between 1991 and 2008. At the same time, the percentage of people employed in salaried positions rose, particularly among women. In 1991, 82% of female workers were in salaried employment, a figure that had risen to almost 87% by 2008. Men are more likely to be self-employed than women, but their numbers are declining. In 1991, 22% of male workers were self-employed on average across the OECD. By 2008, this proportion had dropped to just under 19%. These figures do not take into account the aftershocks of the financial crisis and it will be interesting to see how the pattern develops: as unemployment rises, do workers turn to self-employment, or do they seek security in those salaried positions that are available? Preliminary data suggests it is the latter. Education can thus play a role in developing and sustaining the necessary skills for a changing labour market, as well as providing entrepreneurial tools to help keep the self-employed sheltered from the storm.

Figure 3.12. **Number of salaried workers on the rise while self-employment decreases**

Proportion of males and females in salaried employment and self-employed (right axis) as an OECD Average, 1991-2009



StatLink http://dx.doi.org/10.1787/888932758321

Source: World Bank (2012) *World Databank: Self Employed, and Wage and Salaried Workers.*

And education?

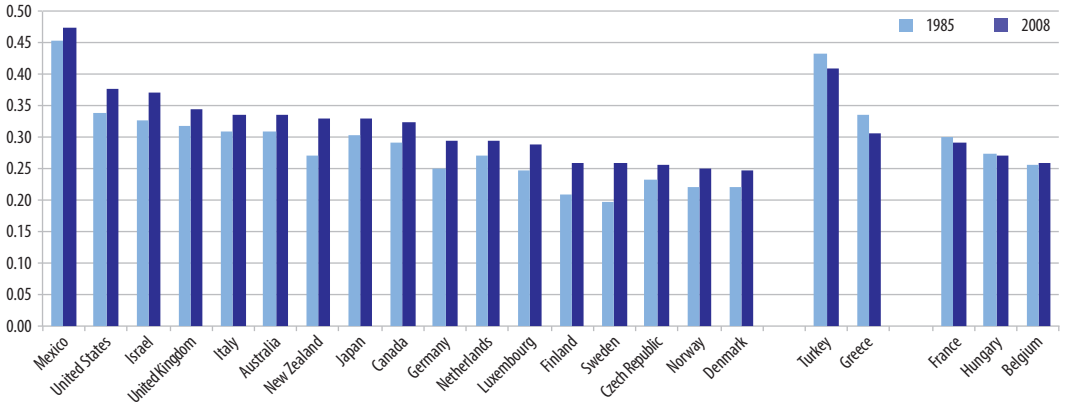
- What is the role of the education system in promoting entrepreneurship and providing the skills required to be self-employed?
- People are working in more positions and different companies over the course of their career. What is the role of educational systems in providing the lifelong learning opportunities needed to support career change and re-skilling?
- People are now increasingly likely to be working part-time, with some choosing this option to have a better work-life balance. What is the role of education in raising awareness of life options and in preparing young people to engage in activities outside of formal work?

MIND THE GAP

Despite increasing affluence, income inequality has been growing on average in OECD countries in the last 25 years. This widening gap in income equality seems to be due not to increasing separation between the poor and middle class. Rather, there is a growing divide between the middle class and the rich in many (though not all) OECD countries. At the same time, spending on social programmes has increased in every OECD member country. Education can play a role in addressing some of the causes of inequality by providing individuals from poorer backgrounds with the cognitive and social skills necessary to succeed in the modern world. However, more can and should be done to support those least well off to achieve their goals in education and the workforce.

Figure 3.13. **Growing income inequality in many countries**

Gini Coefficients for OECD countries, in 1985 and 2008



StatLink http://dx.doi.org/10.1787/888932758340

Note: The Gini Coefficient is an indicator of income inequality, where the higher the number, the greater the inequality.

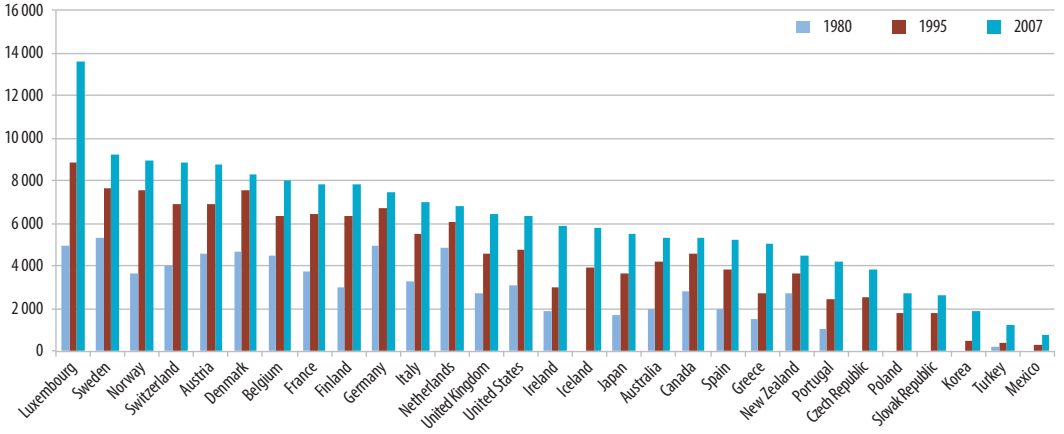
Source: OECD (2011), *Divided we stand: Why inequality keeps rising*.

Income inequality is often represented by an index known as the Gini Coefficient for individual's income within a population. In essence, the higher the figure, the greater the level of inequality in a country. Between 1985 and 2008 the coefficients reveal growing income inequality in most OECD countries. The highest level of inequality was measured in Mexico in both of the years shown in the figure above, followed by Turkey and the United States. Despite growing slightly during the period shown, Denmark and Norway had the lowest levels of income inequality. However, not all countries shared this general tendency. Belgium, France, and Hungary experience no change in income inequality across this time, while Greece and Turkey both saw decreases in income inequality, reversing the general trend. It is important to note that, as the latest figure available is from 2008, these trends do not take into account the impact of the recent financial crisis which is likely to have influenced the current conditions.

While income inequality is growing in many OECD countries, social spending has increased. This might be expected, as rising inequality puts pressure on governments to provide funds (or mandate payments from private sources) to aid those members of society in need. Social spending includes investments, such as income supplements, housing, unemployment coverage and other social policy programmes. Between 1980 and 2007, social spending increased for each of the 29 countries in the figure below. The largest recent increases were in Luxembourg, which went from spending EUR 8 800 per capita in 1995 to spending EUR 13 600 per capita in 2007. This can be contrasted to Korea, Mexico, and Turkey, the countries with the lowest figures, spending less than EUR 2 000 per capita in 2007.

Figure 3.14. **Increasing social expenditure**

Public and mandatory private social expenditure per capita, at constant purchasing power parity 2000 USD, 1980, 1995, and 2007



StatLink http://dx.doi.org/10.1787/888932758359

Note: Social expenditure is the provision by public (and private) institutions of benefits to households and individuals in order to provide support during circumstances which adversely affect their welfare.

Source: OECD (2012), *OECD.Stat Social Expenditure Data*.

And education?

- Education can stimulate social mobility by providing opportunities, but it also plays a role in reproducing inequalities when the already privileged have better access to education. Can education be designed in such a way that it does not reinforce inequalities?
- Does greater school choice and more personalised learning inevitably favour those with the greater cultural resources? How can we balance equity with the legitimate rights of parents to choose what is best for their child?
- Does increased social expenditure mean a trade-off in investing in education? How can education co-operate with other sectors (for example, health, social affairs) in a cross-governmental perspective to tackle challenges?

NOTE

1. More information on this project and the skills typologies can be found at *http://skills.oecd.org/useskills/documents/41abalancingskillsdemandandsupplyinlocaleconomies.html*.

FIND OUT MORE

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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.

Definitions and measurement

- **Employment rates:** Employment rates are a measure of the extent of utilisation of available labour resources. They are calculated as the ratio of the employed to the working age population.
- **Gini Coefficient:** The Gini Coefficient is an indicator of income inequality, where the higher the number, the greater the inequality.
- **High Skills Equilibrium:** This can occur within a local economy where a strong supply of skills is matched by a strong demand for skills from local employers.
- **Knowledge Economy Index:** The Knowledge Economy Index is intended to measure country performance on four pillars of a knowledge economy, including Economic Incentive and Institutional Regime, Education, Innovation, and Information and Communication Technologies.
- **Low Skills Equilibrium:** This can occur within a local economy where a low supply of skills in the workforce is matched by low demand for skills from local employers.
- **Office applications:** Software – used either alone or in conjunction with other applications – that people use to electronically read, create, record, manipulate, format, search, receive, distribute and copy information. The software is an aid to accomplish most business tasks on a computer.
- **Patent:** A patent is a right granted by a government to an inventor in exchange for the publication of the invention; it entitles the inventor to prevent any third party from using the invention in any way, for a specified period of time
- **Part-time employment:** Persons who usually work less than 30 hours per week in their main job. Both employees and the self-employed may be part-time workers. Employment is generally measured through household labour force surveys and, according to the ILO Guidelines, employed persons are defined as those aged 15 or over who report that they have worked in gainful employment for at least one hour in the previous week.

- **Research and Development:** Research and development is a term covering three activities: basic research, applied research, and experimental development.
- **Self-employed:** Workers are self-employed if they hold the type of job where remuneration is directly dependent upon the profits derived from the goods and services they produce. According to ILO guidelines, self-employed workers include employers, own-account workers, and members of producers' co-operatives. These workers typically work on their own, or with one or a few partners or in co-operative.
- **Skills Mismatch:** Local economies can experience a state of skills mismatch when there is an imbalance in skills supply and demand. This may lead to a *skills gap* or *skills shortages* if demand outstrips supply, or it may produce a *skills surplus* in which supply in the local economy exceeds employer demand.
- **Social expenditure:** Social expenditure is the provision by public (and private) institutions of benefits to, and financial contributions targeted at, households and individuals in order to provide support during circumstances which adversely affect their welfare, provided that the provision of the benefits and financial contributions constitutes neither a direct payment for a particular good or service nor an individual contract or transfer.
- **Total fertility:** The total fertility rate is not something that is actually counted. It is not based on the fertility of any real group of women, since this would involve waiting until they had completed childbearing. Instead, it is calculated by imagining that a woman would go through her entire fertile life (15 to 49 years of age) with the fertility rate current in each specific age group. These levels are calculated by dividing the number of life births each year to women from each age group by the population of women in the same age group. The calculation assumes no mortality.

Chapter 4

Modern families

Ageing societies: *trends and forecast about the growing number of older people in OECD countries, and a rise in old-age dependency ratios.*

Love then marriage?: *questions what is normal in family life through decreasing marriage rates and increasing numbers of unmarried parents.*

Smaller families: *looks at the long-term trend of declining birth rates, recently (at least temporarily) reversed, as well as shrinking households.*

Balancing the budget: *observes that households with children are better off, but also spending more over time.*

Infant and adolescent health: *teenage and child health examined through pregnancy levels and low birth weight, respectively.*

Great expectations: *looks at child poverty figures and trends in children's expectations of success from PISA 2003 and 2009.*

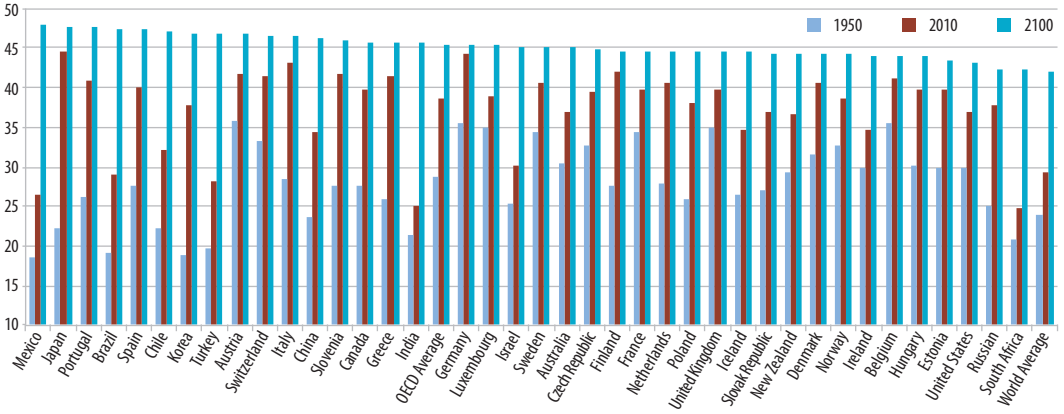
A late journey to parenthood: *considers the postponement of family through the average age of women's first birth, and looks at enrolment in early childhood educational programmes.*

AGEING SOCIETIES

Our population is ageing, with increasingly fewer young people and more adults living to old age. The ratio of those aged over 65 years compared to the working population of 15-64-year-olds is expected to rise considerably to the middle of this century, a change that will have wideranging implications for government and society. Indeed, many OECD countries have considered or implemented changes in retirement age, begun to rethink social security funding, and engaged in national debates about healthcare costs and pensions. Also, the shrinking number of individuals of employable age has an impact on employers and skill needs for the twenty-first century. Ageing societies have several potential consequences for education: The availability and demographic profile of teachers and the accessibility of resources for youth pose challenges. However, re-skilling, interest in lifelong learning, and potential for later life careers all create opportunities.

