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**PROGRESS TOWARDS
THE LISBON OBJECTIVES
IN EDUCATION AND TRAINING**

**Indicators and benchmarks
2008**

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Report prepared by :

DG Education and Culture, Unit A4 (Analysis and studies)

Coordination : Anders Hingel, Head of unit

Oyvind Bjerkestrand

Richard Deiss

Maria Hrabinska

Lars Bo Jakobsen

Margot Kuzma

Cristina Marcone

Flora Dewar

Mikaël Le Bourhis

Joint Research Centre, Centre for Research on Lifelong Learning (CRELL)

Andrea Saltelli, Head of unit

Michela Nardo

Mircea Badescu

Marcella Deluca

Béatrice D'Hombres

Bryony Hoskins

Michaela Saisana

Daniele Vidoni

Ernesto Villalba

Eurostat

Jean-Louis Mercy, Head of unit

Lene Mejer

Marta Beck-Domzalska

Eric Gere

Georgeta Istrate

Fernando Reis

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Preface

“Progress towards the Lisbon objectives in education and training” is the 5th annual report examining performance and progress under the Education and Training 2010 Work Programme.

The purpose of this report is to provide strategic guidance for the Education and Training 2010 Work Programme on the basis of indicators, benchmarks and research results. The report sets out progress towards the objectives agreed by the Council. The Progress Reports for 2004, 2005, 2006 and 2007 were able to give more and more detailed analysis of performance and progress as data and research material became available.

On 25th May 2007 the Education Council adopted conclusions on a coherent framework of 16 core indicators for monitoring progress towards the Lisbon objectives in education and training (European Council, 2007a). The 2007 and 2008 Reports have used these core indicators, reinforced by contextual data and research results.

Reflecting these indicators and the political priorities of the Education and Training 2010 programme, the main part of the 2008 report (Part B.) is structured in eight chapters as follows:

1. Making lifelong learning a reality
2. Developing school education
3. Developing vocational education and training
4. Developing higher education
5. Key competences for lifelong learning
6. Improving equity in education and training
7. Employability
8. Investment in education and training;

The Report indicates the direction in which European education systems are moving and how their contribution towards meeting Europe's Lisbon objectives is developing.

World beating performance is found within some areas of EU education and training. At the same time, many Member States are challenged in particular fields. The Report shows that the best policy practice already existing within the EU could add value if it could inspire more general improvement. The Report helps point to the scope for exchanging information and policy experience. It also points to the scope for further improving the framework of indicators and benchmarks which underpins it.

The report was prepared by the Directorate-General for Education and Culture, CRELL (the lifelong learning research unit in the Joint Research Centre) and Eurostat, in cooperation with, the Eurydice European Unit.

PART A Performance and progress of European education and training systems since 2000

1. **The policy framework – The Lisbon strategy**
2. **Progress towards five benchmarks for 2010**
3. **Best performing countries: Learning from good practice**
4. **European Educational systems in a Worldwide perspective**

MAIN MESSAGES 2008

- Performance of the European Union in education and training levels with the best in the World such as Australia, New Zealand, Canada, US and Korea. However the overall performance of the EU masks wide divergence between Member States.
- 60% of 5-29 years old participate in schools and higher education. This is comparable to the US and 18% higher than in Japan.
- There are about 3 million more students in higher education and 1 million more graduates per year than in 2000.
- There are 13 million more higher education graduates in the working age population than in 2000.
- Almost 108 million people still have low educational attainment - about 1/3 of the labour force.
- There are still important inequities in European educational systems.
 - 6 million young people, 1 in 7 of 18-24 years old, achieve only compulsory education or less.
 - 25-64 year-olds are 3 times more likely to participate in lifelong learning if they have completed at least upper secondary education.
 - 1 in 7 of the 4 year-olds are not enrolled in education. Many of these are in high need categories, such as children with migrant background or from families with low socio-economic status.
 - Gender inequalities remain. Boys do less well at reading and have more special education needs. Girls do less well at mathematics and are underrepresented among mathematics, science and technology students and graduates.
- The EU set itself the overall ambition of achieving 5 benchmarks by 2010, on literacy, reduction of early school-leaving, upper secondary attainment, maths, science and technology graduates and participation in adult learning. Only the benchmark on mathematics, science and technology graduates is likely to be exceeded. Indeed, low performance in reading literacy, which was benchmarked to decline by 20% by 2010, has actually increased by more than 10% between 2000 and 2006 and has reached 24.1 %.
- Education and training in the EU is improving slowly but steadily. Yet there are significant divergences between Member States and fields.
 - All countries have relative strength and weakness in the five benchmark areas.
 - Finland, Denmark, Sweden, the United Kingdom, Ireland, Poland, Slovenia, Norway and Iceland exceed the composite objective of the five benchmarks set for 2010 and are progressing in yearly averages; while France, the Netherlands, Belgium, have average performance below the composite objective and have not made progress.
 - Participation in lifelong learning is becoming a reality in Sweden, the United Kingdom, Denmark, Norway and Iceland, countries which have developed comprehensive and coherent lifelong learning strategies. Slovenia, Finland, Austria, Belgium and Spain are following closely behind.

1. The policy framework - the Lisbon strategy

Education and training have an important place in the integrated guidelines for delivering the revised Lisbon strategy for jobs and growth.

As part of this overall strategy, the Council set out broad common objectives for the education and training systems of the EU. The Education and Training 2010 Work Programme supports the actions of the Member States to achieve these objectives. It is implemented through the open method of coordination, using indicators and benchmarks to support evidence-based policy making and to monitor progress.

The Council in May 2007 identified a framework of 16 core indicators for monitoring progress towards the Lisbon objectives.

Sixteen core indicators for monitoring progress towards the Lisbon objectives

- Participation in pre-school education
- Special needs education
- Early school leavers
- Literacy in reading, mathematics and science
- Language skills
- ICT skills
- Civic skills
- Learning to learn skills
- Upper secondary completion rates of young people
- Professional development of teachers and trainers
- Higher education graduates
- Cross-national mobility of students in higher education
- Participation of adults in lifelong learning
- Adult skills
- Educational attainment of the population
- Investment in education and training

These indicators enable the Commission and the Member States to:

- underpin key policy messages;

- analyse progress both at the EU and national levels;
- identify good performance for peer review and exchange; and
- compare performance with third countries.

In order to guide progress on the Education and Training 2010 Work Programme, the Council adopted 5 benchmarks to be achieved by 2010.

Five EU benchmarks for 2010

- No more than 10% early school leavers;
- Decrease of at least 20% in the percentage of low-achieving pupils in reading literacy;
- At least 85% of young people should have completed upper secondary education;
- Increase of at least 15% in the number of tertiary graduates in Mathematics, Science and Technology (MST), with a simultaneous decrease in the gender imbalance;
- 12.5% of the adult population should participate in lifelong learning.

The core indicators cover the whole learning continuum from pre-school to adult education, teachers' professional development and investment in education and training.

Not all the data for these indicators are fully available yet. In most of these areas, new surveys are being prepared.

Indicators never tell the full story. But they help to identify differences, similarities and trends and to provide a starting point for further analysis in order to understand better performance and progress.

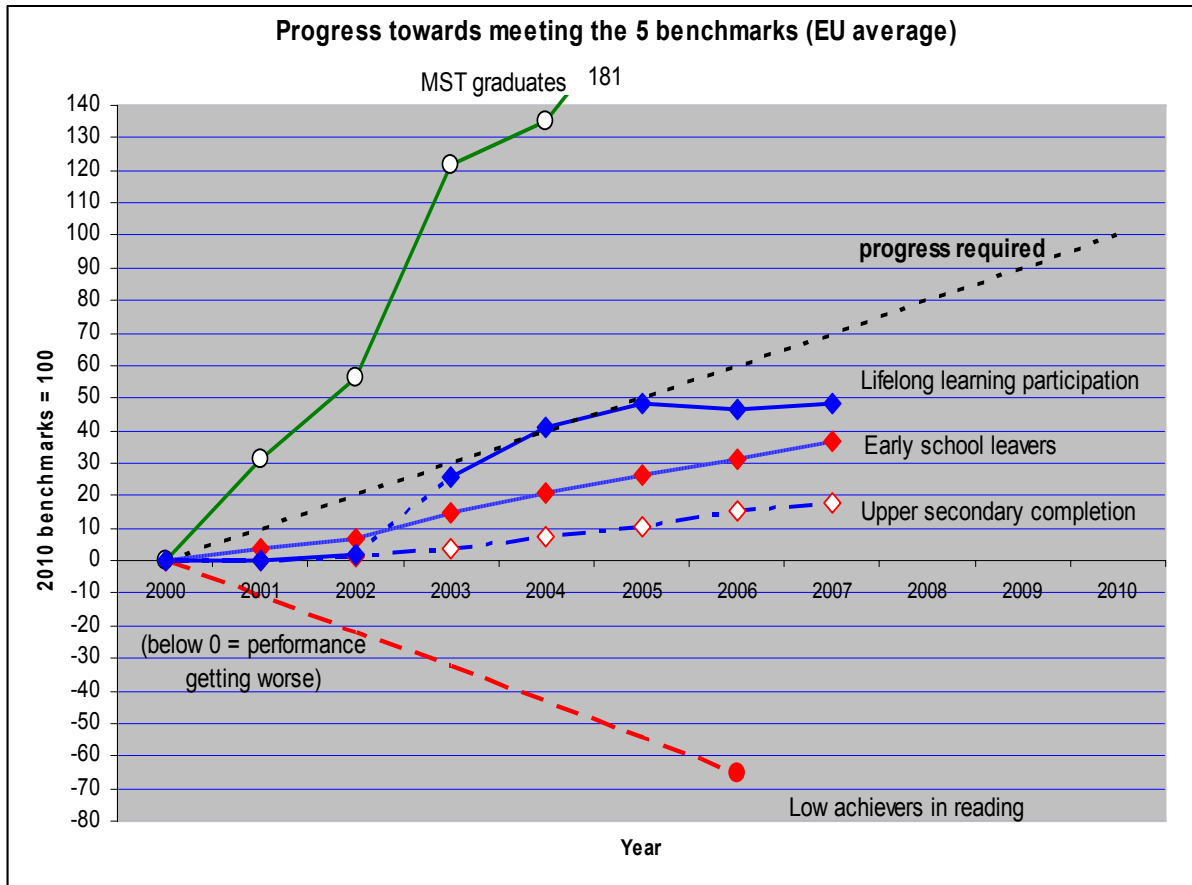
2. Progress towards five benchmarks for 2010

Education and training systems in the EU are generally improving. The EU benchmark on mathematics, science and technology graduates was already reached in 2005. Yet although

there is broad progress, attaining the benchmarks on early school leaving, completion of upper secondary education and lifelong learning will need more effective

national initiatives. Indeed, the situation is getting worse for reading literacy of young people, the benchmark in the field of key competences. (Chart A.1.)¹

Chart A.1 Progress towards meeting the five benchmarks for 2010 (EU average)



Source: DG Education and Culture

In this chart the starting point (in 2000) is set at zero and the 2010 benchmark at 100. The results achieved each year are measured against the 2010 benchmark (= 100). The diagonal line shows the progress required, i.e. an additional 1/10 (10%) of progress towards the benchmark has to be achieved each year to reach the benchmark. If a line stays below this diagonal line, progress is not sufficient; if it is above the diagonal line progress is stronger than what is needed to achieve the benchmark. If the line declines, the problem is getting worse.

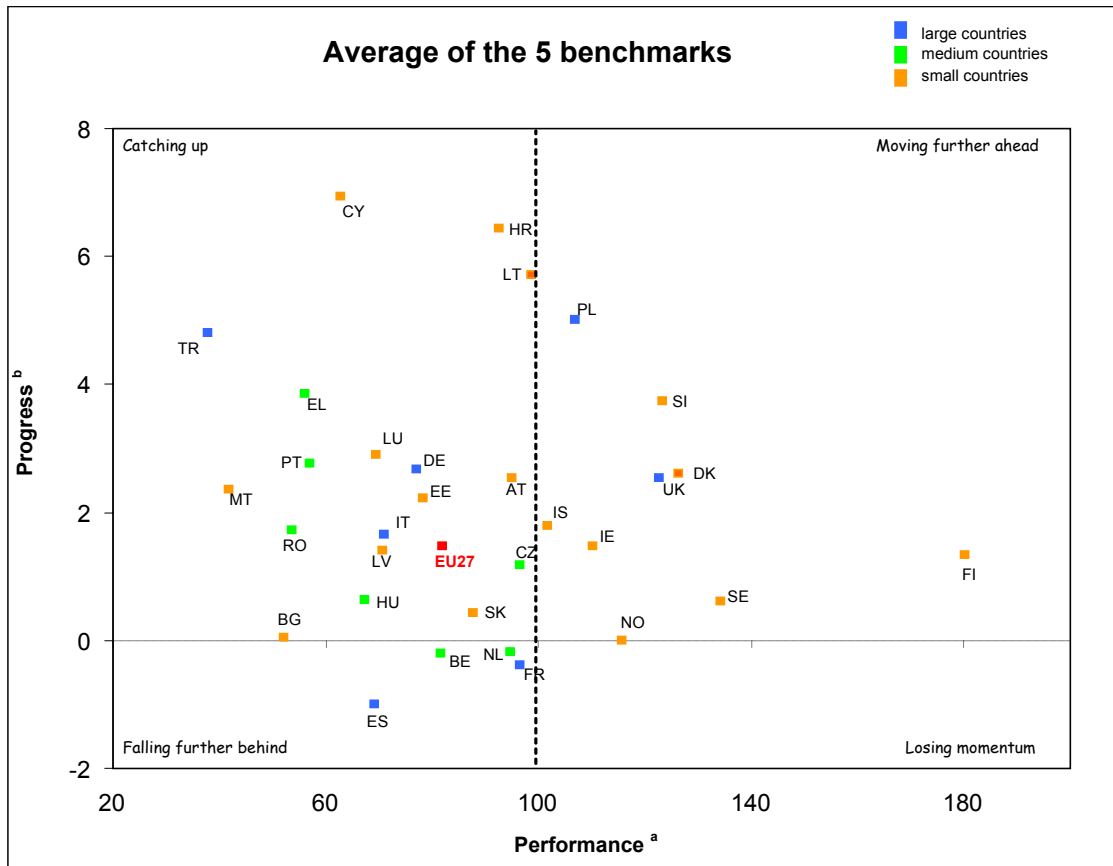
In the case of lifelong learning, it should be kept in mind that there have been many breaks in the time series, which tend to overstate the progress made, especially in 2003. Therefore the 2002-2003 line on LLL participation is dotted. For low achievers in reading (data from the PISA survey) there are results for 18 EU countries for only two data points, 2000 and 2006. It is therefore not yet possible to assess to what extent the observed differences are indicative of longer-term trends.

Chart A.2 gives an overview of the average performance levels and progress of countries across the 5 benchmark areas (giving them equal weights). Most countries are progressing: their overall performance in the benchmark areas is improving. Finland, Sweden, Denmark, the United Kingdom, Ireland, Poland Slovenia, Norway and Iceland are

pulling further ahead. However 4 countries, France, the Netherlands, Belgium and Spain, have an average performance across the five benchmarks areas below the 2010 targets and are falling behind.

A more detailed analysis of each of the five benchmark areas is provided in Charts A.3 to 7.

Chart A.2 : Average levels of country performance (2006) and progress (2000-2006) across the five benchmark areas



Source : CRELL/Joint Research Centre 2008

Benchmark for 2010= 100 (Performance)

^a Average Performance (2006)

^b Average annual growth (2000-06) %. (Average yearly growth across the five benchmarks)

In the case of the indicators on low achievers and Early school leavers the average growth rate is multiplied by (-1) to take into account that a negative growth rate is a plus for the country.