Figure 4.1. **Median age going up into the next century**

Median age of the population, in 1950, 2010 and 2100



StatLink http://dx.doi.org/10.1787/888932758378

Note: The median age is the age that divides the population in two parts of equal size, that is, there are as many persons with ages above the median as there are with ages below the median.

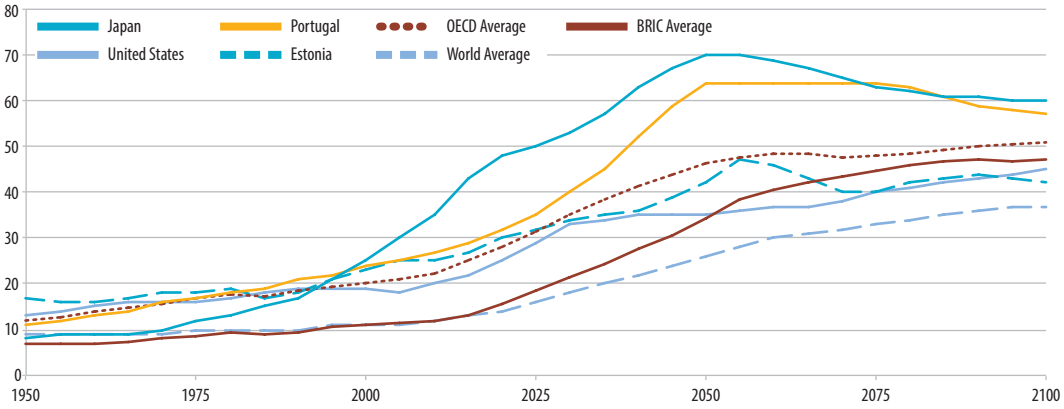
Source: United Nations Population Division (2010), *World Population Prospects: The 2010 Revision*.

Across all OECD and BRIC countries the population is ageing. The median age for all OECD countries has risen from 29 years in 1950 to 39 years in 2010. In some countries this increase was dramatic: Korea, for example, increased from a median age of 19 years in 1950 to 38 years in 2010, while China went from 24 to 35 years in that same period. For others the trend is slower, with a relatively low median of 30 years or less recorded in Israel, Mexico and Turkey in 2010. However, the ageing of our populations is expected to continue for all countries, so that by 2100 the forecast is a median age of 45 years across all OECD and BRIC countries. This projected median has already been attained by Japan and is closely approached by Germany and Italy (with median population ages recorded in 2010 of 44 and 43, respectively).

Another measure of ageing populations is the "old age dependency ratio", which compares the proportion of the population over 65 years with those of working age (15-64 years). This ratio is an indicator, though not an exact measure, of the number of elderly financially dependent people compared to the potential working population. Across all OECD countries, this ratio increased from 12% in 1950 to 22.3% in 2010. Although this increase is expected to continue to 2060, forecasts suggest that it will plateau after that time and remain relatively steady at around 50% until the end of the century. This trend is expected in all OECD member countries. Those with the highest current ratios (Japan, Portugal) are expected to move back towards the mean and those with the lowest (Estonia, the United States) are projected to rise. Although the average ratio for the BRIC countries is expected to be consistently lower throughout this century, they too are predicted to reach close to a 50% old age dependency ratio by 2100.

Figure 4.2. **Old age dependency ratio climbing to a plateau**

Population aged 65 years and over per 100 persons aged 15-64 years, 1950-2100



StatLink http://dx.doi.org/10.1787/888932758397

Note: Japan and Portugal are ranked the highest of OECD countries on this measure in 2100, while the United States and Estonia are the lowest. All values beyond 2010 are medium variant estimates calculated by the United Nations Population Division. BRIC represents a group figure composed of Brazil, Russian Federation, India and China.

Source: United Nations Population Division (2010), *World Population Prospects: The 2010 Revision*.

And education?

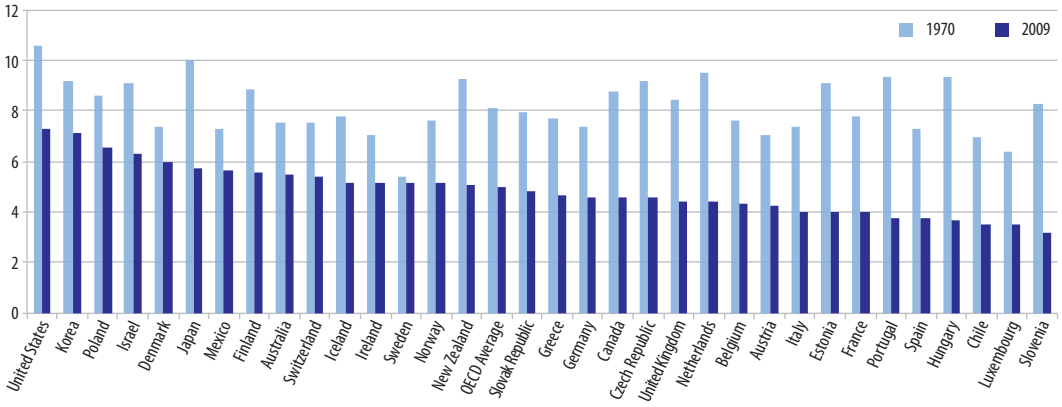
- Many older people are mentally and physically active for much longer. What role should the education system play in meeting the learning and cultural needs of many older members of the population?
- Older people will spend increasingly more time out of the labour force. What can education systems do to secure the transmission of knowledge from one generation to the next? What formal and informal roles can retired people play in helping to educate the young?
- The education workforce at all levels is ageing in line with the general population. How can we attract and retain sufficient numbers of teachers and academics to the profession?

LOVE THEN MARRIAGE?

Families are changing. While the nuclear family – mother and father married with children – was considered the bedrock of the family institution throughout the early part of the 20th century in most OECD countries, it is becoming less common. Since the 1970s, a number of clear trends can be observed: less people are getting married and divorce is more frequent; couples are increasingly living together without being married; and more and more children are being born to unmarried parents. Although the family is still important, modern visions of what a family is, and what it should be, have shifted radically throughout the last 40 years. This has an impact on the diversity of relationships and family structures represented in a classroom, with schools in some cases playing a pivotal role in encouraging tolerance and open discussion of these essential questions.

Figure 4.3. **Fewer married people**

Annual number of marriages per 1 000 population, in 1970 and 2009



StatLink http://dx.doi.org/10.1787/888932758416

Note: Data listed for 2009 refers to 2008 for Iceland and Turkey; 2007 for Australia, Canada, Ireland Japan, Korea, Mexico, New Zealand, the United Kingdom and the United States; and to 2006 for Chile and Israel.

Source: OECD (2011), *OECD Family Database*.

Marriage rates have steadily declined across OECD countries since 1970, from more than eight per thousand population on average each year to only five per thousand population in 2009. The decrease in the number of marriages is consistent across all OECD countries. The greatest changes can be observed in Hungary and Portugal, where the number of marriages plummeted 67% from 1970 to 2009. Even in countries where marriage is still relatively common, there is a noticeable decrease. For example, in the United States marriage rates fell from almost 11 per thousand in 1970 to seven per thousand in 2009. The country with the lowest number of marriages is Slovenia, with an average of just over three per thousand in 2009.

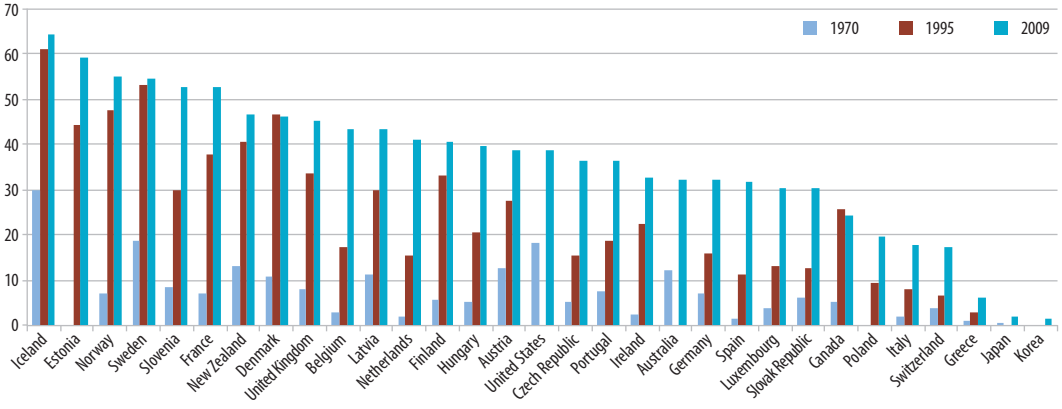
Rates of marriage are decreasing at the same time that divorce is increasing: on average across OECD countries, divorce rates increased from just over one per thousand population in 1970 to nearly 2.3 per thousand population in 2008. In some countries the change has been dramatic: divorce rates increased threefold in Belgium, Greece, Korea,

Portugal, and Turkey between 1970 and 2008. At the same time that more people are getting divorced, fewer people are getting married, indicating that the decline in overall numbers of marriages is real and not a function of individuals staying married for longer.

These figures are part of a larger trend in changing expectations about marriage and family life. Since 1970, the number of births to unmarried parents increased, indicating that marriage is increasingly not seen as a prerequisite for forming a family. In Estonia, France, Iceland, Norway, Slovenia and Sweden, less than 50% of births are to married couples. As with all changes in norms and values, however, there are large country differences in these patterns. In Greece, Japan, and Korea, for example, over 90% of births are to married couples, only a small increase from 1970. These changes in family structure are reflected in our schools and communities, and teachers and students are required to adapt accordingly. Depending on the country and social context, there can be more or less resistance to "newer" types of families such as single-parent or unmarried relationships and same-sex couples.

Figure 4.4. **Increasing numbers of unmarried parents**

Proportion of all births to unmarried parents, in 1970, 1995 and 2009



StatLink http://dx.doi.org/10.1787/888932758435

Note: Data for 2009 refers to 2007 for Australia, Belgium, Japan, Korea, Ireland, Italy, New Zealand and the United States; and 2005 for Canada. Data for 1970 refers to 1980 for Australia, Japan, Korea and the United States.

Source: OECD (2011), *OECD Family Database*.

And education?

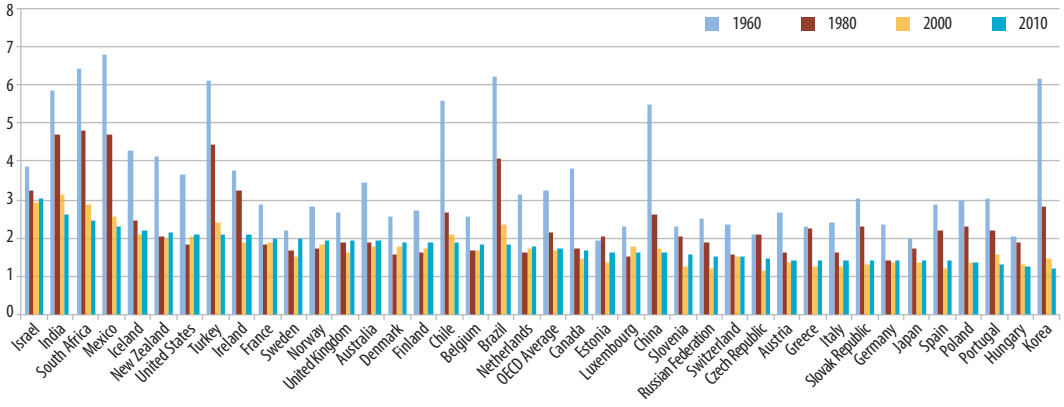
- Effective education at the school level relies on good home-school relations. Does the growing diversity of family structures affect the nature of these relations? If so, how?
- Diversification of family structures means that more children will come from non-traditional families (for example, mixed-race or same-sex couples). Is there a role for educators in encouraging open discussion and shaping attitudes of these issues?
- There will be an increasing share of older, unmarried and childless people in the future. Can education systems help them stay connected with society? What do these individuals need to maintain their familial and societal networks?

SMALLER FAMILIES

Between 1960 and 2000, there was a consistent decline in the numbers of children born. A slight baby boom has been experienced since then, with a minor increase in birth rate across most OECD countries. As a result of people having overall fewer children, and less people relying on intergenerational living arrangements, the size of households has also gone down across OECD countries in recent decades. These changes mean that children today are much less likely to grow up with numerous siblings, and are also less likely to live with their grandparents or extended family members. For education, the impact of these trends is felt directly by planners and local school authorities, who must cope with changing levels of enrolment and demand in their systems. The impact is also felt in the classroom, and by teachers in their interactions with both students and their families.

Figure 4.5. **Birth rates well down from the 1960s, but rising since 2000**

Total fertility rates: Children per woman aged 15-49, in 1960, 1980, 2000 and 2010



StatLink http://dx.doi.org/10.1787/888932758454

Note: For more information about total fertility rates, see StatLink above.

Source: World Bank (2012), *World Bank Data: Fertility Rate.*

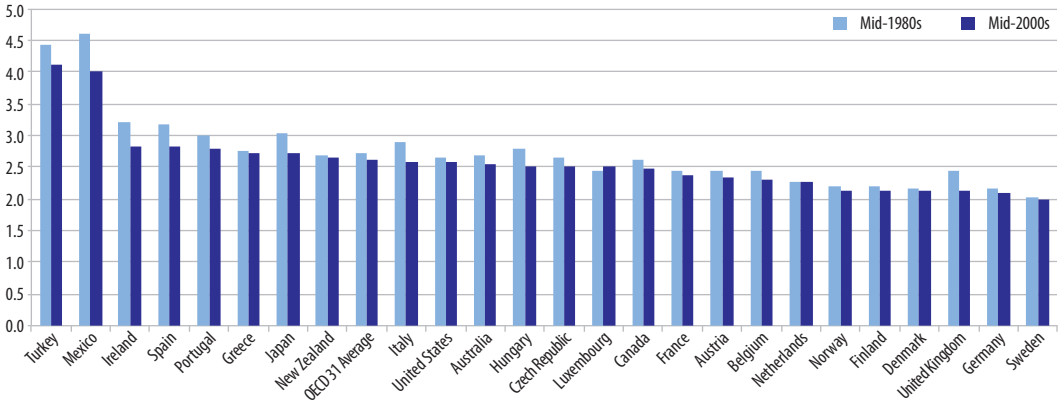
Birth rates have been declining on average across all OECD countries. In 1960, the average fertility rate was 3.2 children per woman. This number had declined to 2.2 by 1980, and further to 1.7 children per woman by the year 2000. For some countries, the reduction in the number of births has been truly dramatic. In Korea for example, the average of six children per woman in 1960 fell to only 1.2 by 2010. There has been a small but sure increase in birth rate over the past decade, with an OECD average of 1.75 children per woman in 2010, up on the average rate of 1.68 in the year 2000. Of all OECD countries in 2010, Israel had the highest birth rates at 3 children per woman, followed by Iceland and Mexico at 2.2 and 2.3 children per woman, respectively. It is thought that this recent rebound can be explained in part by an increase in births to mature mothers who had previously delayed childbirth.

Between the mid-1980s and the mid-2000s, there was a slow and continual decline in the number of persons per household across OECD countries. Both smaller families

and in many countries the decreasing adherence to the custom of living with elderly relatives and grandparents are contributing to this trend. In the figure below, Mexico and Turkey are the countries most affected by these trends, with households shrinking from an average of around 4.5 people in the mid-1980s to just 4 people per household in the mid-2000s. Countries such as Ireland, Japan, Portugal and Spain have also seen a drop in numbers. For other OECD countries, the magnitude of change is less, with a reduction of only 2.7 to 2.6 people per household on average calculated for 31 OECD countries.

Figure 4.6. **Households getting smaller**

Number of people per household, in the mid-1980s and mid-2000s



StatLink http://dx.doi.org/10.1787/888932758473

Note: The size of households is determined by members who live in the same dwelling and include dependent children of all ages.

Source: OECD (2011) *Doing Better for Families*.

And education?

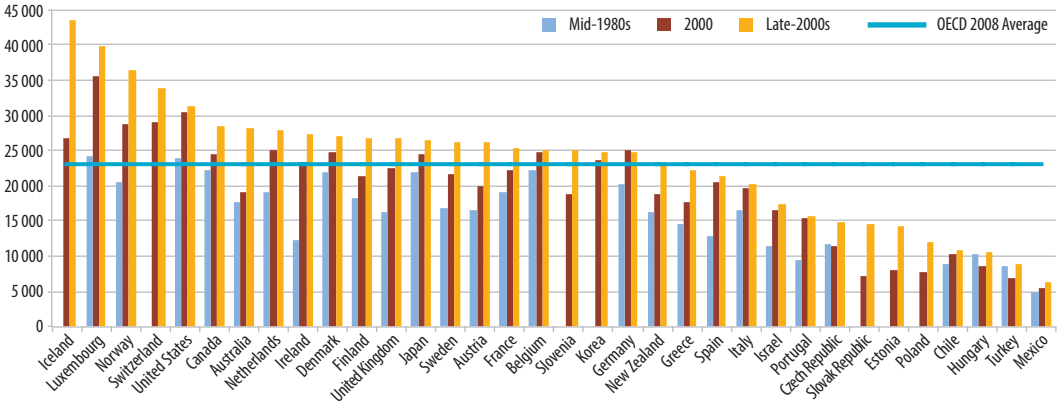
- What does it mean for young people coming into education to have fewer or, often, no brothers and sisters? How does it change the way in which they experience (school) life?
- Decreasing populations in rural and remote areas can place stress on these school districts. Are local educational authorities equipped with the tools they need to plan for changing levels of enrolments and demand for other services in their systems?
- Households are less likely to include more than two generations, with grandparents more likely to live elsewhere. What impact does this have on intergenerational learning?

BALANCING THE BUDGET

Spending habits of families and households are one of the indicators of a country's economic well-being. In healthy economies, incomes and purchasing power rise over time, and spending habits tend to rise with them. In general across OECD countries, the average income and the amount of money spent in households has increased since the 1980s. The recent financial crisis heavily damaged banks and some national economies, but it also affected the everyday spending and income of families and households. This has an impact on the day-to-day lives of millions of individuals and is also relevant to education. Financial education is receiving renewed importance in curriculums across OECD countries. Indirect effects can be seen, for example, in the increasing numbers of students in tertiary education, a popular strategy to delay entry to a troubled labour market.

Figure 4.7. **Households with children are better off**

Mean disposable real income of children (0-17 years of age) in purchasing power parity USD, in the mid-1980s, 2000 and the late 2000s



StatLink http://dx.doi.org/10.1787/888932758492

Note: Mean disposable real income per child represents the amount of household income available per household member for their living needs. For Australia, Belgium, Chile and the Czech Republic, mid-1990s figures are used in place of data for the mid-1980s. For Chile, Estonia, Iceland, Korea, Slovak Republic, Slovenia and Turkey mid-2000s figures are used in place of data for 2000.

Source: OECD Secretariat calculations based on: OECD (2012), *OECD Income Distribution and Poverty*, and *OECD Family Database*.

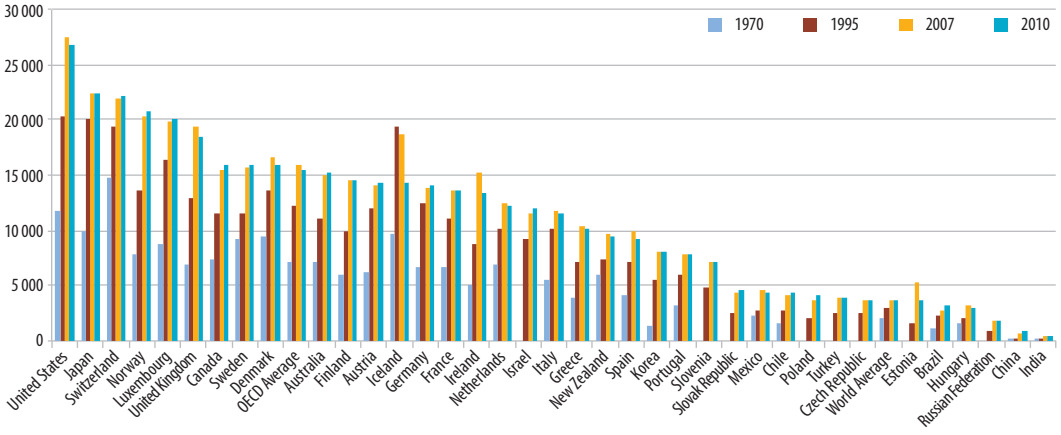
Average incomes in households with children rose steadily across OECD countries from the mid-1980s to the late 2000s. The mean disposable income of children rose throughout this time period across all countries, with Iceland, Luxembourg, and Norway topping the list (note that the figures are pre-financial crisis for Iceland). The countries with the least amount of disposable income available per child in the late 2000s were Chile, Hungary, Mexico, and Turkey. These data reflect the fact that changes in real disposable income over time mirror trends in a country's material standard of living. Note that these averages do not take into account the differences between families with one parent versus those with two parents, although the former are likely to be more squeezed than the latter. Despite the impact of the financial crisis, the trend for increased disposable income per child is expected to increase in the medium term. The question is

whether the percentage used for consumption and expenses (as opposed to savings) will change based on the lessons learned by recent events.

Family expenditure rose consistently across OECD and BRIC countries from 1970-2007. Household spending more than doubled in that time period on average among OECD countries, from just over 7 000 constant USD per capita in 1970, to over 15 000 in 2007. In Greece, Ireland, Korea and the United Kingdom, spending increased nearly threefold during this time. The recent financial crisis interrupted this long-term trend, with a slight dip on average across OECD countries observed in 2010. Individual country profiles for 2010 are varied, with household income holding steady or even increasing for some countries, while others (notably Iceland and Ireland) experienced a fall in household expenditure. In the medium term, all countries are expected to see a return to household expenditure growth, and it is an open question whether there will be changes made in individual lifestyle and spending for households in countries that were heavily injured by the crisis. How people spend their money has already changed: in the period between 1995 and 2009, household spending increased dramatically for communication related expenses, as well as for health and education, while spending on clothing, furnishings and household equipment decreased.

Figure 4.8. **Rising family expenditure**

Household expenditure per capita in constant 2005 USD, in 1970, 1995, 2007 and 2010



StatLink http://dx.doi.org/10.1787/888932758511

Note: Data for 2010 are from 2009 for Chile.

Source: World Bank (2012), *World Bank Data: Household Final Consumption Expenditure Per Capita*.

And education?

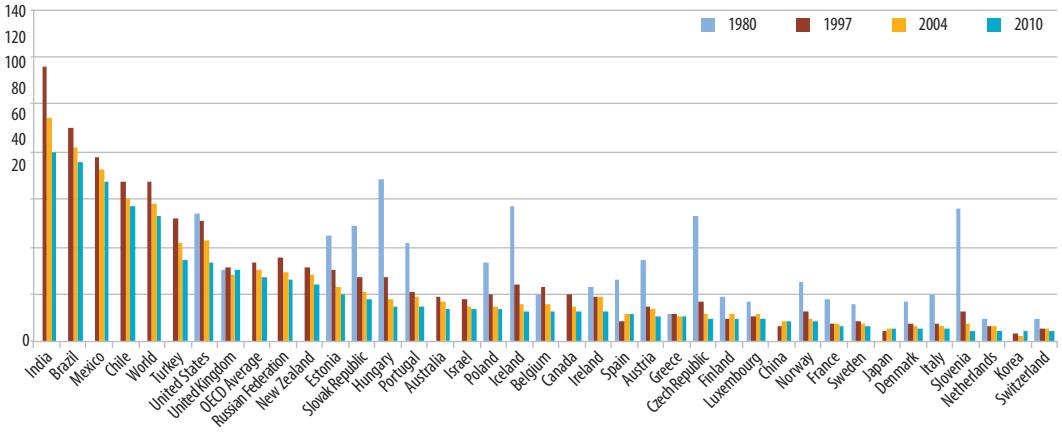
- What is the role of educational institutions in addressing the need for greater financial education? What should this look like in terms of curriculum planning and design?
- The rise in household expenditure is partly due to higher costs of education, including tuition fees and new expenses (for example, computing and Internet access in the home). What is the role of governments in supporting those families who have difficulty covering these costs?
- Budgetary constraints, paired with a troubled labour market in many countries, contribute to the increase in young people choosing to study rather than work. How might post-secondary and tertiary educational providers meet this demand?

INFANT AND ADOLESCENT HEALTH

As our societies change so do some of the risks associated with infant and adolescent health. This section looks at two very different trends: the rate of teenage pregnancy and the numbers of babies born with low birth weight. The first trend reflects changing expectations about the age of motherhood, as well as the impact of campaigns to reduce teenage pregnancy. The second trend is a result of advances in medical technology as well as continuing well-known risk behaviours during pregnancy, such as smoking, drinking, and consumption of drugs. Education can play a role in ensuring that young mothers are not forced to drop out of school, for example by providing childcare facilities as well as preventative sexual education. In terms of babies born with low birth weight, more can be done to raise awareness of healthy prenatal behaviours. However, advances in medical technology which allow for increasingly premature births will continue to have an impact on these figures.

Figure 4.9. **Fewer teenage pregnancies**

Adolescent fertility rate: Births per 1 000 women aged 15-19 years, in 1980, 1997, 2004, and 2010



StatLink http://dx.doi.org/10.1787/888932758530

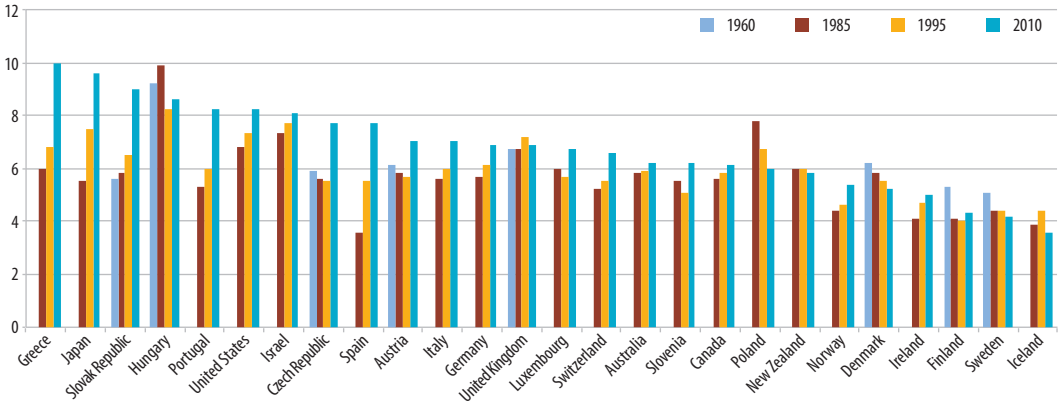
Source: World Bank (2012), *World Bank Data: Adolescent Fertility Rate.*

On average, the rates of teenage pregnancy have been declining since 1980. In the Czech Republic, Hungary, Iceland, and Slovenia, this decline was especially marked in the period between 1980 and 1997, while in other countries, such as the United States, there has been a slow yet steady decline across the entire time period. This worldwide trend can be explained through a combination of a change in expectations about the suitable age of marriage and motherhood in some countries, and overall improved access to contraception and thus more control on the part of sexually active adolescents to postpone or avoid pregnancy. Government information campaigns and awareness raising have been credited with reducing teenage pregnancy. Despite an overall reduction in rates of teenage pregnancy, some countries continue to struggle with high rates, while others are seeing the reversal of previous gains. The United Kingdom, for example, already struggling with relatively high rates of teenage pregnancy, is one of the few countries that saw an increase in the numbers of pregnancies between 2004 and 2010.