Average country performance and progress (2000-2006) (Chart A 2)

The quadrant: "Moving further ahead" includes countries that have performance levels in 2006 above the composite 2010 target, and have been progressing (yearly average) during the period. The quadrant: "Falling further behind" includes countries that in 2006 have performance below the 2010 composite target and have negative average levels of progress during the period. Performance and progress of countries in each of the benchmark areas are shown in the graphics A.3-7.

The following indicators have been applied (Chart A.2-7)

Low achievers: Percentage of pupils with reading literacy proficiency level 1 and lower on the PISA reading literacy scale

Early school leavers: Share of 18-24 year-olds with only lower secondary education or less and not in education or training

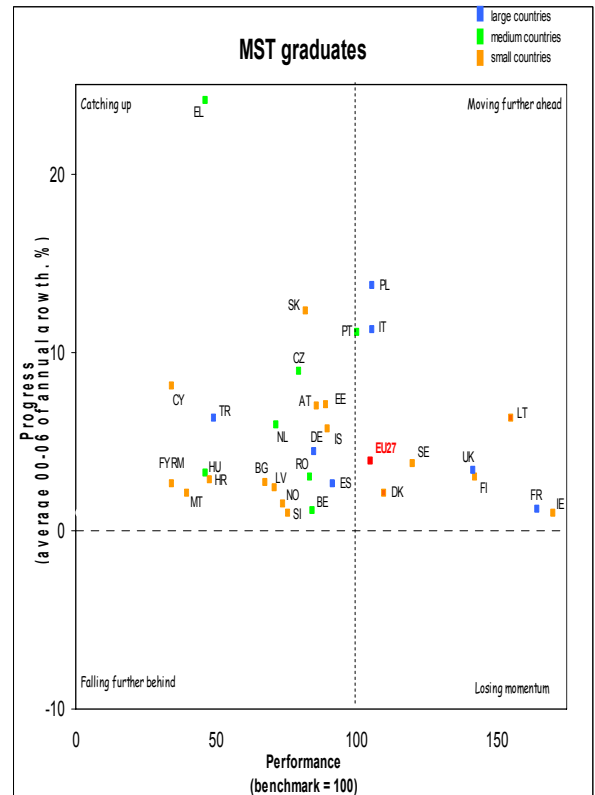
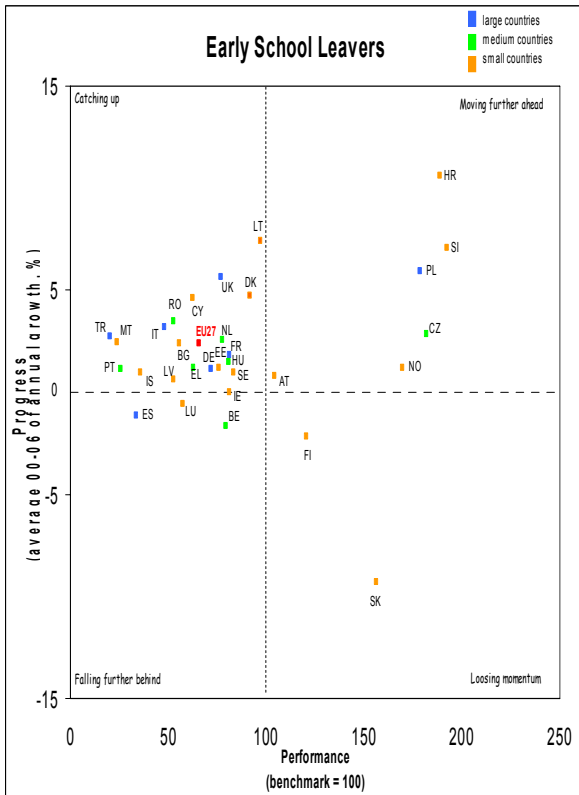
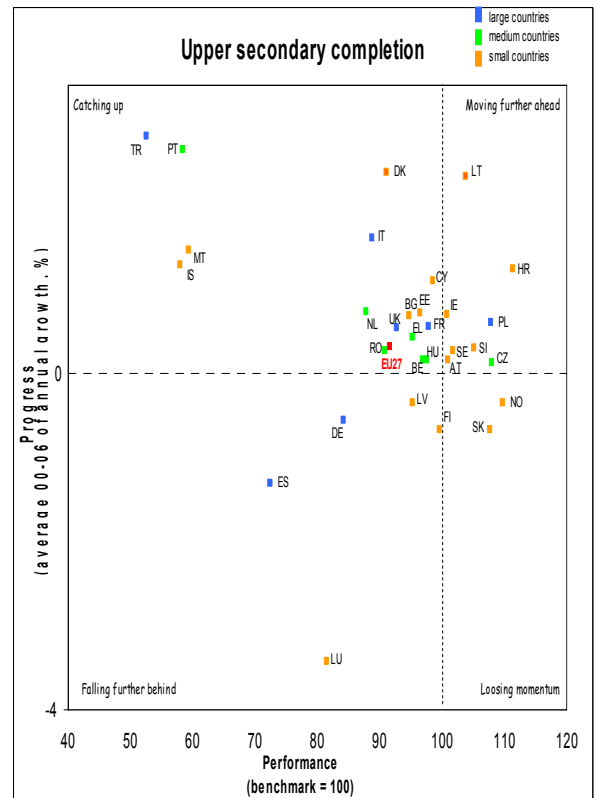
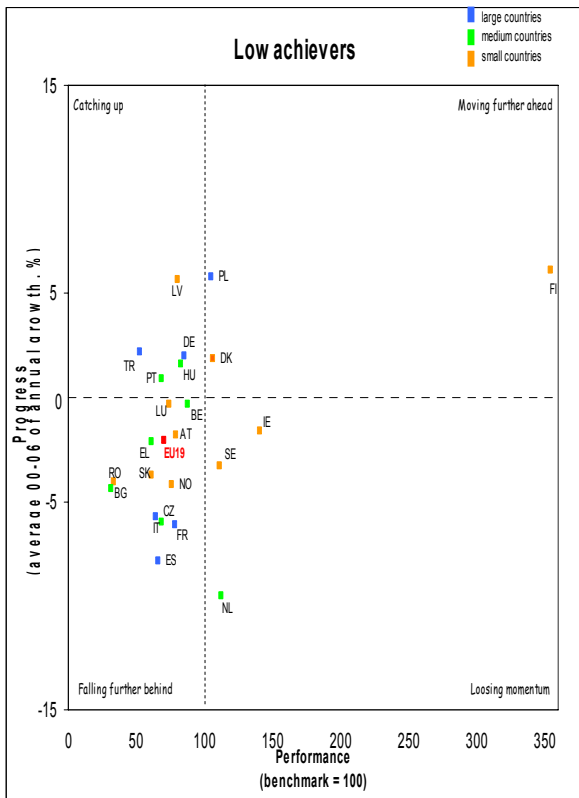
Upper secondary completion: Percentage of 20-24 year-olds with at least upper secondary education

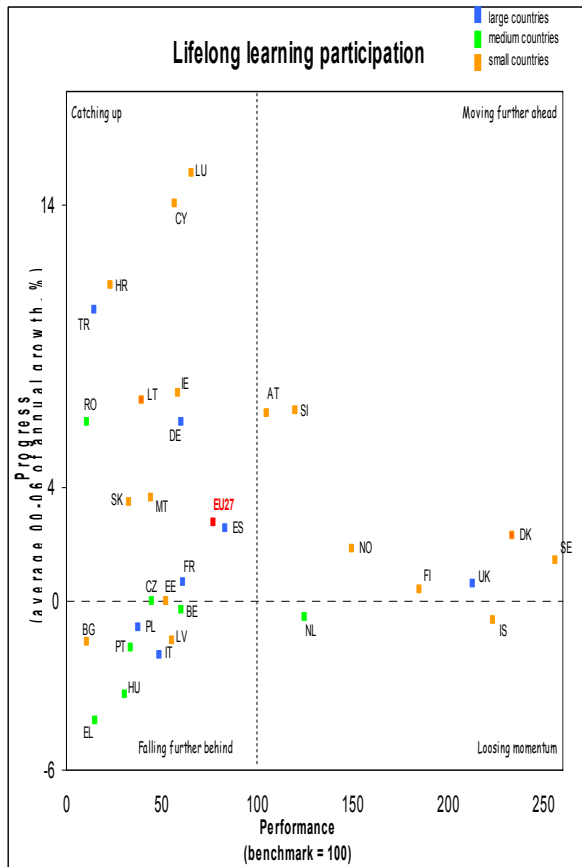
MST graduates: Total number of MST graduates / per 1000 of the population, 20 – 29 year-olds.

Life long learning participation: Percentage of population aged 25-64 year-olds participating in education and training in the four weeks prior to the survey.

Sources: Eurostat (UOE, LFS); OECD/PISA

Charts A.3-7 Country performance (2006) and progress (2000-2006) in all five benchmark areas





EU progress and performance on the benchmark on Low Achievers in reading literacy (the rate to be reduced by at least 20%). The EU performance levels are worsening. (Chart A.6) Only Denmark, Poland and especially Finland are moving ahead with performance levels above the EU benchmark. Other countries (Ireland, the Netherlands and Sweden) have high performance above the benchmark but have not progressed further during the period (Chart A.3).

EU progress and performance on the benchmark for Early school leavers (rates to be reduced to 10% by 2010) are stronger in some new Member States: Croatia, Slovenia, Poland, the Czech Republic and to a lesser degree Austria. Finland and Slovakia are also above the EU benchmark in performance but not progressing further and even have a decreasing performance in the field. (Chart A.4)

Progress and performance on the benchmark of upper secondary completion rates – the benchmark needs to reach 85% by 2010, (Chart A.5) – is the strongest in Poland,

Croatia and Lithuania. The performances in Slovakia and Norway are also significantly above the EU benchmark in the field but not progressing further and their performance has in fact decreased somewhat in recent years. Completion rates in Germany and Spain are falling further behind compared to the performance and progress of other countries in the EU in the field.

In the case of the benchmark on Mathematics, Science and Technology graduates – to increase the number of graduates by 15% - the EU is performing above the level expected for 2010 – increasing. (Chart A.6). All countries are increasing the number of graduates in Mathematics, Science and Technology as compared with 2000 and the majority of them are close or above the 2010 target. Four big countries (United Kingdom, France, Poland and Italy) are driving the EU average with both high levels of performance and progress. However, gender imbalance among MST graduates is still pronounced, especially in engineering and computing.

When it comes to lifelong learning participation of adults (to reach 12.5% by 2010) one observes vast difference between countries as concerns both performance levels and progress. (Chart A.7) The highest performers are the Nordic countries (Sweden, Denmark, Finland and Norway), as well as the UK, Slovenia and Austria, all of which have performance levels above the EU benchmark for 2010 and still progressing. The performance of the Netherlands and Iceland has of similar high levels but progress has stopped.

In Chart A.8 the country performance and progress are highlighted by colours indicating whether countries in each of the benchmark areas are: "Moving further ahead", "losing momentum", "catching up" or "falling further behind". The overall presentation of performance and progress clearly shows that countries all have strengths and weaknesses in the five benchmark areas and that no country is "falling behind in all areas. No country is neither above the benchmark in performance and moving further ahead in all areas. It should be underlined that Poland has performance levels above the EU benchmark and moving

further ahead in four of the five areas and that Austria, Denmark, Finland, Slovenia and

Sweden show that level of performance and progress in three areas.

Chart A.8 Country performance progress in each Benchmark area, period 2000-2006

| | <i>Low performers in reading</i> | <i>Early school leavers</i> | <i>Upper secondary education</i> | <i>MST Graduates</i> | <i>Lifelong learning</i> |
|----------------|----------------------------------|-----------------------------|----------------------------------|----------------------|--------------------------|
| EU | | | | | |
| Belgium | | | | | |
| Bulgaria | | | | | |
| Czech Republic | | | | | |
| Denmark | | | | | |
| Germany | | | | | |
| Estonia | ++ | | | | |
| Ireland | | | | | |
| Greece | | | | | |
| Spain | | | | | |
| France | | | | | |
| Italy | | | | | |
| Cyprus | | | | | |
| Latvia | | | | | |
| Lithuania | - | | | | |
| Luxembourg | | | | | |
| Hungary | | | | | |
| Malta | | | | | |
| Netherlands | | | | | |
| Austria | | | | | |
| Poland | | | | | |
| Portugal | | | | | |
| Romania | | | | | |
| Slovenia | ++ | | | | |
| Slovakia | | | | | |
| Finland | | | | | |
| Sweden | | | | | |
| United Kingdom | + | | | | |
| Croatia | + | | | | |
| Turkey | | | | | |
| Iceland | | | | | |
| Norway | | | | | |

For low achievers in reading where only 2006 results were available: ++ performance above benchmark, + performance above EU average, - performance below EU average

Changes in 2007: early school leavers: LU improving to catching up, LT to moving further ahead, AT to falling further behind
Upper secondary attainment: Cyprus changing to moving further ahead, Austria and Finland changing to losing momentum,
lifelong learning participation: Portugal and Poland changing to catching up

| | ABOVE EU BENCHMARK | BELOW EU BENCHMARK |
|------------------------|----------------------|------------------------|
| INCREASING PERFORMANCE | MOVING FURTHER AHEAD | CATCHING UP |
| DECREASING PERFORMANCE | LOSING MOMENTUM | FALLING FURTHER BEHIND |

3. Best performing countries: Learning from good practice

All Member States can learn from the best performers in the Union. Therefore it is important to complete the above analysis by looking at the details in the benchmark areas and in other core indicator areas (See Tables A.9 to 11).

This is why the Council asked for the three best performing countries (leaders) in specific policy areas to be identified. Half the Member States are leaders in at least one benchmark area. There is quite a spread of good practice and expertise in the EU. Three more countries are among the leaders on investment in human resources and pre-school participation, core indicators for which the Council set targets.

Table A.9: Best performing countries on benchmark relating to school education (2007)

| | Target for 2010 | Best performing countries in the EU | | | EU | USA | Japan |
|--|-----------------------|--|---------------------------------|-------------------|--------|-----|--------|
| Low-achievers in reading (15-year-olds, %) | At least 20% decrease | Change in the percentage of low achievers in % (2000-2006) | | | | | |
| | | Finland ^a -31.4% | Poland -30.2% | Latvia -29.6% | +13.1% | - | +82.2% |
| | | Share of low achievers ^a | | | | | |
| | | Finland 4.8% | Ireland 12.1% | Estonia 13.6% | 24.1% | - | 18.4% |
| Early school leavers (18-24) %) | No more than 10% | Poland 5.0% | Czech Rep. 5.5% ^a | Slovakia 7.2% | 14.8% | - | - |
| Upper secondary attainment (20-24, %). | At least 85% | Czech Rep. 91.8% | Poland 91.6% | Slovenia 91.5% | 78.1% | - | - |

^a: 2006;

Source: DG Education and culture

Data sources: Eurostat UOE and LFS; OECD/Pisa

Table A.10: Best performing countries on benchmarks relating to higher education and lifelong learning

| | 2010 target for EU | Best performing countries in the EU | | | EU | USA | Japan |
|---|------------------------------------|---|--------------------|------------------------------|---------|--------|--------|
| Graduates in Mathematics Science Technology (per 1000 young people) | Increase of at least 15% graduates | Average annual increase 2000-2005 | | | | | |
| | | Poland +13.7% | Slovakia +12.3% | Portugal +13.1% | +4.7% | +3.1% | -1.1% |
| | | MST Graduates per 1000 inhabitants (aged 20-29) in 2006 | | | | | |
| | | Ireland 21.4 | France 20.7 | Lithuania 19.5 | 13.0 | 10.3 | 14.4 |
| | | % of female graduates in 2006 | | | | | |
| | | Estonia 42.9 % | Bulgaria 41.2 % | Greece 40.9 % | 31.3 % | 31.3 % | 14.6 % |
| Lifelong Learning participation (25-64, %) | At least 12.5% | 2007 | | | | | |
| | | Sweden 32.0 (06) | Denmark 29.2% | UK 26.6% (p) ^a | 9.7%(p) | - | - |

^a: 2006, p: provisional

Source: DG Education and Culture

Data source: Eurostat UOE and LFS

Table A.11: Best performing countries on other selected core indicator areas

| | Best performing countries in the EU | | | EU | USA | Japan |
|--|---|------------------|-----------------|-------|-------|-------|
| Participation in pre-school education | Participation of 4-year-olds in pre-primary education, 2006 | | | | | |
| | France 100% | Italy 100% | Belgium 100% | 86.8% | 58.2% | 94.8% |
| Investment in education and training | Public spending on education as a % of GDP, 2005 | | | | | |
| | Denmark 8.28 | Sweden 6.97 | Cyprus 6.92 | 5.03 | 4.85 | 3.52 |
| | Increase in public spending on education, in percentage points of GDP (2000-2005) | | | | | |
| | Cyprus +1.48 | Hungary +0.95 | UK +0.81 | +0.35 | -0.09 | -0.30 |
| Educational attainment of the population | Share of the working age population with high education attainment, 15-64 years-old (ISCED 5 and 6), (2007) | | | | | |
| | Cyprus 29.7% | Finland 29.5% | UK 28.2% | 20.6% | - | - |

Source: DG Education and Culture
Data sources: Eurostat UOE

4. European Educational systems in a Worldwide perspective

The European Council set the objective of “making European education and training systems in Europe a world quality reference by 2010”. (Council, 2002c, paragraph 43).