Infants with low birth weight are more likely to suffer from health complications at birth, including infections and respiratory difficulties. Low birth weight is also associated with longer-term health problems and cognitive development, with those infants more at risk for learning difficulties, chronic respiratory illness (for example, asthma), cerebral palsy, cardiovascular disease and diabetes. Despite efforts to improve prenatal health and screening, there has been a rise in the percentage of low-weight births across most OECD countries since 1960. For many, the increase was particularly marked since 1995. By 2010, low-birth-weight babies accounted for 10% of all live births in Greece. It should be noted that this trend is not universal: Denmark and Poland are notable exceptions that have seen a steady decrease in the numbers of babies born with low birth weight over time. Still, these data indicate that for many OECD countries, action from health care providers and policy makers alike is required to raise awareness of the potential dangers associated with low birth weight, and provide more effective prenatal support and guidance for at-risk mothers.

Figure 4.10. **Increasing prevalence of low-birth-weight babies**

Low-birth-weight births as a percentage of live births, in 1960, 1985, 1995 and 2010



StatLink http://dx.doi.org/10.1787/888932758549

Note: Low birth weight is the weight of a baby at birth of less than 2.5 grams (5.5 pounds). Data for 2010 for Australia, Canada, Italy, Norway and Portugal are instead from 2009. Latest data for Australia, Canada, Italy, Norway and Portugal are from 2009.

Source: OECD (2012) *OECD Stat: Health Status*.

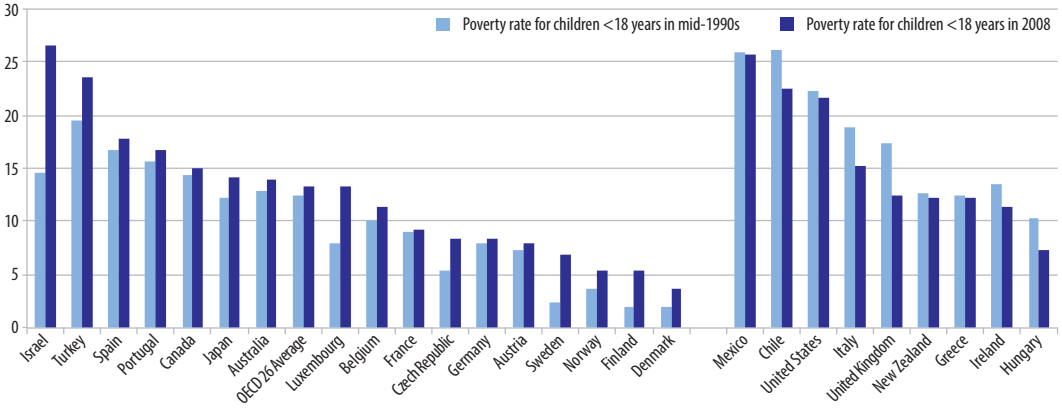
And education?

- A great deal of emphasis has been given in recent years to improving the cognitive performance of children. Does education also have a responsibility for improving students' mental and physical health?
- Children with low birth weight have an increased risk of learning difficulties and can struggle with the development of some non-cognitive skills. How can education systems address these needs? Is there a particular role for early childhood education and care providers?
- Young mothers who are at university or still in school require assistance with organising their education schedules. What kind of innovative solutions might educational institutions find to support these needs and retain these women in the system?

GREAT EXPECTATIONS

Children's life chances are shaped and influenced by the conditions into which they are born and develop. As well as being able to measure the persistence of poverty in populations as a whole, it is also possible to identify how many children live in poverty. Very wide variations exist between OECD countries in terms of children living in poverty, and the average continues to rise slightly. Despite hardship, children's expectations of success, their hopes and dreams for school and career, seem to be rather resilient. Students today are more likely to expect to earn a university degree as measured by PISA. Moreover, in many countries, students from more disadvantaged backgrounds are more likely than before to expect to earn a university degree. The importance of social background in shaping attainment remains one of the most well-charted relationships in educational and social research.

Figure 4.11. **Child poverty still tending to rise**
Child poverty rates, in mid-1990s and 2008



StatLink http://dx.doi.org/10.1787/888932758568

Note: The childhood poverty rate is the percentage of children aged <18 years who live in a family where the total income is less than 50% of the median income in their country. The median is the mid-point between the highest and the lowest income levels in the population.

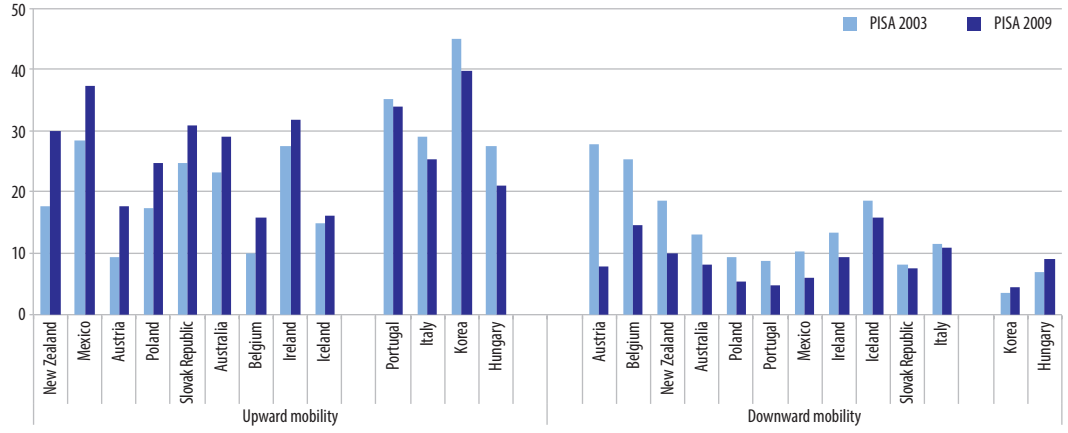
Source: OECD (2011), OECD Family Database.

Rates of childhood poverty – children living in households earning less than 50% of the country's median income – increased in the decade up to 2008 in 17 of the 26 OECD countries shown. The OECD average rate of child poverty accordingly modestly increased from 12.4% to 13.4% during this period. In Finland, Israel, Luxembourg, and Sweden, rates of child poverty nearly doubled from the mid-1990s to 2008. Not all countries followed this trend: nine of the countries shown in Figure 4.11 recorded *decreases* in rates of child poverty, most markedly in Chile, Hungary and the United Kingdom. Overall, the rates of childhood poverty vary considerably. In 2008, the figures ranged from around 3% to 5% in Denmark, Finland and Norway, to more than 20% of children living in poverty in Chile, Israel, Mexico, Turkey and the United States. Of course, the full impact of the financial crisis is not reflected in these figures. However, it might be that those countries hardest hit see little change in child poverty due to a concurrent fall in the national median income.

Comparing students' responses on PISA questionnaires is a way to track the evolution of 15 year olds' educational and career expectations. Between PISA 2003 and PISA 2009, students in 8 of the 13 countries shown in Figure 4.12 were significantly more likely to expect to obtain a university degree, even when neither of their parents had obtained this level of education. Austria, Mexico, New Zealand, and Poland were the countries with the largest increases in expectations of such upward mobility over that time. Students in Italy, Hungary and Korea, in contrast, reported significantly lower expectations of obtaining a university degree if their parents did not have one in 2009 compared to 2003. In Iceland and Portugal no significant difference was observed. Downward mobility, or the expectation of not obtaining a university degree even when one of their parents did, is also an interesting measure. In 9 of the 13 countries shown, students were significantly less likely to report expectations of downward mobility in 2009 than in 2003, with Austria the country to experience the largest reduction. Students in Korea and Hungary, on the other hand, were significantly more likely to report expectations of downward mobility in 2009 than they were in 2003. In Italy and the Slovak Republic, there was no significant difference in responses across the two PISA cycles.

Figure 4.12. **More students expect to attain more education than their parents**

Proportion of students who report expecting to either obtain a university degree when their parents did not (upward mobility), or to not obtain a university degree when their parents did (downward mobility), in PISA 2003 and PISA 2009



StatLink http://dx.doi.org/10.1787/888932758587

Note: Data for Belgium is only from the Belgium Flemish Community. PISA is the OECD's Programme for International Student Assessment, for more information, see *www.oecd.org/pisa*.

Source: OECD (2012), *Grade Expectations: How Marks and Education Policies Shape Students' Ambitions*.

And education?

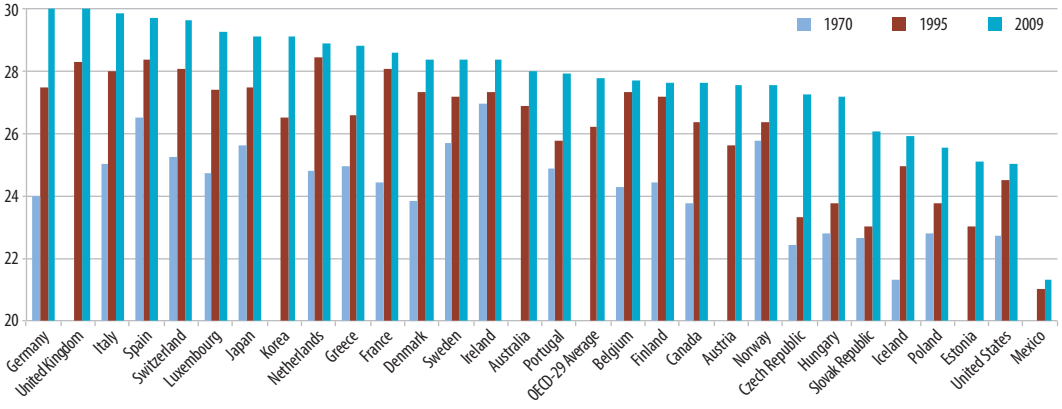
- Are poverty conditions and educational disadvantage increasingly concentrated in particular schools and neighbourhoods? If so, what can be done to address this?
- Positive and achievable expectations for one's own educational success are a significant motivating factor. What can educators do to nurture and realise this potential?
- Teacher expectations of student success are strongly linked to student aspiration and achievement. How can teachers be best provided with the tools they need to maintain positive expectations for all of their students?

A LATE JOURNEY TO PARENTHOOD

As family structures change, so too do the age profiles of parents. More women and men are waiting until later in life to begin their families. They do so for a number of reasons, including planning for greater financial security and emotional maturity, as well as taking more time to find a stable relationship and to commit to their careers before turning their attention to having children. As the parents who wait are also likely to be in the workforce, there is a growing need for early childcare. In addition to the practical demand for early childcare, there is an increasing awareness of the key role that early childhood education plays in the cognitive and emotional development of the young. As a result, ensuring the quality and standards of early childhood education and care has become a policy priority in many countries.

Figure 4.13. **Starting parenthood later**

Average age when mothers have their first child, in 1970, 1995 and 2009



StatLink http://dx.doi.org/10.1787/888932758606

Source: OECD (2011) OECD Family Database.

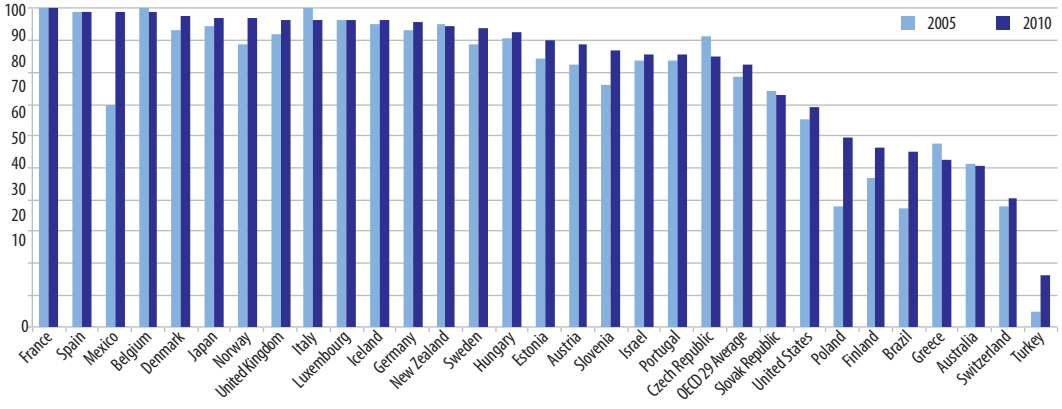
The average age at which mothers have their first child has increased across all OECD countries in the last 40 years. In 1970, Iceland had the lowest average age of mothers giving birth to their first child, at just over 21 years. But Iceland was not an exception: of the 23 countries for which data is available, five other countries had an average of under 23 years, and the average across all countries was just over 24 years. By 1995, this had increased to more than 26 years on average across OECD countries, and by 2009 it had risen again to almost 28 years. Despite this overall trend, there is still wide variation among countries. In 2009, Germany and the United Kingdom had the highest national averages, recording an average age of first birth at 30 years. In contrast, Mexico had the lowest average age at just over 21 years.

More recently, there has been a trend to rising enrolments in early childhood education and care. High quality early childhood education and care is linked to a host of positive outcomes, including improved child well-being and learning, the reduction of poverty, and increased inter-generational social mobility. In the five years between 2005 and 2010 alone, the percentage of 4 year old children enrolled in early childhood education

programmes increased in 20 of the 26 countries in Figure 4.14 (excluding the four that were already at 100% or above in 2005). In some cases this increase was substantial: Turkey has tripled its enrolment rate since 2005, and in Mexico and Poland, participation in early childhood programmes increased by around a third. In 2010, Belgium, France, Mexico, the Netherlands and Spain were all at roughly 100% enrolment for children aged 4 years. They were followed closely by 11 other countries, each of which had enrolment rates of 90% or above. In the six countries where enrolment rates decreased in that time period, the largest drops were seen in the Czech Republic (from 91% in 2005 to 85% in 2010), Greece (from 58% in 2005 to 53% in 2010) and Italy (from over 100% to 97%). In many countries, there is a push to enrol increasingly younger children in early childhood education and care, with countries focusing on encouraging parents of three and even two year olds to consider this option. There is also increasing integration between early childhood care and formal educational programmes. As these data only demonstrate change across a five year time period, it will be important to revisit this trend in the years to come.

Figure 4.14. **Early childhood enrolments generally rising**

Enrolment rates of children aged 4 years into ISCED 0 level early childhood programmes, in 2005 and 2010



StatLink http://dx.doi.org/10.1787/888932758625

Note: The term ISCED refers to a standardised notion of educational level, and in this case ISCED level 0 is the initial stage of organised instruction that occurs as early childhood or pre-primary education within school-based centres. Data from 2006 is used in place of a 2005 figure for Germany, and from 2009 instead of 2010 for Canada.

Source: OECD (2012), *Education at a Glance 2012: OECD Indicators*.

And education?

- Women are often postponing parenthood to pursue a career and are thus making greater use of childcare. How might governments support childcare to make sure it is as enriching as possible, and should they?
- Are schools taking full advantage of the professional experience and skills that older parents might bring to the classroom?
- Older parents might be better equipped to invest more time and resources towards their child's education. Is this reflected in the intensity of their demands on the education their children receive? Are educators appropriately prepared to handle this?

FIND OUT MORE

Relevant sources

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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.

Definitions and measurement

- **BRIC countries:** The BRIC grouping of countries includes Brazil, the Russian Federation, India and China. The broader group acronym BRIICS also includes Indonesia and South Africa.

- **Childhood poverty rate:** This figure is the percentage of children aged <18 years who live in a family where the total income is less than 50% of the median income in their country. The median is the mid-point between the highest and the lowest income levels in the population.
- **Household expenditure:** Household final consumption expenditure is the market value of all goods and services, including durable products (such as cars, washing machines, and home computers), purchased by households. It excludes purchases of dwellings but includes imputed rent for owner-occupied dwellings. It also includes payments and fees to governments to obtain permits and licenses.
- **Household size:** The size of households is determined by members who live in the same dwelling and include dependent children of all ages.
- **Low birth weight:** Low birth weight has been defined by the World Health Organisation (WHO) as weight at birth of less than 2 500 grams (5.5 pounds). This is based on epidemiological observations that infants weighing less than 2 500 g are approximately 20 times more likely to die than heavier babies.
- **Mean disposable real income per child:** Mean disposable real income per child represents the amount of household income available per household member for their living needs. The data is sourced from national income survey data, it is specific to households with children, and it includes all income (wages, transfers, etc.).
- **Median age:** The median age is the age that divides the population in two parts of equal size, that is, there are as many persons with ages above the median as there are with ages below the median.
- **Total fertility rate:** The total fertility rate is not something that is actually counted. It is not based on the fertility of any real group of women, since this would involve waiting until they had completed childbearing. Instead, it is calculated by imagining that a woman would go through her entire fertile life (15 to 49 years of age) with the fertility rate current in each specific age group. These levels are calculated by dividing the number of life births each year to women from each age group by the population of women in the same age group. The calculation assumes no mortality.

Chapter 5

Infinite connection

Universal access?: *looks at patterns in access to computers in schools and at work.*

Exponential use of the Internet: *the rapidly-expanding worldwide network and exponential rise in Internet use.*

The world in your pocket: *focuses on the expansion of mobile phones and their increasing use as broadband devices.*

A digital society: *examines the outbreak of social networks with the example of Facebook and its number of active users, as well as the online advertising opportunity it has created.*

Local diversity: *the use of English language is progressively losing its prevalence on the Internet as online interactions among communities emphasise the diversity of cultures.*

Transforming our Internet: *looks at the rise in the numbers of Apps available for download to portable devices and Internet traffic for cloud computing.*

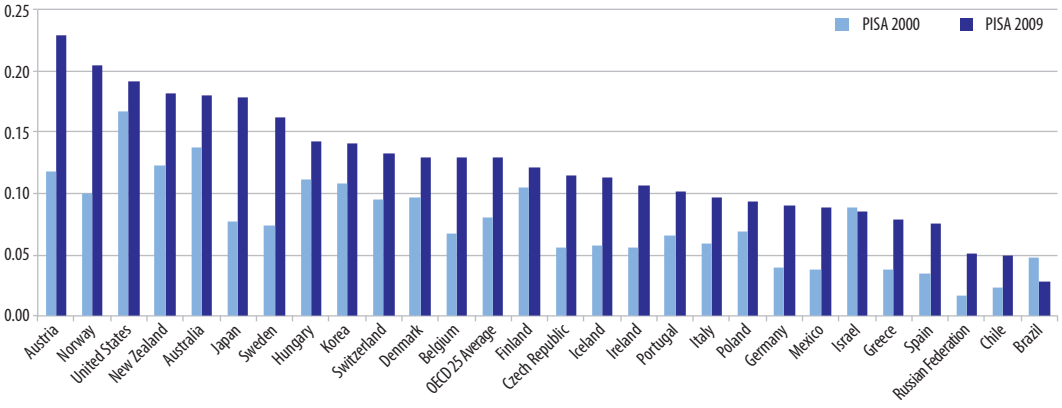
New connections, emerging risks: *takes a walk on the wild side of cyber bullying and internet fraud.*

UNIVERSAL ACCESS?

Information technology has developed very rapidly over the past 40 years, with computers becoming smaller, faster, cheaper, and more powerful. Information technology is now an integral part of our daily lives and embedded in many products. Many of us are now living in technological environments and need to adjust to the rapid pace of change. The ease and speed at which very large quantities of information can be rapidly accessed in a variety of settings is a key matter for education, as is the development of the skills necessary to use this resource effectively. While access to a computer at home and work has become almost universal in OECD countries, many questions may be raised about the use made of that technology for education, despite significant investments made by countries in order to provide access to computers and the Internet in schools.

Figure 5.1. **More computers in schools**

Average ratio of the number of computers to the number of students in schools, in PISA 2000 and 2009



StatLink http://dx.doi.org/10.1787/888932758644

Note: PISA is the OECD's Programme for International Student Assessment, for more information, see *www.oecd.org/pisa*.

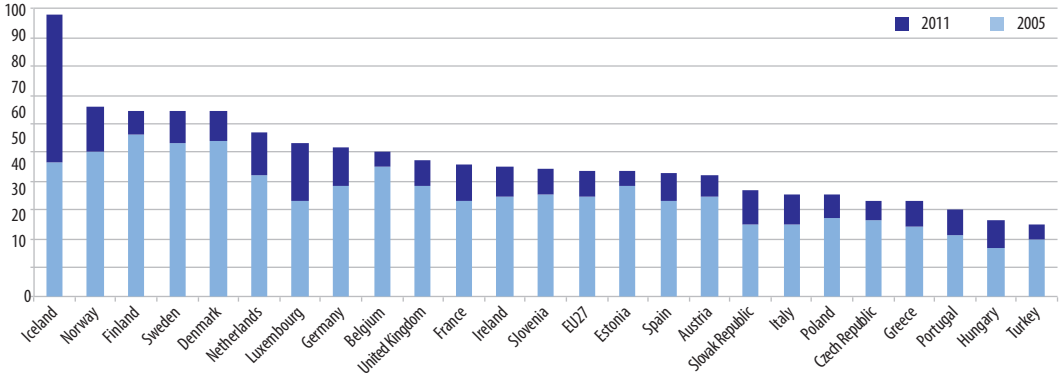
Source: OECD (2011), *PISA 2009 Results: Students OnLine: Digital Technologies and Performance (Volume VI)*.

Despite the ubiquity of computers in homes, student access to computers at school is still limited. Data from the OECD's Programme for International Student Assessment (PISA) indicate that on average across OECD countries the ratio of computers to students increased from 0.08 (so, less than one in ten) to 0.13 (just under one in eight) between 2000 and 2009. However there is wide variation: in Austria and Norway there was over one computer available for at least every five students in 2009, while in Brazil, Chile, and the Russian Federation there was one computer available for 20 children or more. Between 2000 and 2009, some countries experienced large increases in the ratio of computers to students at school: Chile, the Czech Republic, Germany, Greece, Japan, Mexico, Norway, the Russian Federation, Spain, and Sweden all doubled their ratios. But just as with home access, the presence of computers in schools by itself says little about how computers are actually used: access to computers, time spent (and for what purpose), and types of instructional methods all combine to give a better indicator of how technologies are being used at school.

Access and use of computers at work is also increasing, becoming for many an indispensible part of their working day, in particular through use as a communication channel. Between 2005 and 2011 there was a clear increase in the share of workers using an Internet-connected computer. Iceland and other Nordic countries (Finland, Denmark, Norway, and Sweden) had the highest levels in 2011, while Hungary and Turkey had the lowest levels. The size of the increase is also country specific: Iceland more than doubled its share in that time period (from 46% to 98%), a far greater increase than any other country. For education, these trends indicate that computer literacy is a fundamental skill for the majority of jobs, and not just restricted to those positions commonly labelled "information intensive". Future forms of the "digital divide" might thus centre on the skills and capabilities to use information technologies effectively, and schools can play a role in equipping graduates with equal capacities in this domain.

Figure 5.2. **Computing becoming a more common part of the work environment**

Share of employed people at work using an Internet-connected computer, in 2005 and 2011



StatLink http://dx.doi.org/10.1787/888932758663

Note: In place of data for 2011, figures from 2010 are used for Austria, Denmark, the EU27, Iceland, Turkey and the United Kingdom.

Source: OECD (2012), *OECD Internet Economy Outlook 2012*.

And education?

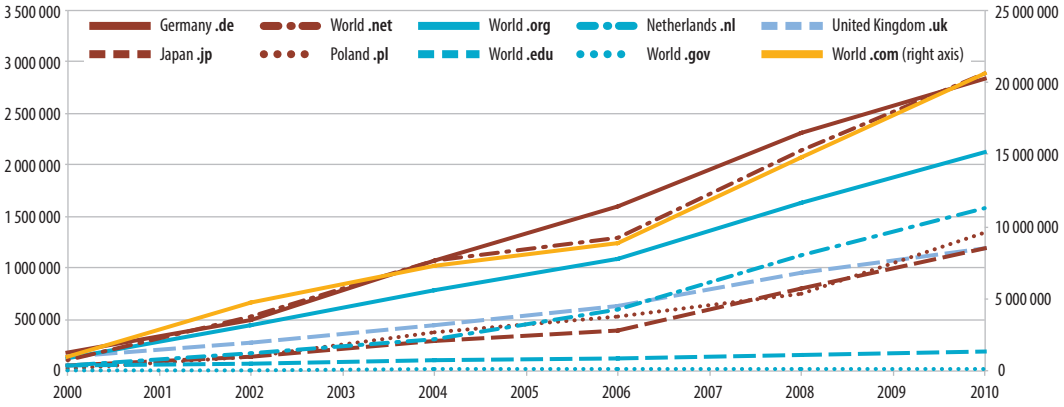
- Increasing numbers of computers are present at schools and routinely used at work. Are we adequately preparing students with the techniques and skills needed to take advantages of the opportunities that ICT offer?
- Teacher use of ICTs often lags behind the technical skills required by students by the time they enter the workplace. How can education ensure that students develop these skills? And how might teachers be better prepared for this?
- With technological development continuing at a rapid pace, how well has education kept pace and, indeed, should it? What are the benefits and costs of students learning through technology?