This report therefore puts European performance into a world-wide perspective by comparing it with the USA, Canada, Japan, South Korea, Australia, New Zealand, China, Russia, India and Mexico, countries which are trading partners or high educational performers.

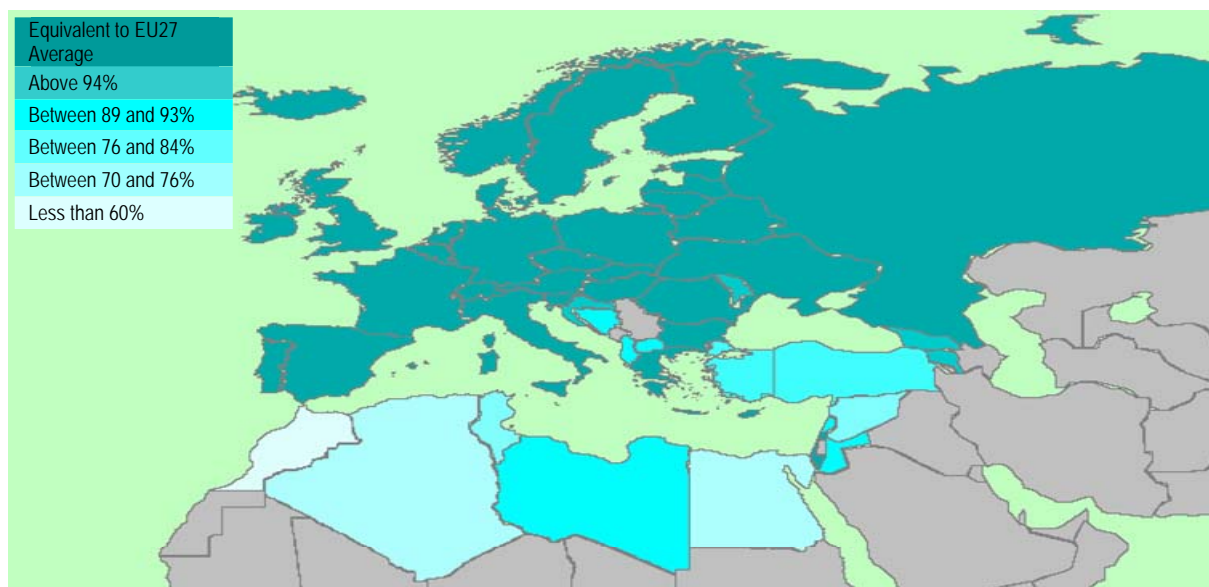
An overall evaluation of the performance of the EU compared to the rest of the World can be made by applying the UN education index, a component of the UN human development index. The education index measures a country's relative achievement in both adult

literacy and combined primary, secondary, and tertiary gross enrolment. It is a weighted average of the Adult Literacy Rate and the Gross Enrolment Rate where adult literacy is given two-thirds weight while gross enrolment is given one-third weight See Table Ann A.1 in the Statistical annex).

The education index clearly puts EU among the world's best performers. Australia, New Zealand, Republic of Korea and the US perform slightly better, Russia is level while Japan, China and India perform at lower levels. (Chart A.10)

The analysis of neighbouring countries (Chart A.9) shows that Europe's north-eastern neighbours are mostly around an equivalent level, while its south eastern and southern neighbours are some way behind (Israel and Croatia are exceptions).

Chart A.9: EU Education average performance level in a neighbouring countries perspective (EU-27 average : 100%)



Source: CRELL research Centre/ DG Joint Research Centre (2008)

Data Source: UN Education Index, 2007 (reference year 2005)

Chart A.10: EU Education performance in a Worldwide perspective (UN education index)



Data source: UN Education Index (reference year 2005)

| |
|--|
| PART B Monitoring performance and progress |
|--|

1. MAKING LIFELONG LEARNING A REALITY

1.1 Making lifelong learning a reality in Europe

1.1.1 Participation in education and training at various life-time stages

1.2 The highest performing countries in making lifelong learning a reality.

MAIN MESSAGES

Making Lifelong Learning a Reality

- **5 countries have very high performance in lifelong learning participation: Sweden, the United Kingdom, Denmark, Norway and Iceland.** Lifelong learning is becoming a reality for their citizens. Slovenia, France, Finland, Austria, Spain and the Netherlands are following closely behind. 16 European countries have developed national lifelong learning strategies, with a comprehensive vision covering all types and levels of education and training throughout life.
- **Less than 10% of adults in the EU participate in lifelong learning.** This reflects continuous progress but it is too slow to reach the benchmark of 12.5% by 2010. Catching up with adult participation in lifelong learning remains the main challenge in many European countries
- **All 4 year olds in Belgium, Italy and France participate in pre-school education.** Spain, Malta and Luxembourg are close behind and 12 countries in all exceed the Barcelona target of 90% participation. Many countries have achieved significant increases since 2000 (more than 10 percentage points for Germany ;Cyprus, Latvia, Romania, Slovenia Sweden and Norway).
- **There are 2 million more 5-29 years old in education and training in the EU than in 2000.** Today 60% of 5-29 years olds Europeans participate in education. This is comparable to the US, but 18% higher than in Japan. Increasing participation in pre-primary and higher education has been enough to outweigh the demographic changes of the new smaller cohorts.
- **Time spent by young people in education and training is increasing in all European countries.** Youth cohorts are smaller but they can expect to stay more years in education. It is the highest in Finland, the UK, Sweden and Iceland with 20 years

In 2002, the Member States committed themselves to develop national lifelong learning strategies (Council Resolution, 2002a) covering all contexts (formal, non-formal and informal) and levels of education and training (pre-primary, primary, secondary, tertiary and adult) and all learning activity undertaken throughout life, with the aim of improving knowledge, skills and competences within a personal, civic, social or employment-related perspective. The Lisbon integrated Guidelines underline the need to have such strategies to be in place by end of 2006.²

The concept of lifelong learning shifts responsibility for education and learning to the individual, focusing on the development of individual capabilities and the capacity to learn; it implies a shift from traditional education institutions to diverse learning opportunities that are more process and outcome oriented.

Most European countries have made progress in defining unified and overarching strategies. 16 Member States have developed lifelong learning strategies that set out national policy priorities and how different sectors relate to each other. A lifelong learning strategy should provide a strategic overview and a coherent set of priorities while identifying the resources needed for different measures. An important aspect is to provide flexible learning pathways and effective transition points between systems and levels of education and training that avoid dead ends. It must also include a transparent system for recognition of prior learning (Council, 2008b).

This chapter analyses participation patterns in lifelong learning and makes comparisons with third countries.³

Monitoring progress at the European level

Progress is monitored through indicators of participation in learning for various age groups of the population. The benchmark is 12.5% of the population aged 25-64 should participate in lifelong learning by 2010. However, lifelong learning strategies should be address to the full range of learning, not just adult learning and should stress the quality of learning. These latter aspects are especially treated in each of other chapters of this report).

1.1 Making lifelong learning a reality in Europe

1.1.1 Participation in education and training at various life-time stages

The number of years that pupils and students in the EU can expect to spend in education (ISCED levels 0-6), has increased by one and a half year since 2000 mainly due to increases in pre-primary education and higher education. For some Member States, the increase is even more than 2 years (Latvia, Greece, and Lithuania)⁴. Table 1.1 shows this development in detail. In 2006, the expected years in education for European students were comparable with the number of years in the US and were 2 years longer than in Japan. Some third countries however have significantly longer education than the EU: In Russia it is 3 years longer, while Israel is 4 years longer.²

Table 1.1: Expected years in education and training for students in European countries (d)
Expected school years of pupils and students at ISCED levels 0 to 6

| | EU27 | BE | BG | CZ | DK | DE | EE | IE | EL | ES | FR | IT | CY | LV | LT | LU | HU |
|--------------|--------|------|------|------|------|--------|--------|------|------|------|------|------|--------|------|------|--------|------|
| 2000 | 16.7 | 18.6 | 14.2 | 15.6 | 17.8 | 17.2 i | 16.8 | 16.3 | 15 | 17 | 16.6 | 16.1 | 13 i | 15.5 | 15.8 | 14.3 i | 16.1 |
| 2003 | 17.2 | 19.4 | 15.1 | 16.6 | 18.2 | 17.2 i | 18 | 16.8 | 16.5 | 16.9 | 16.7 | 16.7 | 14.2 i | 17.4 | 17.3 | 14.7 i | 17.1 |
| 2006p | 17.2 | 19.6 | 15.6 | 17.1 | 18.9 | 17.5 i | 18.2 | 17.2 | 17.9 | 17.2 | 16.7 | 17 | 14.7 i | 17.8 | 18 | : | 17.8 |
| | MT | NL | AT | PL | PT | RO | SI | SK | FI | SE | UK | HR | MK | TR | IS | LI | NO |
| 2000 | 14.4 i | 17.2 | 15.5 | 16.4 | 16.9 | 14 i | 16.7 i | : | 18.6 | 19.9 | 18.9 | : | 12.9 i | : | 17.9 | 13.5 i | 17.8 |
| 2003 | 14.7 i | 17.3 | 16 | 17.2 | 17 | 14.9 | 17.4 i | 15.3 | 19.4 | 19.9 | 20 | : | 16.4 i | 12.4 | 19.2 | 15.5 i | 18.1 |
| 2006p | 15 i | 17.6 | 16.5 | 17.8 | 16.7 | 15.6 | 17.9 i | 16.1 | 20.3 | 19.9 | : | 14.9 | 13.3 i | 12.5 | 19.9 | 16.1 | 18.3 |

Data source: Eurostat (UOE data collection)

(:) Missing or not available, (d) See definitions, (i) See information notes, (p) Provisional data

(d) Number of years a person of a given age (4 years in this case) can expect to spend within the specified levels, including years spent on repetition.

(i) BE: Data exclude independent private institutions. Data from the German speaking community is missing;

DE, RO, SI: Data exclude students in ISCED level 6

CY, MT: Tertiary students studying abroad are not included, as a result data is underestimated

LU: Secondary and tertiary students study abroad and are not included, as a result data is underestimated

MK: Data exclude ISCED 5A second degrees and ISCED 6

LI: Data refers to students studying in Liechtenstein (e.g. using the domestic concept). Many pupils/students study and graduate abroad, mainly in Switzerland and Austria (ISCED levels 3 to 6 after obligatory schooling)

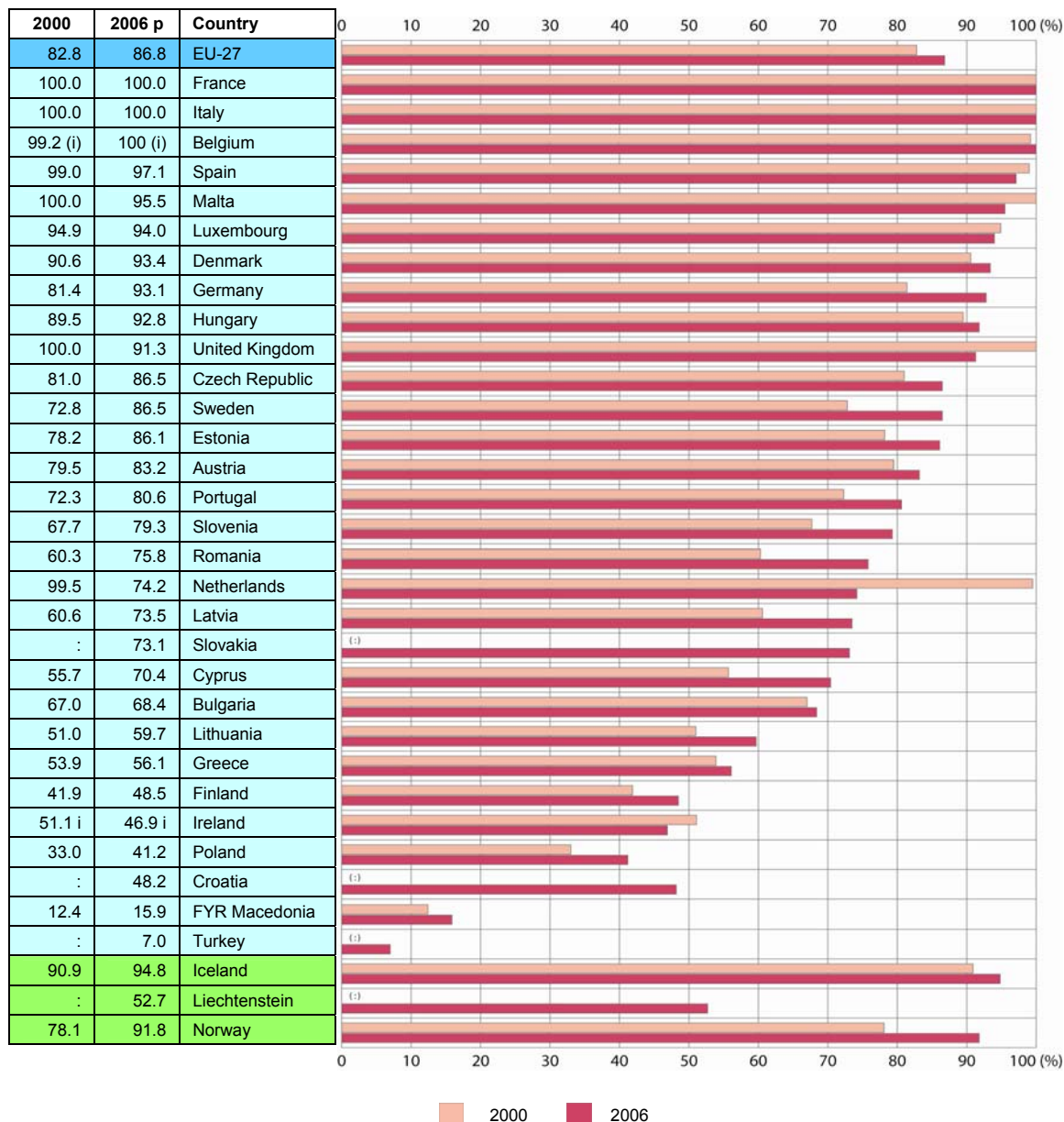
Demographic change is affecting key education indicators. In many Member States the numbers in compulsory schooling will fall over the next decade and in some, the decline will reach the later stages of education and labour market entry beyond compulsory education. In a number of European countries, the 15-19 population will fall by 30% between 2005 and 2015 (the decline goes as high as 40%). This will affect the demand for upper secondary education. Reduced cohorts

demanding less school places may offer a window of opportunity to deal with access and quality issues more easily. At the same time, while youth cohorts may be smaller, they can expect to stay longer in formal education.