EXPONENTIAL USE OF THE INTERNET

Computers and information technology have become an integral part of daily life for everything from business to entertainment, as well as for social interaction. Once a primarily Anglophone medium, the Internet is now a completely global space that is transforming almost all aspects of our lives. Our language reflects this change: words like "google" or "tweet" or "skype" have become verbs that are incorporated seamlessly into conversation. For education, complex pedagogical and technical questions remain in determining the best way to support and guide teachers in their use of technology in the learning process. Students can also benefit from basic guidance in their use of technology. For example, they often need help in determining the quality and objectivity of information found in search results that may appear to be rigorous research, but is often from biased or dubious sources.

Figure 5.3. **Internet expanding world wide**

Web servers by domain, 2000-2010



StatLink http://dx.doi.org/10.1787/888932758682

Note: Domains are the suffix letter strings attached to the end of web addresses that identify the site's origin or type. Every country has a unique domain suffix and there are also worldwide topic-related suffixes (.org or.edu). Data presented here include the top five OECD country domains, as well as the top five world domains, ranked according to 2010 figures.

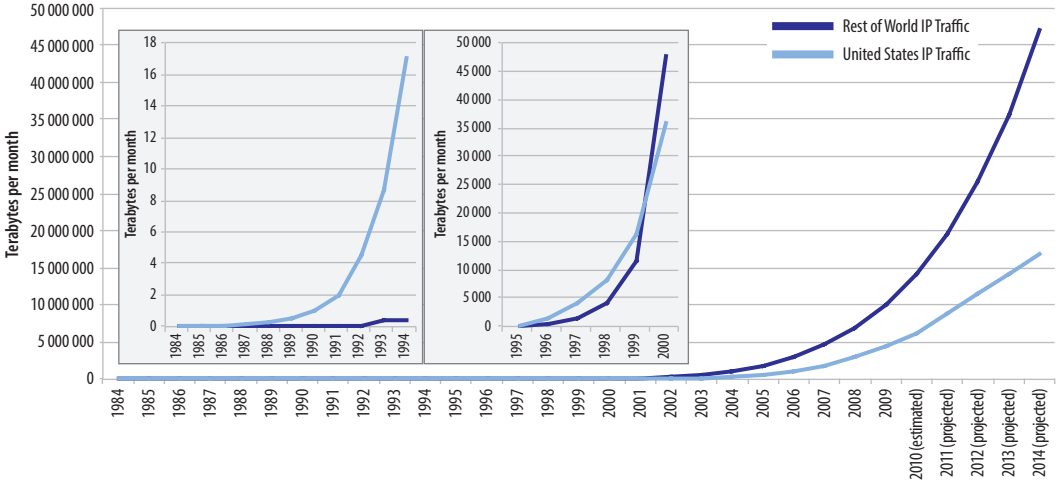
Source: OECD (2011), *OECD Communications Outlook 2011*.

In the last decade, the number and diversity of web sites world wide has exploded. From just over 2.2 million in 2000, the number of websites registered world wide grew to nearly 46 million by 2010. Almost 34 million of these websites were registered to the domain names in the figure above (the most common of all suffixes used), and over 20 million of these used the ".com" suffix. But, the numbers are only part of the story. The diversity of domain names has also increased, from the year 2000 when.com accounted for more than half of all websites to 2010, when the German suffix .de, the Polish .pl, the Japanese .jp and the British .uk all joined the worldwide domain suffixes of .net and .org as major registries of websites and Internet activity. This diversity clearly illustrates the expanding reach and impact of the Internet on our day-to-day use and transmission of information.

The increase in the amount of global Internet activity (the flow of traffic, not just the number of websites) has been so rapid that it is difficult to grasp conceptually. The figure below illustrates that during the 30 years between 1984 and 2014, the volume of Internet activity increased exponentially. During the late 1980s and 1990s total IP traffic in the United States more than doubled each year until 1995, when it increased tenfold. It was not until 1995 that global IP traffic similarly began to climb, increasing so rapidly that by 2000, IP traffic from the rest of the world had surpassed the volume from the United States. These dramatic increases can be attributed to numerous phenomena, including the proliferation of mobile devices (particularly Internet-enabled devices like smart phones and tablets), an increasing number of Internet users, faster broadband speeds, more affordable connectivity, and greater use of video and voice over protocol (VOIP, for example, Skype) online.

Figure 5.4. **Global Internet activity rising exponentially**

Global IP traffic, 1984-2014 (projected)



StatLink http://dx.doi.org/10.1787/888932758701

Note: Internet Protocol (IP) traffic, is the amount of data exchanged between different IP addresses (unique numbers assigned to every device using the Internet). This is essentially a measure of the volume of Internet activity. Terabytes are a unit of digital data equal to 10^{12} bytes. The maximum figure on the y axis of 50 million terabytes is equal to 50 exabytes.

Source: OECD (2011), *OECD Communications Outlook 2011*.

And education?

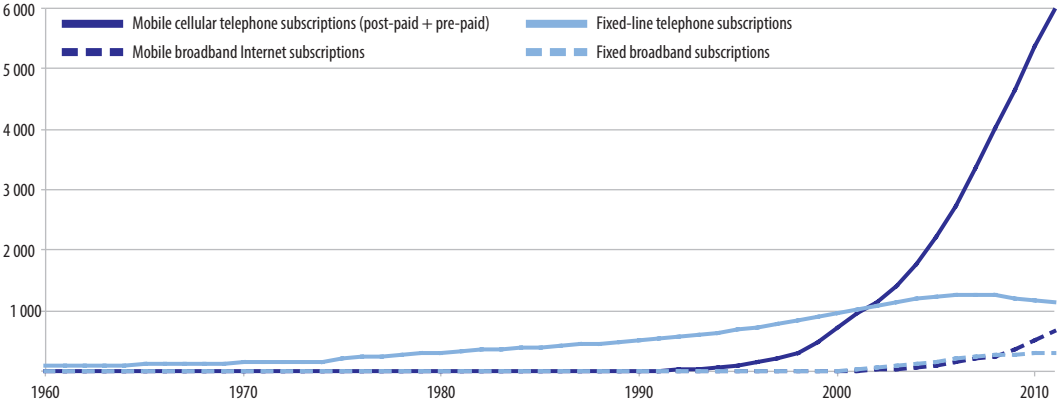
- There has been dramatic growth in the amount of information available and the ease with which anyone can upload materials. How can educators develop their students' critical capacity to use and contribute to this wealth of information?
- With new modern technology we can type any question about any subject and get an immediate answer. Does this search and find mentality alter cognition, including the way we store and retrieve information? Should this influence the way we teach in the classrooms?
- With the rise of online courses, what kind of quality control should be imposed on e-learning? Who oversees quality assurance?

THE WORLD IN YOUR POCKET

Mobile technology continues to transform the way we work, access information, and communicate with each other. Although mobile phones have been around since the late 1980s, it is only in the last ten years that they have become almost universal. Mobile phones now not only far outnumber fixed-line telephones, they are starting to completely replace them. As smartphones and other portable devices continue to develop and expand their range of services, their share of the world market expands. The ubiquity and ease of use of mobile devices has profound implications for education in terms of access, use of information, and privacy. It also has the potential to change the way we communicate and collaborate with each other, both in real time and across national boundaries.

Figure 5.5. **Mobile devices expanding, while use of fixed lines dwindles**

Number of fixed-line and mobile telephone subscriptions (in millions), and number of mobile and fixed broadband Internet subscriptions (in millions), 1960-2011



StatLink http://dx.doi.org/10.1787/888932758720

Note: Broadband and Internet data for 2011 include estimates for some countries.

Source: OECD (2012), *OECD Internet Economy Outlook 2012*.

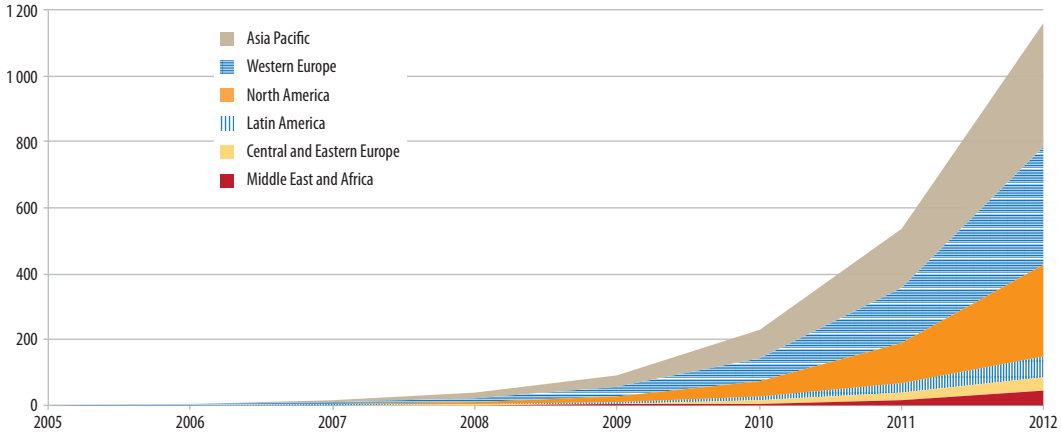
The fixed-line telephone was the king of communication devices throughout the twentieth century up until the mid 1990s, when people started to use mobile phones. By 2002, the number of mobile phone subscriptions had outnumbered fixed-line subscriptions for the first time. In 2011, there were nearly 6 billion mobile phones, or one phone each for 87% of the world's population. Given that not everyone has a mobile phone, this means that in many countries people are now actively using more than one. In OECD countries, the highest number of mobile phones per population can be found in Estonia and Italy, which average nearly 1.5 phones per person. In contrast, countries like Cuba, for example, only 11% of the population has a mobile phone. This is truly a worldwide trend: mobile subscriptions rose from 35% of people in UN-classified developing countries in the year 2000 to 75% in 2011. This is partly a result of improved coverage, with 90% of the world's population within range of at least 2G reception in 2010, up from 61% in 2003.[1]

Subscriptions to services through which people can use mobile broadband on phones and other portable devices have also increased in recent years. The figure below shows

a very marked increase in subscribers to mobile broadband between 2005 and 2012, especially in North America, Western Europe and the Asia Pacific. The projections foresee this growth continuing over the medium term. Easier and more frequent access to the Internet and mobile devices is changing the way we communicate with each other, and also the way we work and collaborate. For education, these trends put issues of privacy, data protection, and control of the sources and quality of knowledge, squarely on the agenda for policy makers, teachers, and school leaders.

Figure 5.6. **Expanding use of mobile broadband**

Mobile IP traffic world wide by region, 2005-2012



StatLink http://dx.doi.org/10.1787/888932758739

Note: Internet Protocol (IP) traffic is a measure of the amount of data exchanged between different IP addresses (unique numbers assigned to every device using the Internet). This is essentially a measure of the volume of Internet activity. Here it refers to only the traffic initiated from mobile sources, such as smartphones or other similar portable devices using a mobile (non-fixed-line) Internet connection. The data from 2010 are estimated figures, those from 2011 and 2012 projected.

Source: OECD (2011), *OECD Communications Outlook 2011*.

And education?

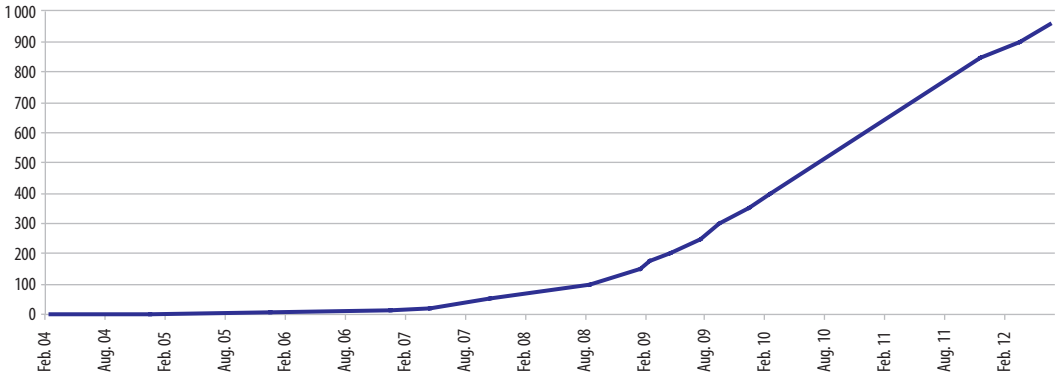
- Many students have access to pocket-sized portable devices connected to the World Wide Web, permitting endless possibilities for information access and communication. How does this affect conventional notions of curriculum, assessment and examinations? Should it?
- Many students have their own mobile phone. What place, if any, do mobile phones have in the classroom and in learning?
- More students have access to unlimited information on portable devices. To what extent does this transform our understanding of the classroom as the *place* of learning?

A DIGITAL SOCIETY

Continuing rapid technological development has changed the way we interact with each other and our communities. Online services include banking, shopping, research and development, multi-media entertainment, and audio and video communication. The introduction of user-generated content has made the Internet a participatory experience and has redefined knowledge as well as community, with social networking playing an increasingly important role. The rise of Facebook and other online communities and the escalating use of online advertising are key trends that illustrate how fundamental a role the Internet plays in most people's lives. As adolescents and children are the most frequent users of online services and social networks, schools and teachers are increasingly faced with the challenges of educating and guiding students through the positive and negative aspects of the virtual world.

Figure 5.7. **Increasing engagement with online communities**

Number of active Facebook users (in millions), 2004-2012



StatLink http://dx.doi.org/10.1787/888932758758

Source: Facebook (2012), *News Room: Key Facts and Timeline*.

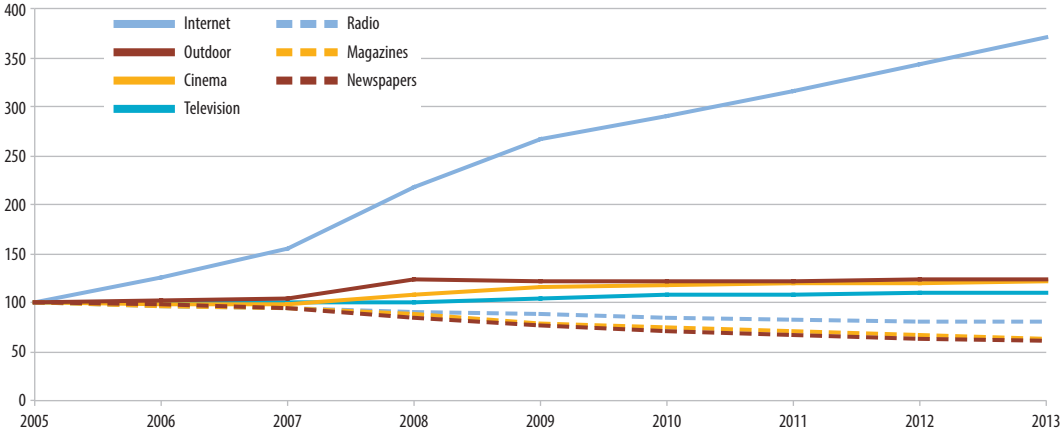
Interactive social networking has become the new norm. Online communities, such as Facebook, LinkedIn, Instagram and others, have exploded into existence in a very short period of time. Founded in 2004, Facebook had 955 million monthly active users by the end of June 2012. Of these, over half (543 million) are using Facebook via their mobile or handheld device, and 81% of these are outside of Canada and the United States. For many, Facebook has become an essential part of their daily routine, like having a morning coffee or eating lunch with a colleague. Indeed 552 million people world wide use Facebook every day. The ubiquity of Facebook has transformed the way friends and acquaintances communicate with each other, as the site is often used as the sole means of communication for arranging upcoming events. It has also led to challenges for some as it has the potential to blur the boundaries between the personal and professional parts of life.

Another example of how the Internet is woven into the fabric of our daily lives is the rapid rise of Internet advertising relative to other, more traditional forms of advertisement. Prior to 2005, television, radio, newspapers and magazines, and even

billboards, were the most commonly used media for advertising. Since then however, the Internet has outstripped all the other categories combined in terms of the amount expended on advertising. This simple measure reveals a great deal about what we do with our time, what we pay attention to, and where we are considered to be most receptive to advertising messages. It also reveals the habits and patterns of consumers under 25 years, the segment of the population with the highest level of discretionary income and thus a highly targeted market for advertisers.

Figure 5.8. **Internet now a key medium for advertising**

Advertising expenditures by medium, 2005-2013



StatLink http://dx.doi.org/10.1787/888932758777

Source: OECD (2012), *OECD Internet Economy Outlook 2012*.

And education?

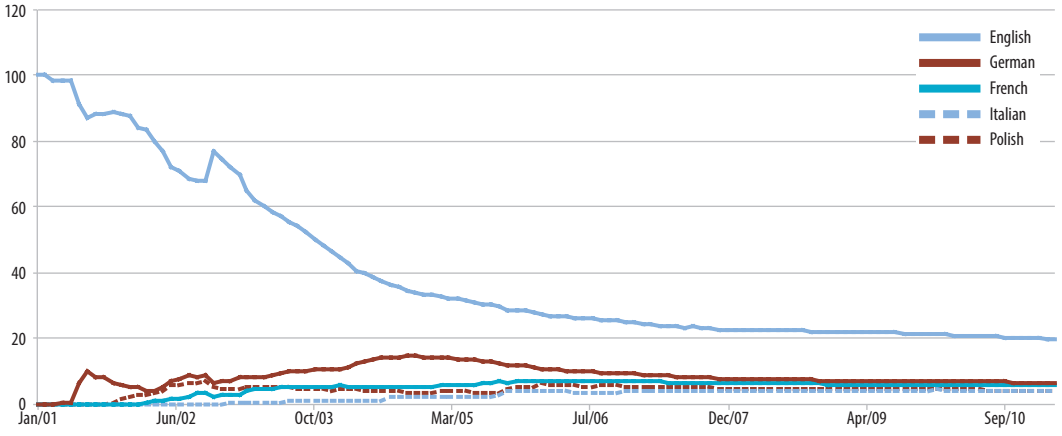
- With the increase of user-generated content on the Internet, what can its participatory and collaborative models bring to formal learning systems?
- Students are one of the most targeted demographic groups for advertising. Should our school systems be teaching our children about advertising and the impact its messages can have on them? If so, starting at what age?
- Social networking and user-generated-content Internet sites are often perceived as taking time away from the core business of learning. Should schools see social network sites as an opportunity to extend the learning process/experience beyond the classroom?

LOCAL DIVERSITY

English was long the dominant language of the Internet, but that is changing. Since the mid-2000s, the number and diversity of languages on the Internet – on websites, social networking, wiki sites, and on blogs – has increased dramatically. There are now over 250 languages represented on the Internet, with English, Chinese, Japanese, Portuguese, and Spanish making up the top five. This diversity makes the Internet that much more accessible to users of different nationalities. For education, the diversity in online content means that non-English materials, resources, opinions, blogs and networks, are more readily available to teachers and students. It also opens new opportunities for language learning, for example through Skype language lessons and conversational exchange, or through other web pages or materials that are produced and made available for free by native speakers in their countries.

Figure 5.9. **English becoming less dominant online as major sites increase multi-lingual content**

Proportion of Wikipedia articles by language as a percentage of total articles on this site, January 2001-February 2011



StatLink http://dx.doi.org/10.1787/888932758796

Source: OECD (2012), *OECD Internet Economy Outlook 2012*.

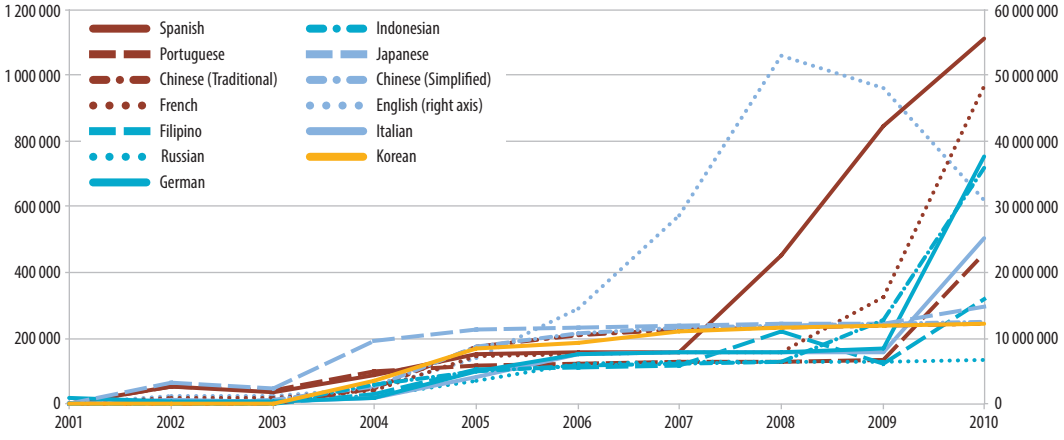
Online content is more multi-lingual, with a rise in non-English language content over the last several years. One example of this is Wikipedia, an online encyclopaedia created and maintained collectively by thousands of authors. The rationale behind this process is that the sheer number of users reading the articles should ensure that content is edited and mistakes corrected. When it began in January 2001, 100% of the articles were written and maintained in English. Just two and a half years later, in October 2003, only 50% of the entries were written in English, with French, German, and Polish following in descending order of volume. By February 2011, less than 20% of the content was written in English, and more than 250 other languages were represented in entries on the site.

Another measure of user diversity in online content is the number and origins of blogs. From 2001 to 2010, the number of blogs skyrocketed. While English is still the language

of the majority of them, the diversity of languages represented has broadened widely. As tracked by Google, the languages most frequently used in blogs between 2009 and 2010 were (in order of frequency) Spanish, French, German, Indonesian, Italian, and Portuguese. These were followed by Filipino, Japanese, simplified Chinese, Korean, and a number of other languages, including artificial languages like Esperanto. A fun fact: in the year 2010, there were over 15 000 blogs written in Esperanto on the Internet.

Figure 5.10. **Individuals engaging online in many different languages**

Number of blogs indexed by Google, presented by language (left axis) and English (right axis), 2001-10



StatLink http://dx.doi.org/10.1787/888932758815

Source: OECD (2012), *OECD Internet Economy Outlook 2012*.

And education?

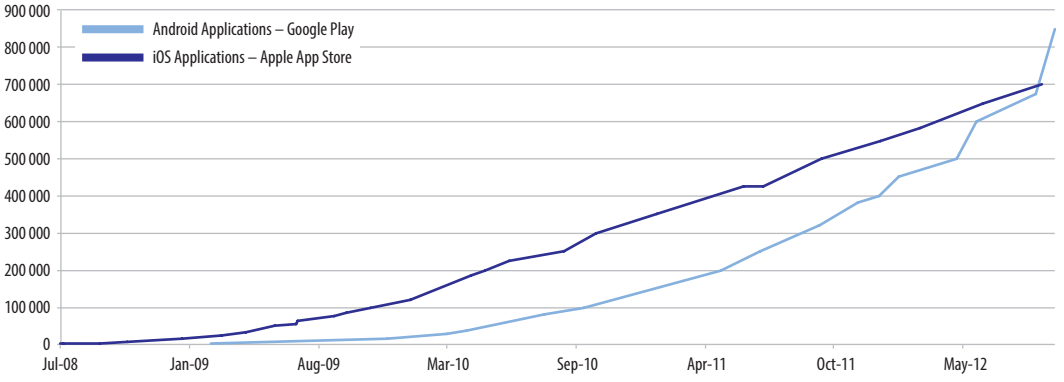
- ICT has the potential to allow more self-paced, interactive and personalised learning. How much more should this potential be exploited, whether in schools, vocational or higher education, or non-formal learning for adults? Can it be over-done?
- The increasingly multi-lingual nature of the Internet creates opportunities for teachers as well as learners. How might teacher professional development take advantage of this potential for peer learning?
- The explosion of the number and quantity of multi-lingual information on the Internet can be an opportunity but also a challenge to the user. How does the local diversity of Internet content lead to better or worse quality of information available for students? Does this vary according to the language used?

TRANSFORMING OUR INTERNET

The Internet has transformed many of our daily tasks, how we socialise and, increasingly, the ways we define ourselves through our online identity and presence. But the Internet itself is also changing and transforming. Two of the most recent and interesting trends are the rise of downloadable applications, or "apps", and the emergence of cloud computing. Applications are essentially software programs, and cloud computing refers to storage or other services provided to users via Internet connection to servers in remote locations. Being able to store large files virtually and allow access to colleagues all over the world is a significant step in global connection. Similarly, the increase in the number of handheld digital devices has spawned an enormous market for mobile interactive information that can be accessed immediately. Want to know what song you're listening to while you're driving or shopping? Want to find the closest Chinese restaurant? There's an App for that!

Figure 5.11. **There's an App for that!**

Approximate number of applications available for download on the Google Play and Apple App Store, 2008-2012



StatLink http://dx.doi.org/10.1787/888932758834

Note: "Apps" or applications are software programs delivered over the Internet on mobile or portable devices.

Source: Wikipedia (2012), *Google Play*, and *Apple Store (iOS)*.

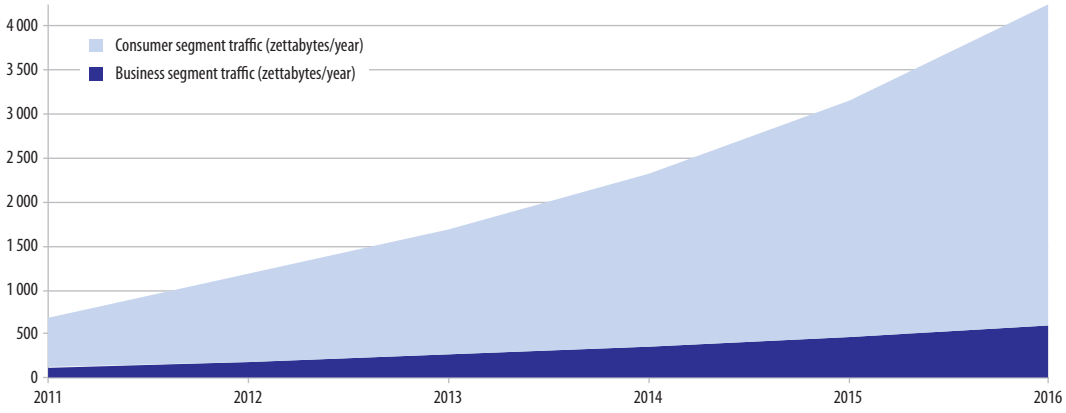
Applications, or *apps* for short, have in recent years become a significant market for providing third party functions to products and services. Perhaps the most prominent use of apps has been for the addition of functionality to portable devices, such as smartphones and tablets. The app retail market for such devices has been explosive. In January 2009, there were 15 000 separate apps available for download from Apple's App Store for use on their iPhones and iPads. Just three short years later in January 2012, this number had grown to over half a million, and by September 2012, the Apple App Store sold more than 700 000 different apps. Competitors to Apple have released their own tablets and smartphones, experiencing a similar pattern of growth in app development and download from their stores. Although slower at the start of 2010, by September 2012 the numbers of apps available for download through Google Play for Android phones had nearly reached those available through Apple. By October 2012, this number had surpassed Apple's figures to reach 850 000. As the market for smartphones and tablets is still growing, these numbers will continue

to rise. Of course, smartphones and tablets are not the only part of the emergence of apps. Apple and other companies provide access to a variety of applications for computers, and online service companies, such as Facebook, have begun to make use of apps to allow third parties to add functionality and provide services to their account holders.