Participation in early childhood education.

Participation in pre-primary or primary education of 4 years old made good progress in the EU. The average enrolment rates for 4 years old increased

Chart 1.1 : Enrolment in pre-primary or primary education of 4 years old
(Enrolment rates at ISCED levels 0 and 1)



Data source: Eurostat (UOE data collection)

(:) Missing or not available, (p) Provisional data

(i) Some countries have participation rates of 100% or close for children aged 4 (as BE, FR, ES and IT where children typically start the school at the age of 3 (see also the Eurydice publications on education);

BE: Data exclude independent private institutions. Data from the German speaking community is missing;

IE: There is no official provision of education at ISCED level 0;

NL: The Dutch figures are based on pupil counts in (pre-)primary education on the 1st of October. Between 1 October and 31 December, a quarter of the 3 years-old become 4 years-old and has the right to enter pre-primary education. Almost all of them do enter education, which brings the participation of 4 years-old on the 31 December 2006 to $74.2 + 25 = 99.2\%$.

from 82.8% to 86.8% and the improvement was widely spread. Participation rose by around 10% points or more in Germany, Cyprus, Latvia, Slovenia, Romania, and Sweden. Nevertheless, there are still large differences in participation across the Member States. More than 2/3rds of the countries had enrolment at 80% or below, in 3 Member States (Poland, Ireland and Finland), enrolment was less than 50%; and in Turkey and FYROM it was even lower. Japanese participation is above the EU, whereas the US is about 30% points lower. (See Table 1.2).

Table 1.2: Enrolment in educational institutions of 4 years old

Enrolment rates at ISCED levels 0 and 1 for 4-year olds

| | EU27 | USA | Japan |
|-------|------|------|-------|
| 2000 | 82.8 | 61.7 | 94.9 |
| 2006p | 86.8 | 58.2 | 94.8 |

Data source: Eurostat (UOE data collection), (p) Provisional data

Participation in school and higher education (5-29 years old).

EU enrolment in formal education institutions for age 5-29 increased to 60% in 2005 (from 57% in 2000), an increase of nearly 2 million learners since 2000. The EU rate is comparable to the US and 18% higher than Japan. 13 Member States have higher rates than the US. (See Table Ann B.1.3 in the Statistical Annex)

Participation in primary education stayed over 90% in most countries. Malta was lowest at 86%. Demand for secondary education (ISCED levels 2 and 3) continues to grow in the EU. In only 3 Member States, enrolment rates did fail to increase since 2000. In Greece, the increase was over 10%

Secondary enrolment rates were above 85% in all Member States and well above 90% in 16 countries. These levels are well above the world averages. Only 6 Member States had lower enrolment rates than the US. Enrolment for secondary education is particular high in Japan, Ukraine and Israel. Overall increases in enrolment in tertiary education have been spectacular since 2000 (see also Chapter B.4). Indeed, some Member States (like Hungary, Lithuania and Slovenia) saw their rates increase by over 25%. If tertiary enrolment was over 50% in nearly all Member States in 2005, there were still important differences across Europe. Whereas tertiary rates were above 60% in almost half the Member States, they were at or below 30% in FYROM and Turkey - as in Morocco and Algeria. Still, only Greece and Finland had tertiary enrolment rates higher than the 82% of the US. Japan was 5%

below the EU. The expansion of higher education is a major explanation for the increase in the duration of education.

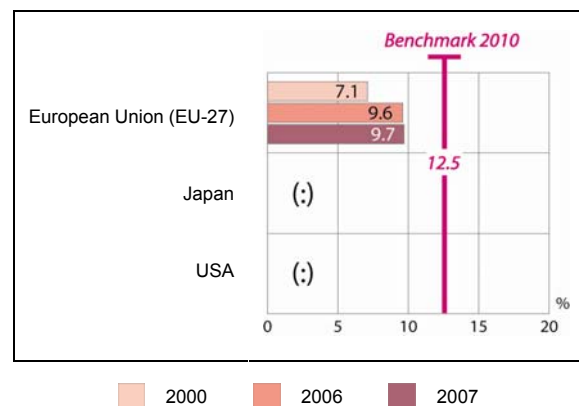
Participation in lifelong learning of adults.

Adult participation in education and training, measured by the EU benchmark,⁵ has made slow but continuous progress.

Provisional results for 2007, shows that 9.7% of 25-64 year olds participated in lifelong learning. This is still far from the benchmark of 12.5% for 2010 and only 5 Member States exceeded the benchmark. To these 5 countries can be added the UK and Sweden that both have very high levels of lifelong learning participation -but no data for 2007 are presently available.

Chart 1.2 : Lifelong learning – benchmark for 2010

Percentage of population aged 25-64 participating in education and training, 2000-2007.

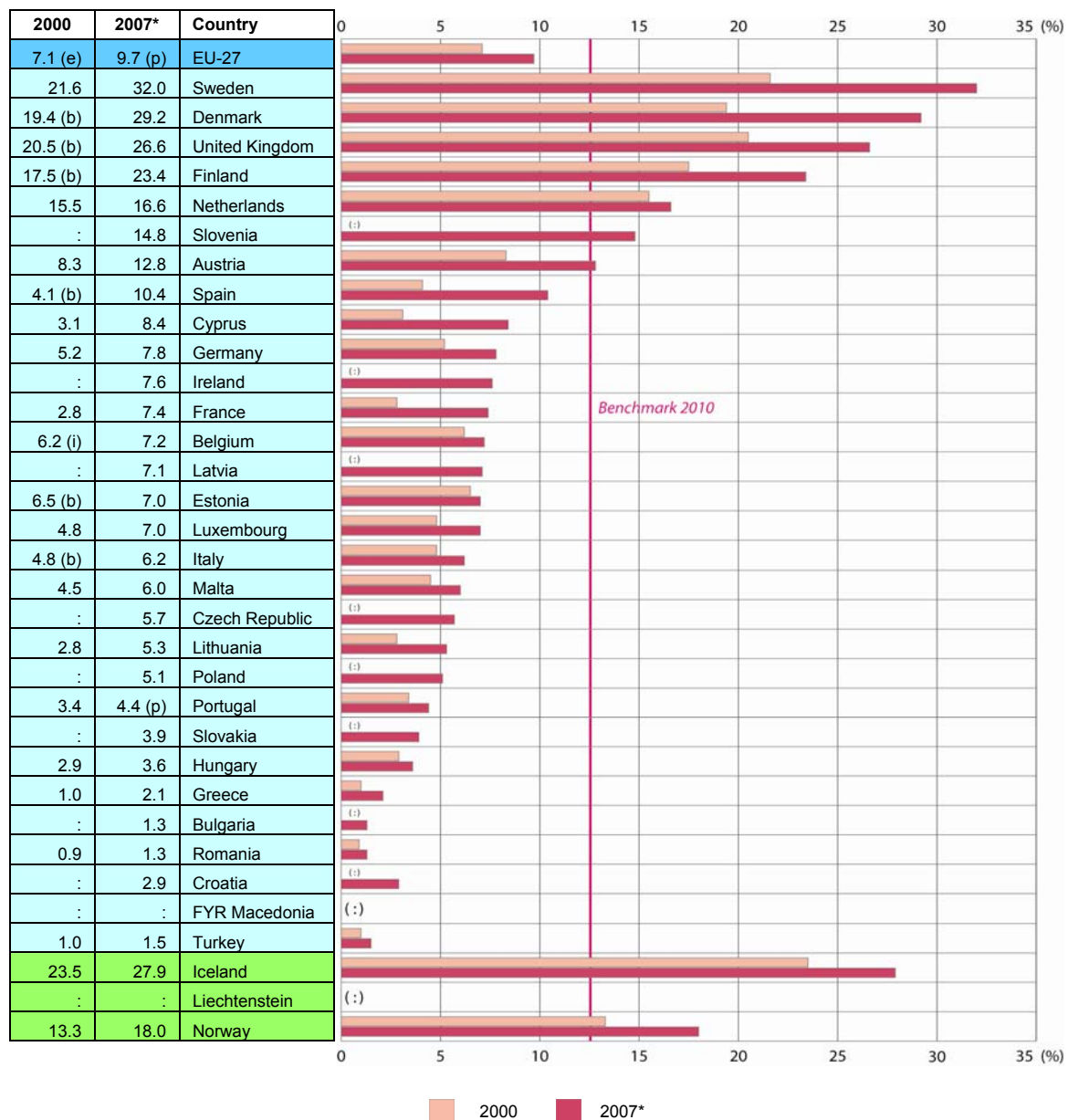


Data source: Eurostat (EU-Labour Force Survey)

There are large differences in participation between Member States; the Scandinavian countries and the UK, the being the best performers, reaching rates of 20-30%.⁶ Data put Belgium, Germany, Ireland, France, Cyprus and Luxembourg in the next group, with participation rates around 7-8% whereas the Czech Republic, Lithuania, Malta and Poland are at 5-6% participation rate. Bulgaria, Greece and Romania have recorded little or no progress since 2000 in improving their extremely low levels of participation.

Participation rates of employees in continuing vocational training courses has actually decreased 1999-2005 for the countries for which data is available (Belgium, Denmark, Germany, Greece, Latvia, The Netherlands, Sweden, the United Kingdom and Norway). However there are increases among most of the new Member States which are catching up the rest of the EU (*see also Chapter B.3*).

Chart 1.3 : Participation of adults in lifelong learning (d) 2000, 2007
 Percentage of the adult population aged 25 to 64 participating in education and training



Data source: Eurostat (EU-Labour Force Survey))

* 2006 data for SE, UK, HR, IS

(:) Missing or not available, (e) Estimated data, (b) Break in series, (p) Provisional data

(d) Lifelong learning refers to persons aged 25 to 64 who stated that they received education or training in the four weeks preceding the survey (numerator). The denominator consists of the total population of the same age group, excluding those who did not answer to the question 'participation to education and training'. Both the numerator and the denominator come from the EU Labour Force Survey. The information collected relates to all education or training whether or not relevant to the respondent's current or possible future job;

Due to the changes in the Labour Force Survey, aiming at improving relevance and comparability of data at the EU level, breaks of series were noted in nearly all countries (in particular in 2003 and 2004).

1.2 The highest performing countries in making lifelong learning a reality.

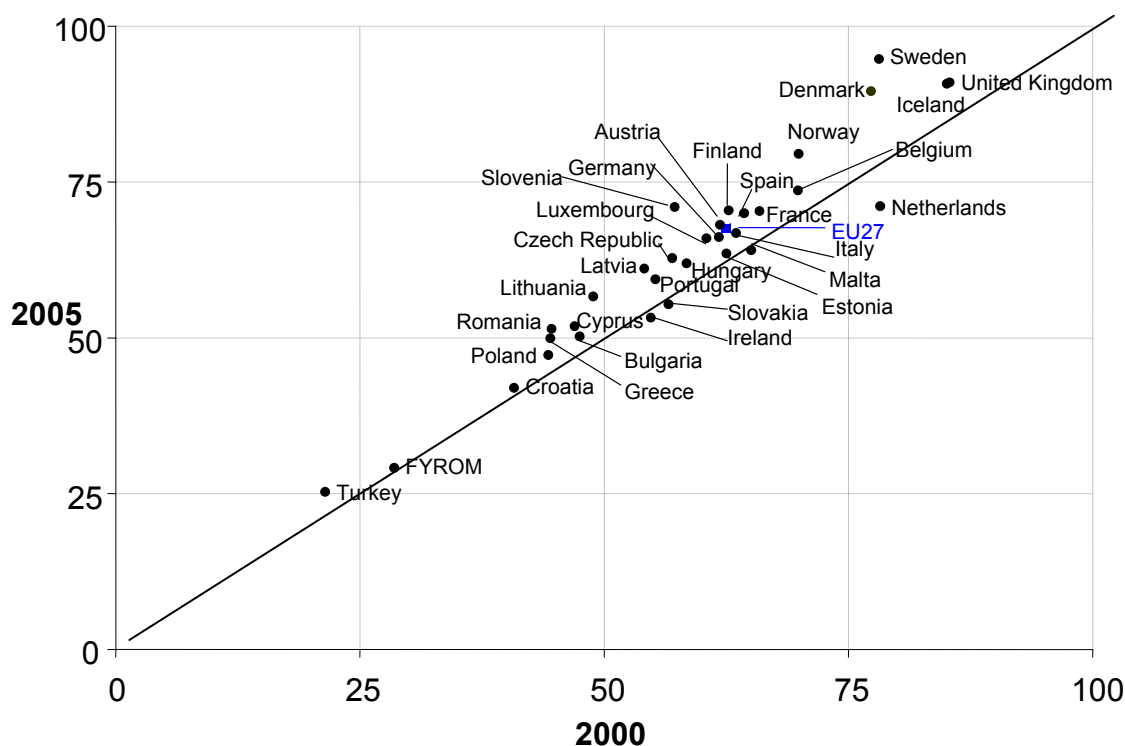
A precise measurement of "making lifelong learning a reality for all" is not possible using simple statistics. To better capture the participation patterns a composite indicator covering all the dimensions of lifelong learning is

constructed and presented in Chart 1.4. The index provides a complementary picture of very different rates of participation in pre-school, school, higher education and adult learning for 4-64 years old across the EU by taking participation in formal and non-formal education and training in the best performing countries in the EU as a reference level.

There are signs that participation in lifelong learning is close to become a reality for a majority of people in Sweden, the United Kingdom,

Denmark, Norway and Iceland, countries which have developed comprehensive and coherent lifelong learning strategies. The index shows that

Chart 1.4 Composite index on "making lifelong learning a reality" (2000-2005)



Source: CRELL, 2008

The Composite Index of Lifelong Learning in Europe is a proxy measure of participation in education and lifelong learning for the population aged 4 to 64. One indicator is used for each stages of lifelong learning: the Early Childhood Education (ECE) measures the participation of 4 years old in education at ISCED levels 0 and 1, EDU shows the participation in primary, secondary and tertiary education of population aged 5 to 29 and LLL is the EU benchmark on participation in lifelong learning (i.e. the persons aged 25 to 64 who stated that they received education or training in the four weeks preceding the Labour Force Survey as percentage of population aged 25-64). Each those index components are assigned equal weight in the overall index in accordance with the principle of considering each stage of lifelong learning participation as being of equal importance. The index is calculated as the simple arithmetic average of three indicators: ECE, EDU and LLL

Missing values (16 values missing out of a total of 99) are estimated by using multivariate analysis. The three indicators are subsequently scaled using the distance to the best performer approach, in which all countries (32 countries + EU27) and both years (2000, 2005) are considered. Given that there are no outliers in the dataset, this normalization approach is appropriate. The index score is calculated as the arithmetic average of the three normalized indicators. There are no correlation issues to be taken into account during the weighting, since path analysis results confirm that by assigning 1/3 weight to each indicator, the total impact of a single indicator to the overall index score is roughly 31%. See Table Ann B.1.1 in Annex for details on the indicators.

these countries have exceptionally high overall participation. For Slovenia, Finland, France, Austria, Spain, Belgium and the Netherlands, participation is above the European average and lifelong learning is near to become a reality for the majority of their citizens. On current trends, some of these countries will catch up on the best performing countries in the near future. The index shows Slovenia as one of the fastest advancing Member States where participation in pre-primary and school/higher education has increased during the period by 9.2% and 6% respectively

Participation in lifelong learning was already high in Sweden, United Kingdom and Denmark in

2000. This was also the case for Norway and Iceland. These countries have progressed even further since then, some notably faster than the EU average. Overall, during the period 2000-2005, the average level of EU performance increased by 1.5 points. In that period, the UK increased by 5.6, Denmark by 11.3, and Sweden by 18.7. It can hardly be a coincidence that the best performing countries (Sweden, the United Kingdom, Denmark, Island and Norway) were also those that developed a coherent lifelong learning strategy at the national level.

The index shows that lifelong learning is progressing in the EU as a whole, mainly due to

progress in pre-school and school/higher education participation. But it is too slow to reach the benchmark by 2010 in participation in adult learning, unless major progress is achieved and equity needs fully addressed (see Chapter B.6). In

particular, some new Member States will have to increase their participation rates substantially in order to catch up with the European average.

2. DEVELOPING SCHOOL EDUCATION

2.1 Completion of upper secondary education – EU Benchmark

2.2 Organization of school education

2.2.1 Decentralisation and school autonomy

2.2.2 Accountability

2.2.3 School leadership

2.2.4 Public and private schools

2.3 Teachers and professional development

2.4 ICT in schools

2.5 Investment in school education

MAIN MESSAGES

Developing School Education

- **Progress since 2000 on increasing upper secondary attainment levels of young people (20-24) has been limited.** 11 countries currently exceed the benchmark for 2010 of 85% completion. 6 of these (Czech Republic, Poland, Slovenia and Slovakia, Norway and Croatia) are beyond 90%; 5 (Lithuania, Sweden, Cyprus, Ireland and Finland) are above 85%. Malta Portugal and Lithuania made significant progress (an increase of 10 percentage points or more). Attainment in Spain and Luxembourg declined considerably since 2000.
- **21% of pupils attend private schools (incl. government dependent).** Belgium and the Netherlands have the highest shares, above 50%. The lowest shares are in the Baltic States and South-East Europe.
- **There are 6 million teachers in the EU - 3% of the active population.**
- **70% of teachers in primary and secondary schools are female.** In primary schools the figure rises to more than 90% in Bulgaria, Croatia, Hungary, Italy, Latvia, Lithuania and Slovenia. It is less than 60% in Luxembourg, Greece and Turkey.
- 15% of pupils attend schools where mathematics or science teaching is hindered by a lack of qualified teachers. The figure rises to up to 30% in Estonia and 40% in Germany.
- More than 90% of schools are connected to the internet. One in three schools has broadband internet connection. Two in three schools have created their own website.
- There are, on average, less than 10 pupils per computer in schools in the EU.
- Investment per pupil is about one third higher in secondary education than in primary education. This is mainly due to lower pupil/teacher ratios.
- Investment per pupil in primary education has increased by 15% since 2000, mainly due to the reduction in the number of pupils.

Globalisation, an ageing population, migration, changing demand for qualifications on the labour market and rapid technological innovation have increased the importance of education and training in the emerging knowledge society. As a result, schools are a more than ever important to the Lisbon strategy and its goals. Furthermore, changing social values and citizens' expectations require a constant development. As a result, schools are under growing pressure to perform. This is reflected by the growing number of performance tests and by the spread of information on inter-school disparities.

The 2008 Spring European Council called for substantial reduction in the number of low achievers in reading and of early school leavers. Furthermore, it called for the achievement levels of learners with a migrant background, or from other disadvantaged groups, to be improved. (European Council 2008a, paragraph 15)

Developing school education implies a wide policy agenda, which touches a number of policy instruments:

- curricula should enable pupils to acquire the necessary skills and values to succeed in the knowledge based society and on the labour market;
- key competences (European Council, 2006a)⁷; and employability.⁸;
- teaching practice that is more learner-centred ;
- systems such as early tracking are debated (European Council, 2006b).⁹
- transition between school levels, especially from upper secondary to higher education, should reflect a holistic view of the education system.

This chapter reviews performance on the upper secondary attainment benchmark. It then analyses some of the areas where reforms to modernise school systems are initiated. School management, the professional development of teachers and trainers, the technical equipment such as ICT and investment in education and training are key areas for change.

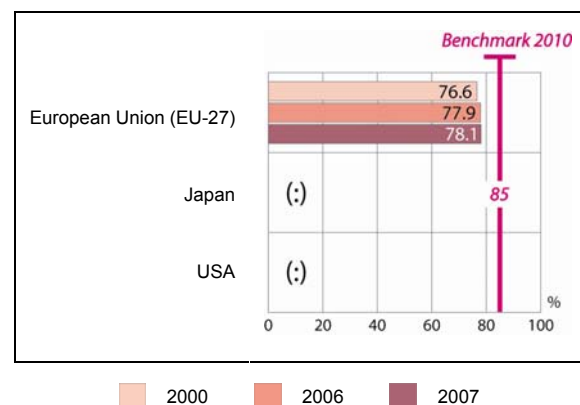
2.1 Completion of upper secondary education – EU Benchmark

Upper secondary attainment is a core indicator and related to the EU benchmark of achieving a 85% rate of upper secondary attainment of young people (aged 20-24) by 2010.

European benchmark
By 2010 at least 85% of 22-year-olds in the European Union should have completed upper secondary education.¹⁰

Data currently available show, however, that the share of young people (aged 20-24) who have completed upper-secondary education has only slightly improved (by 1.5 percentage points) since 2000. There was thus little progress in achieving the benchmark.

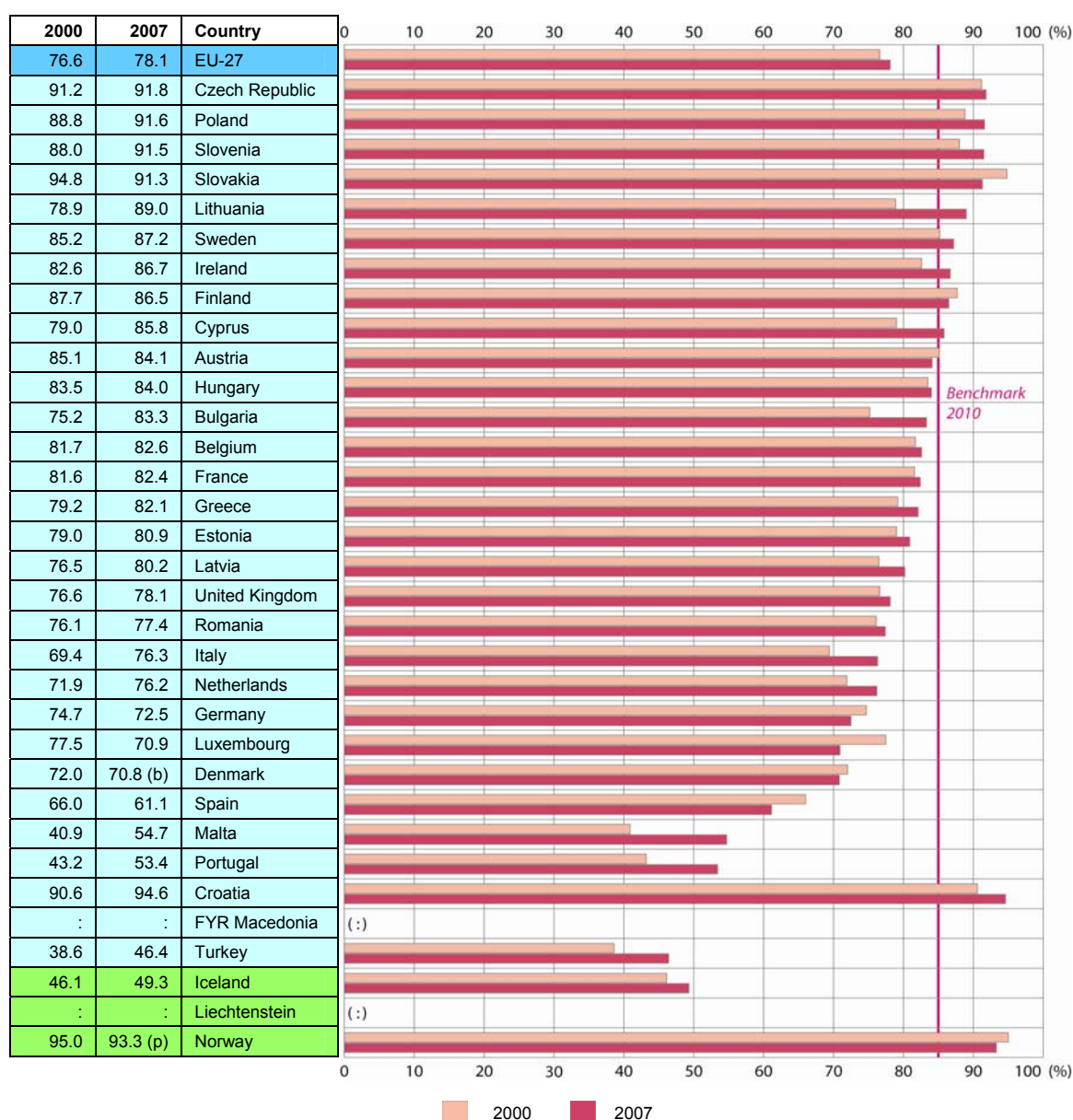
Chart 2.1: Percentage of young people aged 20-24 with upper secondary attainment, 2000-2007



Data source: Eurostat (EU-Labour Force Survey)

The European benchmark hence still poses a significant challenge for the EU. The present (2007) EU average for the population aged 20-24 is 78.1%, whereby females outperform males by more than 5 percentage points.

Chart 2.1 - Percentage of the population aged 20-24 having completed at least upper-secondary education, 2000-2007



Source: Eurostat (LFS), Croatia, Iceland, Norway: 2006 instead of 2007, HR: 2002 instead of 2000, (p) provisional value (b) = break in series

Additional notes:

CY: Pupils usually living in the country but studying abroad are not yet covered by the survey. Hence results for CY are understated. Since the 5 December 2005 release, Eurostat has been applying a refined definition of the "upper secondary" educational attainment level in order to improve the comparability of results in the EU. For the 1998 data onwards ISCED level 3C programmes shorter than two years no longer fall under the "upper secondary" level but come under "lower secondary". This change implies revision of the results in DK (from 2001), ES, CY and IS. However, the definition cannot yet be implemented in EL, IE and AT, where all ISCED 3C levels are still included

In addition to the benchmark, several Member States have set national targets in this area.

Many of the new Member States are already above the benchmark. 4 Member States (Czech Republic, Poland, Slovenia and Slovakia), Norway and Croatia, have already reached over 90% upper secondary attainment. (Chart 2.2).

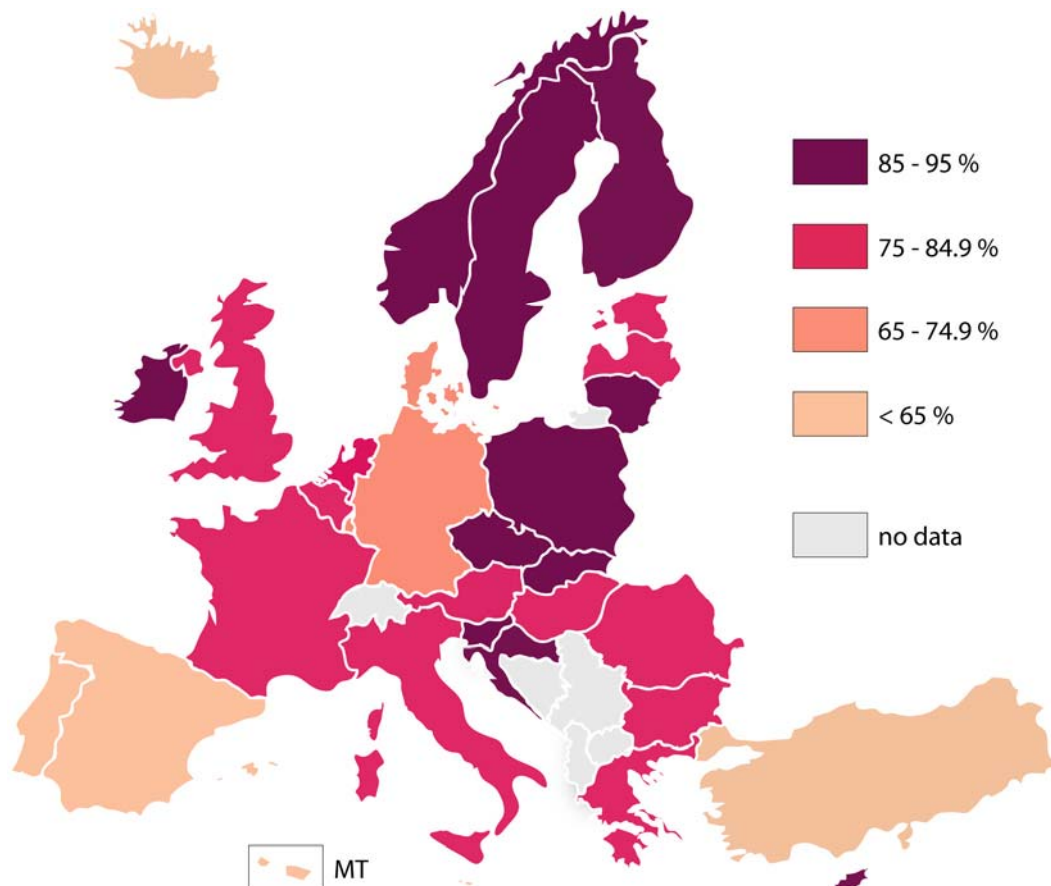
Portugal and Malta, with attainment rates below 55% and Spain, which is above 60%, have the lowest completion rates in the EU. However, Malta and Portugal have made substantial progress, increasing by over 10 percentage points since 2000. Bulgaria, Cyprus, Italy and Lithuania have also progressed by more than 5 percentage points.

Most other Member States, however, have made little progress since 2000. Upper secondary attainment in Luxembourg and Spain has even fallen. This can partly be explained by strong net migration, with many

young adults having been educated outside the national education system.

In recent years the attainment level of males improved more than the one of the females and the large gender gap closed slightly.

Chart 2.2: Percentage of the population (20-24) having completed at least upper secondary education by group of countries, 2006



Data source: Eurostat (LFS)

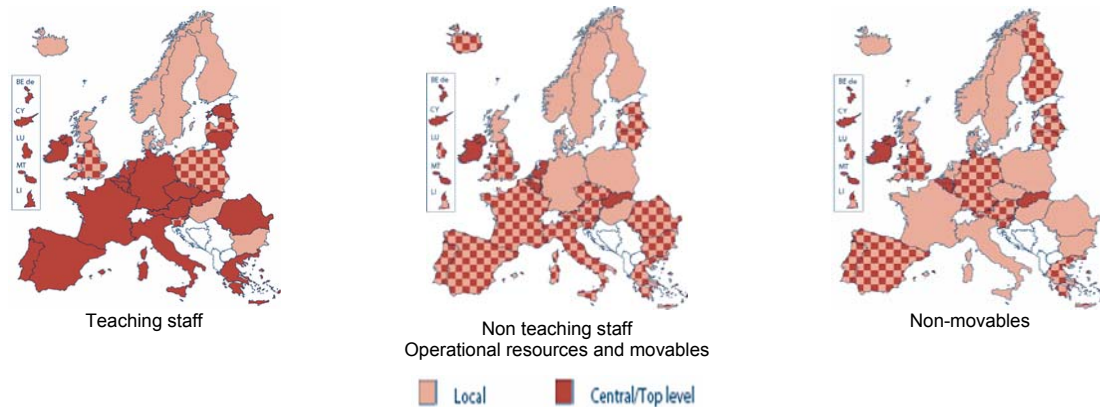
2.2 Organization of school education

The Council Conclusions on efficiency and equity in education and training (2006/C 298/03) recognise the importance of school leadership in achieving high quality learning outcomes. However, there are different concepts of school leadership and different understandings of what this entails. It depends on the context of each individual school system. Nevertheless, research on school leadership and school management is gaining momentum as the importance of leadership teams with translating policies into everyday practice is recognised.