Cloud computing is another emerging face of our interactive world. Although still new, cloud computing already accounts for 39% of data-centre traffic world wide, a figure that is projected to grow to 64% by 2016. It is a truly global trend, led in 2011 by North America (with a traffic volume of 261 exabytes per year), followed by the Asia Pacific (216 exabytes per year), and Western Europe (156 exabytes per year). Projections for future use suggest that the Asia Pacific region will emerge as the biggest user of cloud computing services and solutions by volume, followed by North America. The volumes are staggering: annual global-cloud IP traffic is projected to reach 4.3 zettabytes by the end of 2016. Students need to be increasingly tech-savvy and confident for life in a future where flexible access to enormous data and files will be the norm.

Figure 5.12. **Virtual world increasingly up in the clouds**

Global cloud data-centre traffic volume, 2011-2016



StatLink http://dx.doi.org/10.1787/888932758853

Note: Cloud computing is a general term for hardware and software services delivered over the Internet. Major cloud providers include Amazon, Google and Microsoft. Users make use of cloud storage facilities to manage large files or synchronise between their own devices or with colleagues and friends. Exabytes are a unit equal to 10^{18} bytes. Zettabytes are equal to 10^{21} bytes. One zettabyte is equal to approximately 1000 exabytes. Data beyond 2012 are projections.

Source: Cisco Systems, Inc. (2012), *Global Cloud Index: Forecast and Methodology, 2011–2016*.

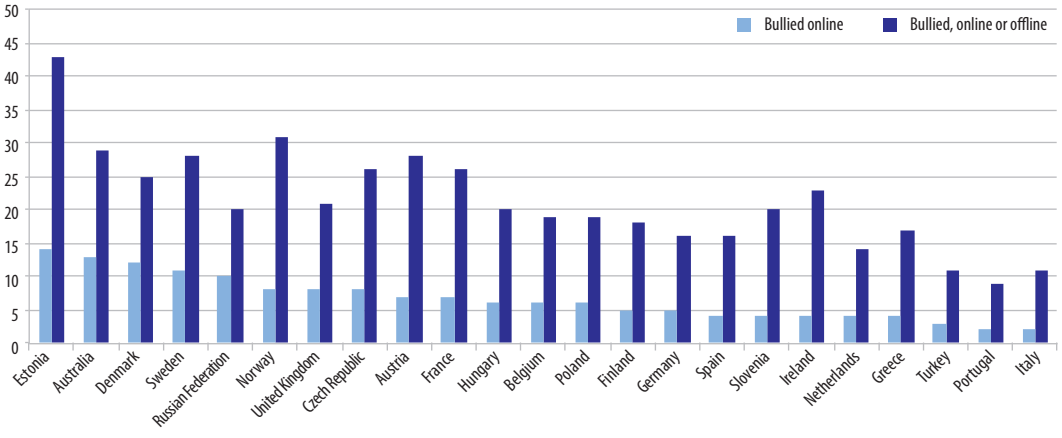
And education?

- Applications are increasingly becoming the way to add functionality to computers, online services and portable devices. Does this make it important for students to learn the programming skills to develop their own apps?
- Cloud computing is already used to virtually store and access large datasets and aid in organising conferences and reviewing draft publications in the international academic community. How can concerns regarding accidental or deliberate disclosure of protected information be best addressed (for example, disclosing the identity of anonymous reviewers, or deliberate data mining)?
- How can education utilise advances in technology to enrich student learning environments? Is there a market for educational apps to improve learning in the classroom and extend it beyond?

NEW CONNECTIONS, EMERGING RISKS

Despite the enormous potential of the Internet to reshape our world, there is a downside to infinite connectivity. Rising challenges, for example the rise of Internet fraud, online privacy concerns and identity theft, are all part of a new global online world. For parents and children, there are also specific issues related to cyber bullying, worries about keeping children protected from explicit content and online predators. Today's students, willingly or unwillingly, are exposed to new dangers, which parents and educators do their best to shield them from. Guides to monitoring and protecting Internet users – of all ages – make it clear that the best preventive strategies involve awareness, constant vigilance, and for protecting children, keeping an open dialogue about their concerns and online lives.

Figure 5.13. **Cyber bullying: An emerging and troubling challenge**
Percentage of children surveyed reporting being bullied online and offline, in 2010



StatLink http://dx.doi.org/10.1787/888932758872

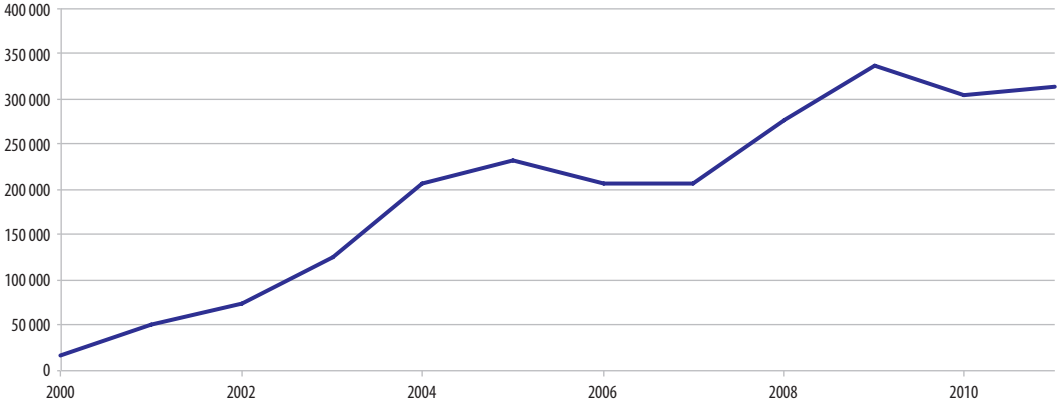
Source: Livingstone, S., L. Haddon, A. Görzig, and K. Ólafsson (2011), *EU Kids Online September 2011*.

Cyber or online bullying occurs when a young person (child, preteen or teen) is threatened, harassed, or embarrassed by another young person using the Internet. A number of high-profile tragedies, for example teens who committed suicide as a result of cyber bullying, have brought this topic to the top of policy, education, and parental agendas. Figure 5.13 illustrates the rates of cyber bullying reported by young people in 2010. More than 10% of the surveyed internet users aged 9-16 years reported having been the victim of bullying online in Australia, Estonia, Denmark, Sweden and the Russian Federation. The lowest rates, between 2% and 3%, were reported by youth in Italy, Portugal and Turkey. While cyber bullying is increasingly worrisome, bullying offline is still reported to be more common. The survey additionally notes that the bully and victim roles are often interchangeable and related. Of the young internet users surveyed, only 4% of those who reported not bullying others had been the victim of cyber bullying. For those who conceded to having bullied others online, 18% reported being bullied themselves. This figure rose to 47% for the self-confessed offline bullies. It is important to note that some of the differences between countries may be accounted for by the fact that the figures are self-reported and so comparisons should be conducted with caution.

Online security is something that concerns all users of the Internet. The numbers and types of reported online fraud, for instance, have multiplied enormously since the start of the century. In the United States alone, the numbers of complaints of Internet fraud have grown from almost 17 000 in the year 2000 to over 300 000 in 2011. These numbers include a variety of scams, including everything from identity theft, romantic fraud, loan collection hoaxes, spam, and the well-known African prince who just needs your bank account details to access his fortune. As awareness of the most common scams grow, so too does the ingenuity and creativity of the fraudsters. The best prevention is constant vigilance, caution, and taking the time to educate yourself and others. It is also important to report experiences of fraud to the appropriate authorities so that the types, volume, and strategies of Internet fraud can be monitored and dealt with appropriately.

Figure 5.14. **Internet fraud on the rise**

Number of complaints received annually from victims of Internet crime by the United States Internet Crime Complaint Center (IC3), 2000-2011



StatLink http://dx.doi.org/10.1787/888932758891

Note: Complaint data are derived from United States figures but the Internet crime may originate anywhere in the world.

Source: United States Internet Crime Complaint Center (2011), *2011 Internet Crime Report*. Used with permission. ©2011. NW3C, Inc. d/b/a the National White Collar Crime Center. All rights reserved.

And education?

- Young people are increasingly engaged online. How can concerned adults, such as teachers and parents, best educate them to be aware of Internet risks and how to deal with them as they arise? Is better filtering and protection the answer?
- The anonymous nature of online posting and commenting has been the subject of intense debate, with those in favour citing freedom of speech issues – and those against arguing that it can encourage hate speech and a lack of accountability. Should education take a pro-active stance in encouraging respectful online behaviour?
- What responsibilities do educators have in monitoring student's time online during school hours, and how can different parental standards of safety be accommodated? Is there a need for system-wide policies to establish consistent standards in online security for all schools?

NOTE

1. International Telecommunications Union (2012), *ITU Statistics*, online, *www.itu.int/ict/statistics*, accessed November 2012.

FIND OUT MORE

Relevant sources

- Cisco Systems, Inc. (2012), *Global Cloud Index: Forecast and Methodology, 2011–2016*, online, *www.cisco.com/en/US/solutions/collateral/ns341/ns525/ns537/ns705/ns1175/Cloud_Index_White_Paper.pdf*, accessed November 2012.
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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.

Definitions and measurement

- **2G**: 2G is short for second generation wireless or mobile telephone technology. The systems through which mobile phones operate have changed and evolved over time, changing their format and adding new services. The 2G networks were not only more efficient than their predecessors, but contained additional data services, such as text messaging. Following 2G systems, 3G or third generation mobile systems were rolled out in many countries since 2001 and added further functionality including greater reliability, faster data transfer speeds and mobile broadband. Phone carriers in many countries are now beginning to install fourth generation or 4G mobile systems, the key benefit of which is again a marked increase in speed of data transfer. While 2G systems have been superseded, they are still used in many parts of the world.
- **Android:** Android is a mobile operating system developed by Google which currently runs on a number of Smartphone brands such as the Motorola Droid, the Samsung Galaxy, and Google's Nexus One.
- **Applications ("Apps"):** Apps are software programs developed for a specific task to run on mobile phones, tablets, Personal Digital Assistants (PDAs) or other portable devices.
- **Cloud computing:** Cloud computing is a general term for hardware and software services delivered over the Internet. In essence, the software and data are stored on servers at a remote location from the user and managed by a third party. Major cloud providers include Amazon, Google and Microsoft. End users can access cloud-based applications through a web browser or via a desktop or mobile application, and primarily make use of cloud storage facilities to manage large files or synchronise between their own devices or with colleagues and friends.
- **Data mining:** The process of analysing data (normally very large quantities) from different perspectives and summarising it into useful information. Data mining software is one of a number of tools for analyzing data, and allows users to reveal trends, patterns and relationships. The use of data mining techniques could have implications for privacy, if information from different sources (each independently privacy protected) is combined in such a way that it allows for the identification of individuals or sensitive data.
- **Domains:** Domains are the suffix letter strings attached to the end of web addresses that identify the site's origin or type. Every country has a unique domain suffix, there are also worldwide topic-related suffixes, such as ".org" which are used for non-profit or international organisations, ".edu" for education-related institutions or information, and ".gov" for government-related websites.
- **Exabytes:** A unit of digital data equal to 10^{18} bytes (or around one billion gigabytes). One exabyte of storage could contain 50 000 years worth of DVD-quality video. This unit of measurement precedes Zettabytes (see below for definition).
- **Internet Protocol (IP) traffic:** The Internet is distributive, that is, there is no one entity "the Internet" administered through any central location. Internet use is therefore measured through flow. In this case, flow is measured through (IP) traffic, a measure of the amount of data exchanged between different IP addresses (unique numbers assigned to every device using the Internet). This is essentially a measure of the volume of Internet activity.
- **iOS:** iOS is a mobile operating system developed by Apple, and is currently running on Apple iPhone, iPod touch, and iPad.

- **Mobile broadband:** Mobile broadband is a general term used to describe high-speed Internet access from mobile providers for portable devices, such as a mobile phones, tablets, or laptops.
- **Terabyte:** A unit of digital data equal to 10^{12} bytes.
- **Webserver:** Essentially a host for a number of unique websites, rather than web pages. For example, the OECD has a website that includes many webpages, but is counted as one webserver.
- **Wireless Internet:** A wireless Internet connection allows access to the Internet without a hard-wired connection, such as an Ethernet cable. Several computers and other Internet-enabled devices can share a single Internet connection if they use it wirelessly, and users can access the Internet from any point within range of the signal.
- **Zettabyte:** A unit of digital data equal to 10^{21} bytes, or 1 000 exabytes (see above for definition).

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