2.2.1 Decentralisation and school autonomy¹¹

The literature has identified reforms that facilitate and characterise decentralisation (Hood, 1991; Barzelay, 2001; OECD, 1995, Paletta, 2007). They do not follow a single pattern and the process varies greatly in intensity between countries. It is more visible in northern and central European countries than in many southern European countries. Financial independence and a school's freedom to allocate its budget are often seen as keys to decentralisation,¹² enabling head teachers to choose staff who share their vision.

Chart 2.3: Location of decision-making authority to determine the overall amount of public expenditure earmarked for schools providing compulsory education, public sector or equivalent, 2002/03



Source: Eurydice 2005

The maps indicate the level of decision-making authority in a number of core areas.

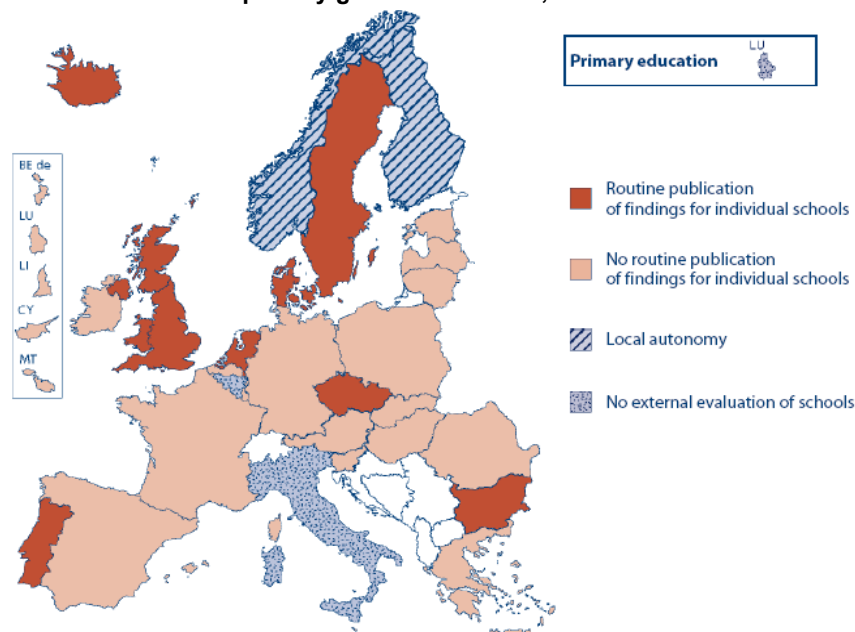
A recent EURYDICE study (2007) examined the management of financial and human resources. It noted that the Baltic countries, Belgium (French and German grant-aided schools), Slovenia, Sweden and the UK (England, Wales and Northern Ireland) grant a large degree of autonomy in these two areas. Hungary and Poland also give autonomy; but decisions have to be confirmed by a higher authority.

The picture in the Netherlands and Finland is mixed. The competent authority can choose

whether to delegate decision-making power to schools. In Luxembourg, Malta, Austria, Portugal and Liechtenstein very little autonomy is granted and in Cyprus, none.

Financial autonomy is more widespread in the use of public funds for operating expenses, the raising of private funds and its use for movable goods, and the letting of premises than in capital expenditure. Autonomy in staff management is variable. The school head is usually reporting to and is chosen by a higher authority. More decisions on staffing can be taken at school level.

Chart 2.4: Publication of findings from the external evaluation of individual schools, compulsory general education, 2006/07



Source: Eurydice (2007)

School autonomy does not necessarily lead to better results. However, research indicates that in areas characterised by local knowledge,¹³ school autonomy can have a positive effect on results, provided that adequate control systems are in place (Wößmann, 2003; Bishop, 1995).

2.2.2 Accountability

The European Parliament and Council Recommendation (2001) invites Member States to establish transparent quality evaluation systems. It encourages them to create a framework that balances schools' self-evaluations with external evaluations, to involve all relevant players in the evaluation process, and to disseminate good practice and lessons learned. Moreover, the Communication on efficiency and equity in European education and training systems called for a culture of evaluation to provide the solid evidence on which effective long-term policies should be based (European Commission, 2006a).

EURYDICE established three scenarios of school accountability in the EU (EURYDICE, 2007a).

In the majority of countries a central inspectorate is responsible for evaluating schools, which have a large degree of autonomy.

In the Scandinavian countries, Belgium and Hungary, accountability is shared with local authorities. Countries in both scenarios have developed national standards for the evaluation of schools by the end of the 1990s.

In countries such as Italy, self-evaluation is strongly encouraged although the school is not accountable to a specific body. However, this is changing. From 2009/10 the National Institute for the Evaluation of Education, Training and Teaching (INVALSI) will be responsible for evaluating schools.

There is a general trend to develop accountability to a range of bodies, from education ministries and local councils, to parents and external partners. This is the case in England, where the schools are accountable to the central OFSTED inspection, to their local authorities and to a governing body that

includes parents and local community representatives.

Only 6 Member States routinely publish findings for individual schools (See Chart 2.4). The OECD, using PISA 2006 data, has noted that students performed better in science in schools posting their results publicly (OECD, PISA, Voll, 2008, p. 243), even after taking into account socio-economic characteristics. They also notice, however, that factors of accountability are difficult to dissociate from other aspects associated with them that might have an influence in the results.

2.2.3 School leadership

“School leadership” may have very different meanings, depending on the characteristics of the educational system. A school leader is not necessarily a head teacher or a person in a management position in the school. Research has tended to focus only on school heads and sought to identify individual characteristics of school leadership and to model leadership behaviour in different contexts. Various taxonomies have been produced to cover the different possibilities.¹⁴

These emphasise that the focus of head teachers is not directly on the pupils, but more on organisation. The TIMSS 2003 survey investigated how head teachers spend their time. It identified a number of areas of activity, ranging from administration to leadership, direct teaching, contact with families and the community and supervision.

No consistent relationship emerges between the average behaviour of head teachers in the different countries and the constraints imposed by the system architecture. In fact, the variables that determine head teachers' time allocation are too numerous and too different to allow any macro-level consideration. Such variability has often made it impossible to quantify the actual influence of school leadership on student achievement. Some evidence, however, indicates that head teachers have more impact on student performance if they focus on promoting effective teaching (Barber, M. and M. Mourshed, 2007). Other studies suggest that distributing school leadership tasks can improve school outcomes (European Commission, 2008a).

The CRELL project on “School leadership and student achievement in Europe”, using data from TIMSS 2003, has shown that head teacher specialisation, either in management (organisational and administrative activities) or leadership (knowledge and support of the educational process), reduces the impact of family socioeconomic status (SES) on student achievement.¹⁵ This has important implications for equity.

A recent OECD report suggests that school leadership could be redefined to focus on those tasks that improve most student learning. It also suggests that distributing leadership tasks can improve school results, that those involved in leadership require adequate preparation and

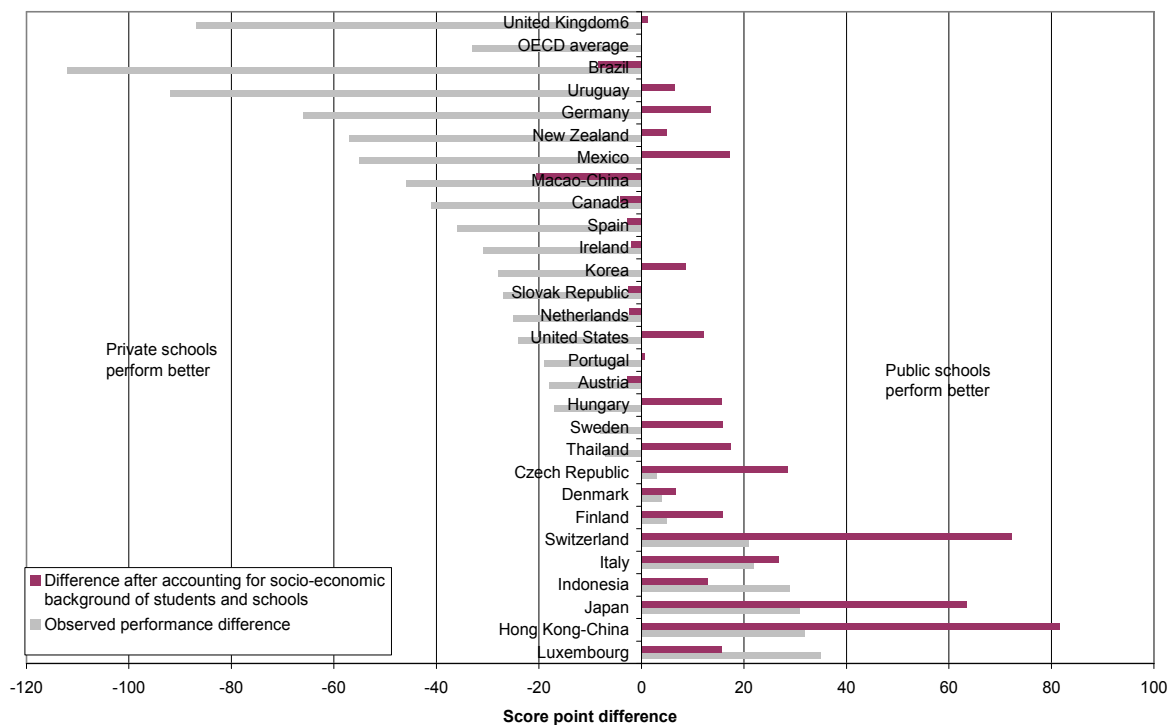
continuing training throughout their careers; and that school leadership should be made an attractive career choice (OCDE, 2008a).

2.2.4 Public and private schools

Table 2.2 below presents the percentage of 15 year-olds attending public or private schools.

A private school is defined in PISA 2006 as: “a school managed directly or indirectly by a non-government organisation; e.g. a church, trade union, business, or other private institution”. The table 2.2 shows the data extracted from EUROSTAT for 2006.¹⁶

Chart 2.5: Score differences in Science scale in PISA 2006 by country and attendance of public or private institutions



Source: Schleicher, A. (2008), PISA 2006, Note: NL: private schools are mainly government dependent)

All educational systems in Europe present a high proportion of students attending public schools, except Belgium and the Netherlands.

PISA 2006 shows that public and private schools differ in their student performance (chart 2.5). In general, private schools perform better than public schools. But private schools tend to have a high share of students with high

socio-economic status, while public schools tend to have higher shares of disadvantages students. When this is taken into account, the differences are considerably reduced.

Ministers of Education agreed in 2007 to give high priority to sustaining and improving the quality of teacher education. They gave high priority to ensuring that provision for teachers'

initial education, early career support (induction) and further professional development is coordinated, coherent, adequately resourced and quality assured. Furthermore, they stated that teachers should be autonomous learners, able to reflect upon their own work, and engage in research as part of their career-long professional development. They noted that greater incentives were needed to encourage and support teachers throughout their careers to review their learning needs and to acquire new knowledge, skills and competence through formal, informal and non-formal learning (European Council, 2007b and European Commission, 2007a).

Table 2.2: Share of pupils in public and private schools (2006)

| % of pupils, 2006 for ISCED 1-4 | Public | All Private (incl. government dependent) | Private independent as a % of total |
|---------------------------------|--------|--|-------------------------------------|
| EU-27 | 79 | 21 | : |
| Belgium | 43.0 | 57 | : |
| Bulgaria | 98.1 | 1.9 | 1.9 |
| Czech Republic | 93.2 | 6.8 | 0.2 |
| Denmark | 87.5 | 12.5 | 0.1 |
| Germany | 93.3 | 6.7 | : |
| Estonia | 97.3 | 2.7 | 2.7 |
| Ireland | 99.4 | 0.6 | 0.6 |
| Greece | 92.9 | 7.1 | 7.1 |
| Spain | 70.3 | 29.7 | 4.6 |
| France | 78.7 | 21.3 | 0.7 |
| Italy | 94.4 | 5.6 | 5.2 |
| Cyprus | 89.9 | 10.1 | 10.1 |
| Latvia | 98.7 | 1.3 | 1.3 |
| Lithuania | 99.6 | 0.4 | 0.4 |
| Luxembourg | 87.4 | 12.6 | 7.3 |
| Hungary | 88.2 | 11.8 | : |
| Malta | 69.2 | 30.8 | 8.7 |
| Netherlands | 23.6 | 76.4 | - |
| Austria | 91.1 | 8.9 | : |
| Poland | 93.2 | 6.8 | 6.1 |
| Portugal | 87.0 | 13 | 8.7 |
| Romania | 98.7 | 1.3 | 1.3 |
| Slovenia | 98.4 | 1.6 | 0.1 |
| Slovakia | 92.1 | 7.9 | : |
| Finland | 93.1 | 6.9 | : |
| Sweden | 92.4 | 7.6 | : |
| United Kingdom | 79.8 | 20.2 | 5.5 |
| Croatia | 98.9 | 1.1 | 1.1 |
| FYR Macedonia | 99.6 | 0.4 | 0.3 |
| Turkey | 98.1 | 1.9 | 1.9 |
| Iceland | 95.6 | 4.4 | 0.1 |
| Liechtenstein | 95.8 | 4.2 | 3.8 |
| Norway | 95.5 | 4.5 | : |

Source: EUROSTAT (UOE)

Notes: BE: Data exclude independent private institutions and enrolments in the German speaking community

NL: data refer to the year 2004

EL: Programmes supervised by Ministries other than the Ministry of Education are reported for the first time for ex. adult literacy programmes for ISCED 3C (+14%), ISCED 4C(+7%). ES: Data include for the first time students in ISCED 3C short (+ 5.9%) FI: Improved coverage for the programmes ISCED 3 and 4 vocational (14% increase for ISCED 3 and 11% increase for ISCED 4).

2.3 Teachers and professional development

Teachers form one of the most important interfaces between society and individuals. The quality of their work is a key determinant in the educational success of students. The quality of teaching staff thus has implications for Europe's economic and social development.

Economic and social changes in Europe are making increasingly complex demands on the teaching profession. The current emphasis on lifelong learning and on "learning at the centre" (Council of the European Union, 2008) requires that teachers become more "research practitioners" (European Commission, 2008a).

Teachers are expected to teach effectively in classes that are culturally and linguistically increasingly heterogeneous, to adapt their teaching to the needs of each individual, to be sensitive to culture and gender issues, to promote tolerance and social cohesion, to respond effectively to disadvantaged pupils and pupils with learning or behavioural problems, to use new technologies and to keep pace with rapidly developing fields of knowledge and approaches to student assessment.

Table 2.3: Teachers as a % of active population and share of part-time teachers (2006)

| Data for 2006 | Teachers as % of active pop | % of part-time teachers | | |
|----------------|-----------------------------|-------------------------|-------|-------|
| | | ISCED | ISCED | ISCED |
| | | 1 | 2 | 3 |
| Belgium | 4.0 | 29.7 | 39.7 | 45.4 |
| Bulgaria | 2.2 | 1.0 | 3.5 | 4.8 |
| Czech Republic | 2.3 | : | : | : |
| Denmark | : | : | : | : |
| Germany | 2.0 | 56.8 | 42.8 | 42.1 |
| Estonia | 2.3 | 61.7 | 72.9 | 64.9 |
| Ireland | 2.7 | 22.7 | : | 29.4 |
| Greece | 3.0 | 3.0 | 3.0 | 3.1 |
| Spain | 2.2 | 8.5 | 15.9 | 14.7 |
| France | 2.6 | 9.6 | 15.5 | 11.8 |
| Italy | 2.8 | 1.6 | 1.9 | 3.4 |
| Cyprus | 2.5 | 3.4 | 5.1 | 6.3 |
| Latvia | 2.7 | 27.0 | 26.8 | 27.6 |
| Lithuania | 3.4 | 17.5 | 31.6 | : |
| Luxembourg | 3.3 | 18.1 | : | 7.1 |
| Hungary | 3.2 | 2.6 | 8.3 | 19.7 |
| Malta | 3.6 | 3.0 | 3.7 | 5.8 |
| Netherlands | 2.8 | 55.9 | : | 47.7 |
| Austria | 2.4 | 24.3 | 22.1 | 25.8 |
| Poland | 3.1 | 22.7 | 26.7 | 38.7 |
| Portugal | 2.9 | : | : | : |
| Romania | 2.1 | 3.7 | 23.2 | 12.5 |
| Slovenia | 2.2 | 1.7 | 11.2 | 19.5 |
| Slovakia | 2.4 | 10.0 | 6.5 | 13.9 |
| Finland | : | : | : | : |
| Sweden | 3.0 | 28.9 | 28.9 | 28.7 |
| United Kingdom | 2.5 | 20.8 | 16.0 | 37.4 |
| Croatia | 2.7 | 5.8 | 24.5 | 50.9 |
| FYR Maced. | : | 0.8 | 10.2 | 14.8 |
| Turkey | 2.4 | : | : | : |
| Iceland | 3.5 | : | 22.7 | 28.6 |
| Liechtenstein | : | : | : | : |
| Norway | 3.7 | 39.0 | 39.0 | 33.5 |

Source: EUROSTAT (UOE)

For country specific notes see:

http://epp.eurostat.ec.europa.eu/portal/page?_pageid=0,1136184,0_45572595&_dad=portal&_schema=PORTAL

Table 2.3 shows the number of teachers as a percentage of the total active population. The range goes from around 2% in Germany, Spain and Slovenia to more than 4% in Belgium and Malta, with 3% for the EU as a whole. The workforce of 6 million teachers, and 1 million pre-primary educators; was up by 50 000, nearly 1%, since 2000. However, some Member States have experienced a strong reduction of their teaching workforce: France (-13%), Slovakia (-12%), Romania and Bulgaria (-11%). Others experienced an increase; Lithuania (+22%), Greece (+19%) and Ireland (+16%).

Table 2.4: Share of female teachers (2006)

| Data for 2006 | Females as a % of all teachers | | | |
|----------------|--------------------------------|-------------|-------------|-------------|
| | ISCED | ISCED | ISCED | ISCED |
| | 1-3 | 1 | 2 | 3 |
| EU-27* | 69.1 | 83.2 | 65.7 | 57.3 |
| Belgium | 66.0 | 79.3 | 60.2 | 58.4 |
| Bulgaria | 81.2 | 93.1 | 80.1 | 75.5 |
| Czech Republic | 72.2 | 94.7 | 73.6 | 57 |
| Denmark | : | : | 67.1 | : |
| Germany | 64.4 | 84 | 60.6 | 47.1 |
| Estonia | 85.5 | 89.4 | 82.4 | 81.4 |
| Ireland | 72.8 | 84.7 | : | 62.1 |
| Greece | 59.7 | 64.2 | 65.5 | 47.8 |
| Spain | 62.5 | 70.5 | 62.5 | 50.2 |
| France | 65.7 | 81.7 | 63.9 | 53.5 |
| Italy | 77.8 | 95.7 | 75.7 | 60.3 |
| Cyprus | 69.3 | 82.6 | 67.6 | 54.8 |
| Latvia | 87.6 | 96.8 | 85.3 | 85 |
| Lithuania | 84.3 | 97.7 | 81.8 | : |
| Luxembourg | 58.2 | 71.6 | : | 46.5 |
| Hungary | 78.7 | 96 | 78.1 | 64.4 |
| Malta | 70.2 | 88.6 | 63.8 | 39.2 |
| Netherlands | 66.3 | 82.6 | : | 45.6 |
| Austria | 69.7 | 89.2 | 68.8 | 51.1 |
| Poland | 75.9 | 84.3 | 73.4 | 65.7 |
| Portugal | 72 | 80.6 | 66.6 | 64.6 |
| Romania | 71.9 | 86.7 | 68.1 | 64.7 |
| Slovenia | 78.4 | 97.4 | 78.5 | 64.4 |
| Slovakia | 76.4 | 89.4 | 75.9 | 69.2 |
| Finland | : | : | : | : |
| Sweden | 68.5 | 81.0 | 66.1 | 50.9 |
| United Kingdom | 67.8 | 81.3 | 61.1 | 61.1 |
| Croatia | 72.3 | 90.4 | 71.0 | 64.4 |
| FYR Macedonia | 58.2 | 70.2 | 51.8 | 56.4 |
| Turkey | 45.2 | 46.8 | : | 41.6 |
| Iceland | 72.1 | : | 79.7 | 52.7 |
| Liechtenstein | 59.2 | 75.0 | 49.0 | 36.5 |
| Norway | 66.2 | 73.0 | 73.0 | 47.4 |

Source: EUROSTAT (UOE)

*EU27 calculated with the weighed average of countries with data

For country specific notes see:

http://epp.eurostat.ec.europa.eu/portal/page?_pageid=0,1136184,0_45572595&_dad=portal&_schema=PORTAL

The Netherlands, Belgium and Germany have high levels of part-time teachers; while Italy, Greece and Malta have the lowest (Table 2.3). The highest proportion of part-time teachers is generally in ISCED 3, although Germany and some others have more part time teachers in primary school. There are big differences between Member States in the share of teachers over 50 (Table 2.5) with Germany over 50% and Italy and Sweden over 45%. The other Member States have less than 35% older teachers. The share of teachers under 30, on the other hand, is only 5% in Germany, but more than 25% in Romania and Malta.

Table 2.5: Age distribution of teachers, 2005

| Teachers by age (%), for ISCED 1-3 | Less than 30 years old | 50 years and older | 60 and older |
|------------------------------------|------------------------|--------------------|--------------|
| Belgium | 17.8 | 27.9 | 2.3 |
| Bulgaria | 10.1 | 26.2 | 2.2 |
| Czech Republic | : | : | : |
| Denmark | : | : | : |
| Germany | 5.1 | 54.7 | 9.3 |
| Estonia | : | : | : |
| Ireland | 17.5 | 32.8 | 6.1 |
| Greece | 8.3 | 23.0 | 2.6 |
| Spain | 10.3 | 27.6 | 3.9 |
| France | 13.1 | 31.4 | 1.1 |
| Italy | 2.7 | 47.4 | 5.8 |
| Cyprus | 24.9 | 12.7 | 0.6 |
| Latvia | 22.7 | 29.4 | : |
| Lithuania | 13.5 | 28.1 | 7.9 |
| Luxembourg | 23.2 | 28.2 | 1.5 |
| Hungary | 13.7 | 24.1 | 3.2 |
| Malta | 32.3 | 26.4 | 2.1 |
| Netherlands | 15.7 | 34.9 | 3.6 |
| Austria | 8.1 | 25.6 | 0.8 |
| Poland | 14.9 | 18.9 | 2.4 |
| Portugal | 16.5 | 22.1 | 2.4 |
| Romania | 25.6 | 29.8 | 2.9 |
| Slovenia | 11.7 | 19.8 | 1.7 |
| Slovakia | 16.1 | 34.8 | 6.4 |
| Finland | 10.0 | 32.5 | 3.5 |
| Sweden | 8.7 | 45.3 | 12.5 |
| United Kingdom | 17.9 | 31.9 | 1.5 |
| Croatia | : | : | : |
| FYR Macedonia | 11.1 | 30.9 | 4.1 |
| Turkey | : | : | : |
| Iceland | 10.5 | 33.1 | 8.3 |
| Liechtenstein | 15.2 | 24.2 | 3.2 |
| Norway | : | : | : |

Source: EUROSTAT (UOE)

*EU27 calculated with the weighed average of countries with data

For country specific notes see:

http://epp.eurostat.ec.europa.eu/portal/page?_pageid=0,1136184,0_45572595&_dad=portal&_schema=PORTAL

Women account for more than 60% of teachers in all the Member States. In Latvia, Bulgaria and Hungary, there is a much higher proportion of women teachers in primary than in upper secondary. Latvia has over 86% female teachers in ISCED levels 1-3. There is a higher proportion of women in primary education than in any other level of education, except in Greece, where there is a slightly higher share of women teaching secondary. In Italy, Latvia, Lithuania, Hungary and Slovenia over 95% of primary teachers are women. In upper secondary (ISCED 3) there is a better gender balance. 6 Member States have more men than women teachers at this level.

Table 2.6: Women headteachers as a % of all headteachers (2006)

| | ISCED 1-3 | ISCED 1 | ISCED 2 | ISCED 3 |
|----------------|-----------|---------|---------|---------|
| Bulgaria | 67.1 | 76.2 | 80 | 65.2 |
| Ireland | 43.0 | 50.8 | : | 37.6 |
| Greece | 73.0 | : | 76.7 | 70.9 |
| France | 64.6 | 80.0 | 41.7 | 40.6 |
| Italy | 39.2 | : | : | 39.2 |
| Cyprus | 57.3 | 67.4 | 60.0 | 41.9 |
| Lithuania | 72.8 | : | : | : |
| Netherlands | 29.3 | 32.6 | : | : |
| Austria | 37.7 | 66.4 | 21.0 | 27.4 |
| Poland | 70.9 | 78.7 | 69.3 | 57.2 |
| Romania | 52.7 | 62.5 | 52.7 | 52.7 |
| Slovenia | 61.8 | 65.0 | 65.1 | 54.0 |
| Slovakia | 65.4 | 86.7 | 50.0 | 49.3 |
| Sweden | 59.3 | 75.0 | 54.5 | 43.1 |
| United Kingdom | 61.5 | 72.0 | : | : |
| FYR Macedonia | 32.9 | : | : | 28.9 |
| Iceland | 58.0 | 82.4 | 50.0 | 33.6 |
| Norway | 47.7 | 50.6 | 50.6 | 43.2 |

Source: EUROSTAT (UOE)

For country specific notes see:

http://epp.eurostat.ec.europa.eu/portal/page?_pageid=0,1136184,0_45572595&_dad=portal&_schema=PORTAL

The proportion of female head teachers is, however, much smaller in all Member States except in Greece. In Italy, for example, the proportion of women teachers in primary to upper secondary is more than 77 %, while the proportion of women head teachers is only 39%.

Professional development of teachers ¹⁷

In a recent OECD survey (OCDE, 2005a), almost every country reported a shortfall in teaching skills and difficulties in updating teachers' skills, especially a lack of competence to deal with new developments in education (including individualised learning, preparing pupils for autonomous learning, dealing with heterogeneous classrooms, preparing learners to make the most of ICT and so on).

PISA 2006 reported that head teachers' views on whether lack of appropriate teaching staff hinders instruction. It shows that 14% of pupils in the EU were in schools where instruction was hindered by the lack of qualified teachers. Luxembourg, Belgium and Estonia are among those with the highest proportion (table 2.7).

Table 2.7: % of students in schools where the principal reports instruction hindered by lack of qualified teachers by subject

| Data for 2006 | Subjects | | | |
|----------------|----------|-------------|---------------|----------------|
| | Science | Mathematics | Test language | Other subjects |
| EU* | 14.9 | 12.8 | 8.5 | 23.7 |
| Belgium | 27.8 | 36.6 | 22.5 | 46.0 |
| Bulgaria | 1.3 | 2.3 | 1.9 | 22.6 |
| Czech Republic | 16.2 | 10.1 | 6.1 | 34.6 |
| Denmark | 24.1 | 5.3 | 3.6 | 25.6 |
| Germany | 36.7 | 19.2 | 11.5 | 43.5 |
| Estonia | 23.5 | 27.1 | 19.4 | 39.9 |
| Ireland | 9.1 | 6.6 | 6.0 | 36.7 |
| Greece | 10.1 | 7.3 | 8.6 | 10.6 |
| Spain | 4.4 | 4.9 | 3.3 | 10.1 |
| France | : | : | : | : |
| Italy | 12.6 | 15.4 | 13.8 | 20.7 |
| Cyprus | : | : | : | : |
| Latvia | 16.5 | 11.8 | 4.1 | 17.1 |
| Lithuania | 14.7 | 14.2 | 6.2 | 27.2 |
| Luxembourg | 33.9 | 44.7 | 52.5 | 39.8 |
| Hungary | 5.1 | 4.2 | 1.7 | 9.4 |
| Malta | : | : | : | : |
| Netherlands | 9.0 | 17.5 | 11.7 | 31.6 |
| Austria | 8.9 | 3.1 | 2.6 | 14.6 |
| Poland | 2.0 | 2.1 | 0.0 | 11.5 |
| Portugal | 0.0 | 1.3 | 0.0 | 2.7 |
| Romania | 2.2 | 0.6 | 4.1 | 12.1 |
| Slovenia | 0.3 | 1.0 | 0.8 | 2.9 |
| Slovakia | 8.0 | 7.6 | 22.8 | 28.5 |
| Finland | 2.2 | 2.2 | 1.3 | 11.7 |
| Sweden | 7.4 | 4.7 | 3.6 | 13.1 |
| United Kingdom | 17.4 | 24.0 | 12.7 | 22.8 |
| Croatia | 14.5 | 7.9 | 1.9 | 14.4 |
| FYR Macedonia | : | : | : | : |
| Turkey | 65.6 | 63.4 | 58.7 | 62.9 |
| Iceland | 25.4 | 16.3 | 7.8 | 20.9 |
| Liechtenstein | 9.1 | 5.4 | 0.0 | 1.7 |
| Norway | 19.7 | 16.7 | 9.2 | 35.3 |

Source: PISA 2006, CRELL calculations

*The EU average is the weighted average of PISA EU participating countries.

No lack of qualified teachers was reported in Portugal and Poland. However, 52% of pupils were affected in Luxembourg. Turkey has major concerns, with 62% of pupils affected.

Improving the quality of initial teacher education and ensuring that all practising teachers take part in continuous professional development have been identified as key factors in securing the quality of school education.¹⁸

Table 2.8: Teacher participation in professional development, excluding ICT-related activities (2001)

| Country | Percentage of teachers who participated in professional development | |
|-------------------|---|------------------------|
| | excluding ICT-related activities | ICT-related activities |
| Belgium (Flemish) | 48 | 30 |
| Denmark | 66 | 52 |
| Finland | 69 | 43 |
| France | 32 | 20 |
| Hungary | 30 | 19 |
| Ireland | 40 | 29 |
| Italy | 36 | 23 |
| Portugal | 37 | 26 |
| Spain | 40 | 29 |
| Sweden | 84 | 37 |
| Netherlands* | 57 | 45 |
| Norway | 56 | 44 |

Source: OECD (2004). Completing the Foundation for Lifelong Learning – An OECD Survey of Upper Secondary Schools

* Country did not meet international sampling requirements. The data reported are not weighted.

EURYDICE has examined how professional development is organized for teachers in lower secondary education and noted that in-service training for teachers is growing in importance: in about half the European countries it is compulsory (EURYDICE, 2002/2004). Eurydice (2003) also noted that ICT skills seem to be a priority in in-service training.

An IEA study on ICT use in schools, SITES 2006 (Law, N. et al., 2008, p. 189), found that in general terms, teachers with higher level of qualifications tend to use ICT more for their teaching. However, little information is available on teachers' actual participation in professional development.

The OECD (2004) collected information on teachers' participation in professional development. On average, in 2001 only 48% of the teachers in upper secondary education in the countries surveyed had participated in some type of professional development.

The highest participation rate was found in Sweden, the lowest in France and Hungary. Examples of professional development given in the study schools, mentoring, peer observations, participation in professional networks, participation in degree programmes (Masters and PhD), conferences to discuss research, visits to companies, collaborative research, regular collaboration between

colleagues, courses and workshops included observation visits to other teachers.

2.4 ICT in schools

The eEurope 2002 Action Plan, adopted by the European Council in June 2000 set the goal of linking all schools to the internet by the end of 2001 (Council, 2000a, p. 9). The Barcelona Spring Council of 2002 furthermore set the goal of ensuring by the end of 2003 a ratio of 15 pupils per online computer for educational purposes. In May 2002 the eEurope 2005 Action Plan, adopted by the Sevilla European Council in June 2002, set the goal of providing all schools and universities with broadband internet access by the end of 2005 (European Commission, 2002a). In 2005 the i2010 Strategy was then adopted, however, without explicit goals for education. As regards the eEurope 2002 goal of linking all schools to the internet, according to a study by Empirica (2006), this goal was nearly accomplished in 2006 in most EU countries. All Member States have more than 90% of the schools connected to the internet.

As a consequence, interest has shifted from connectivity to the use of computers in schools. Data are, however, still scarce on ICT use in schools.

SITES (Law, N. et al., 2008), a study carried out by IEA in 22 educational systems, provides some information for 9 Member States on computer use in schools. PISA could also be a source of information on the use of ICT in schools. However, PISA data is mainly relevant to 15 year-olds students, and interpretation at the school level is not straightforward.

A study carried out by *Empirica* (Bonn) in 2006 and financed by the European Commission within the Lisbon Strategy and i2010, which was based on a survey of teachers and headteachers provided some information on the use of computers in EU

Table 2.9: ICT use and equipment in schools in Europe 2006, 2001

| | Number of computers/ 100 pupils | | Broad band connection in schools in % | | Own web page in % | |
|--------------|------------------------------------|-----------|--|-----------|-------------------|-----------|
| | 2001 | 2006 | 2001 | 2006 | 2001 | 2006 |
| EU-25 | | 11 | | 67 | | 63 |
| EU-15 | 8 | 12 | | 72 | 44 | 62 |
| Belgium | 10 | 10 | 18 | 74 | 44 | 69 |
| Bulgaria | | | | | | |
| Czech Rep. | | 9 | | 63 | | 75 |
| Denmark | 31 | 27 | 64 | 95 | 75 | 99 |
| Germany | 5 | 9 | 8 | 63 | 48 | 70 |
| Estonia | | 7 | | 95 | | 87 |
| Ireland | 11 | 10 | | 66 | 38 | 36 |
| Greece | 5 | 7 | 3 | 13 | 15 | 37 |
| Spain | 7 | 9 | 10 | 81 | 43 | 53 |
| France | 10 | 12 | 10 | 75 | 37 | 29 |
| Italy | 6 | 8 | 24 | 69 | 37 | 73 |
| Cyprus | | 12 | | 31 | | 51 |
| Latvia | | 6 | | 67 | | 41 |
| Lithuania | | 6 | | 33 | | 60 |
| Luxembourg | 32 | 20 | 3 | 77 | 47 | 64 |
| Hungary | | 10 | | 77 | | 56 |
| Malta | | 11 | | 95 | | 63 |
| Netherlands | 13 | 21 | 27 | 92 | 44 | 87 |
| Austria | 11 | 16 | 23 | 68 | 43 | 68 |
| Poland | | 6 | | 28 | | 56 |
| Portugal | 4 | 6 | 4 | 73 | 25 | 61 |
| Romania | | | | | | |
| Slovenia | | 8 | | 85 | | 96 |
| Slovakia | | 7 | | 40 | | 65 |
| Finland | 17 | 17 | 52 | 90 | 77 | 86 |
| Sweden | 15 | 17 | 31 | 89 | 81 | 84 |
| UK | 14 | 20 | 15 | 75 | 50 | 73 |
| Iceland | | 15 | | 92 | | 94 |
| Norway | | 24 | | 89 | | 82 |

Source: Empirica (2006), p. 35

Member States (Council, 2000a). According to this study in the EU almost all schools use computers for instruction¹⁹. In the EU (15), this went from 94% in 2001 to 99% in 2006. Greece experienced the highest increase from 72% to 100%, while Portugal went from 70 to 97%. In the EU (25), 67% of schools had a broadband connection, 63 % had their own web page and 55% their own intranet (LAN).

The percentage of schools with their own web page grew from 44% in 2001 to 62% in 2006 in EU (15). All countries except Greece, France, Ireland and Latvia have more than half of their schools with a web page in 2006. Portugal experienced a 36 percentage points increase from 2001, from 25% to 61%. France and Ireland are the only two countries where the proportion did not increase from 2001. This might indicate some differences in the data collection procedure.

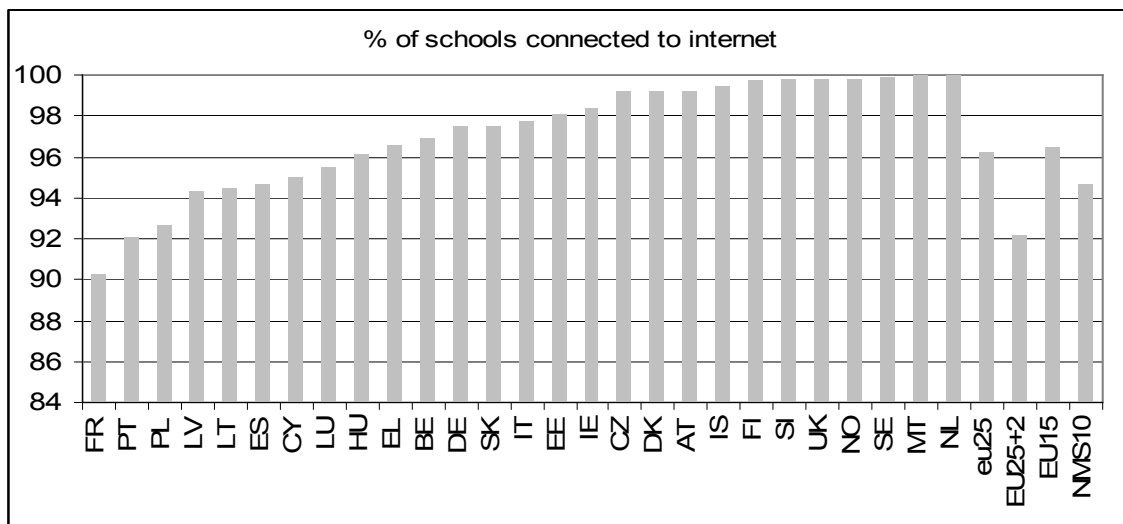
Empirica reported 9 students per computer for the (25) in 2006 (compared to the eEurope 2005 goal of 15 students per online computer by end 2003). The range goes from 6 computers in Portugal, Poland, Latvia and Lithuania to 27 computers for every 100 students in Denmark. Scandinavian countries tend to have higher level of computers per pupil, together with the Netherlands and UK; while Southern European countries and East European countries tend to have fewer computers per student PISA 2006 provides additional information on the ratios of students to computers. However, the only way of analysing the data is by calculating the percentage of students that are in schools with certain level of student/ computer ratio. Calculating school averages with PISA data would be biased, since PISA has a representative sample of 15 year-olds, and not of schools. Thus, chart 2.6 shows the percentage of 15 year-olds that are in schools where the computer-student ratio is higher than the average of all schools participating in PISA. This is equivalent to around 16 computers per student.

The chart has a correspondence with the *Empirica* data, in the sense that countries with low levels of computer-student ratio have a low proportion of schools above the average in PISA. Only six Member States present more than 50% of the students enrolled in schools with more than 11 computers per student. The UK, is the country where most students are in schools with high proportion of computers per student.

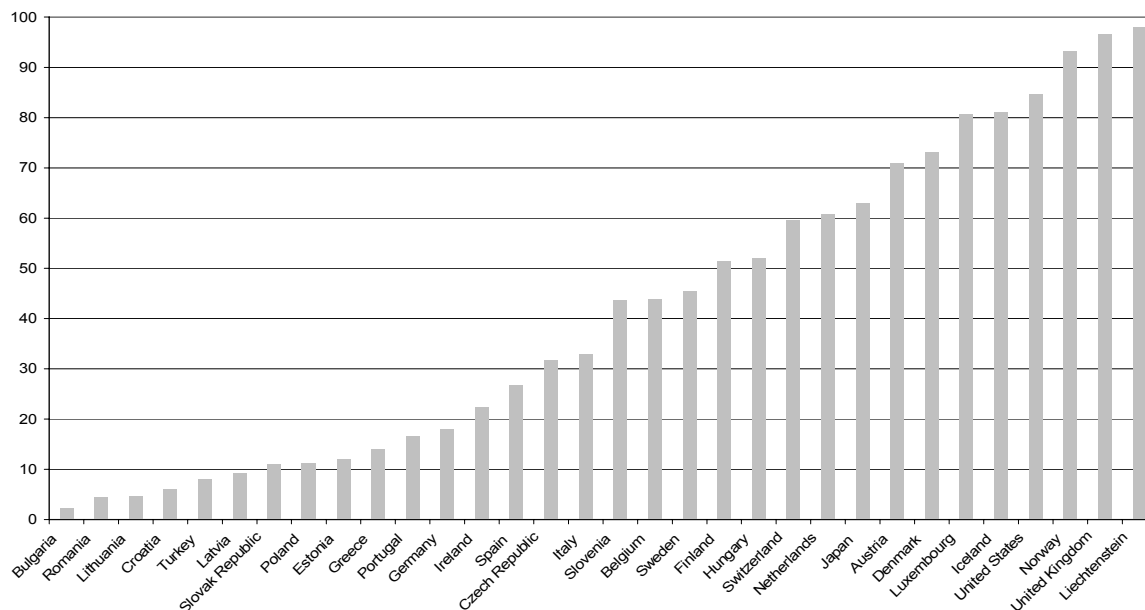
The figure shows the enormous differences among countries. Bulgaria and Romania have less than 5% of students in schools with high proportion of computers, while the UK or Norway have more than 90%.

However, the availability of computers does not mean that students will necessarily use the computers at school often. Table 2.10 shows the percentage of 15 year-olds that report using computers every day or almost every day by place of use. Use of computers at home is by far much more common than use of computers at school.

Chart 2.5: % of schools with connection to the Internet



Data Source: Empirica (2006)

Chart 2.6: Share of students in schools with high proportion of computers per student (more than 16 computers per 100 students). (%)

Source: PISA 2006, CRELL calculations

In the EU countries for which data are available around 72% of students use computers at home every day or almost every day, while this is the case for 8% at school. The range goes from more than 91% in the Netherlands to 48% in Ireland for computer use at home; and from 21% in Denmark to 2% in Germany for the use of computers at school.

Austria, Norway, Denmark and the Netherlands present a high proportion of students using computers both at home and at school. Other countries such as Sweden, Iceland, Germany or Finland present a high proportion of students using computers at home, but a lower proportion of using them at schools every day. Finland, for example, presents 82% of students reporting using computers at home everyday or almost everyday, while this is the case for only 3% at home. Countries that have lower levels of computer use at home such as Greece, Italy or Ireland, present mid levels of computer use at home (from around 5 to 8%).

Hungary, Portugal, Bulgaria and the Czech Republic present relatively high performance of computer use in schools and mid to low use at home. These are countries that in other ICT indicators are catching up with other countries.

Table 2.10: % of 15 year old students that report using a computer everyday or almost everyday by place of use

| | At home | At school | Other places |
|----------------|---------|-----------|--------------|
| EU-27 | | | |
| Belgium | 80.4 | 4.8 | 4.5 |
| Bulgaria | 67.4 | 10.2 | 19.7 |
| Czech Republic | 72.2 | 10.2 | 7.4 |
| Denmark | 84.3 | 20.8 | 9.1 |
| Germany | 74.2 | 2.1 | 4.3 |
| Estonia | : | : | : |
| Ireland | 48.0 | 7.7 | 2.8 |
| Greece | 53.2 | 5.0 | 13.5 |
| Spain | 70.3 | 3.0 | 6.6 |
| France | : | : | : |
| Italy | 64.4 | 5.6 | 5.2 |
| Cyprus | : | : | : |
| Latvia | 64.5 | 8.1 | 10.1 |
| Lithuania | 74.5 | 4.8 | 5.5 |
| Luxembourg | : | : | : |
| Hungary | 66.6 | 9.6 | 6.6 |
| Malta | : | : | : |
| Netherlands | 91.2 | 15.7 | 4.9 |
| Austria | 68.8 | 17.0 | 5.7 |
| Poland | 71.9 | 2.6 | 5.5 |
| Portugal | 74.9 | 10.0 | 7.1 |
| Romania | : | : | : |
| Slovenia | 79.9 | 3.1 | 4.3 |
| Slovakia | 62.0 | 5.8 | 5.9 |
| Finland | 81.6 | 3.3 | 5.2 |
| Sweden | 85.0 | 9.5 | 6.1 |
| United Kingdom | | | |
| Croatia | 70.8 | 3.3 | 4.1 |
| FYR Macedonia | | | |
| Turkey | 39.0 | 9.1 | 18.3 |
| Iceland | 90.1 | 7.8 | 7.4 |
| Liechtenstein | 82.6 | 5.2 | 4.9 |
| Norway | 89.5 | 17.3 | 9.4 |

Source: PISA 2006, CRELL calculations

2.5 Investment in school education

The 2006 Joint Report pointed out that “the necessary reforms cannot be accomplished within current levels and patterns of investment.” (European Commission, 2006b, p. 2) The challenge facing Member States is “to identify those priorities for education investments that will impact most efficiently on the quality and equity of learning outcomes.” (European Council, 2006b, p. 2)

Developing and modernising school education requires resources, for example for investing in teachers and their training; for ensuring ICT resources in all schools; for implementing organisational changes and for ensuring good quality assessment systems. Measures to promote inclusive education could also need more and targeted funding, as would investment in pre-primary education and early intervention programmes or measures supporting pupils with special educational needs (providing specially trained teaching and guidance staff and welfare service).

Table 2.11 Basic demographic trends EU school population, by level (million, EU-27)

| ISCED level | 2000 | 2005 | 2006 |
|---------------|-------------|-------------|---------------|
| 1 (primary) | 31.1 | 29.0 | 28.5 |
| 2 (lower sec) | 22.7 | 23.4 | 22.9 |
| 3 (upper sec) | 24.5 | 26.0 | 22.2 |
| 4 | 1.4 | 1.4 | 1.4 |
| Total | 79.7 | 79.7 | (75.0) |

Source: Eurostat (UOE)

Note: break in series for upper secondary for 2006, ISCED 3 and total not comparable with year before.

Financing is thus an important aspect of modernising and developing school education.

When analyzing the development of spending on school level education the demographic development has to be taken into account.

Primary (ISCED 1) and lower secondary (ISCED 2) education are more affected by demographic trends than upper secondary (ISCED 3) or post-secondary non-tertiary (ISCED 4) education, where growing participation rates can compensate for a decline in cohort size.

The number of primary pupils has fallen in the EU in the period 2000-2006 by more than 8%. The number of pupils in lower secondary education has increased in the same period by nearly 1% while there was a 6% growth in the number of pupils in upper secondary education in the period 2000-05 (in 2006 a break in series in the UK led to a decline in figures).

Taking all education levels together the number of pupils in the EU has remained stable at nearly 80 million since 2000. However, at national level, changes in school population were even stronger. Many New Member States saw a decline in the number of primary pupils of over 20% in the period 2000-2005. Ireland and Slovenia in recent years saw a considerable fall in the number of lower secondary pupils, while the number of upper secondary pupils declined considerably in Poland. It is important to take these developments into consideration when analyzing spending trends.

Apart from the development of the number of pupils the student-teacher ratio is an important factor in explaining spending levels (teacher salaries making up the lion's share of spending on schools). The student to teacher ratio stood at about 12 students per teacher in the EU in 2006

Table 2.12: Basic demographic trends by ISCED level, 2000-2006

| | Growth in the number of pupils 2000-2006 by ISCED level | | | |
|----------------|--|---------|---------|---------|
| | ISCED 1 | ISCED 2 | ISCED 3 | ISCED 4 |
| EU-27 | -8,4 | 0,7 | : | -0,1 |
| Belgium | -5,3 | 16,5 | 14,6 | 32,4 |
| Bulgaria | -30,5 | -18,3 | 12,9 | -30,8 |
| Czech Republic | -26,6 | -6,9 | 13,2 | 60,6 |
| Denmark | 8,2 | 13,7 | 18,9 | -68,1 |
| Germany | -8,9 | -4,9 | 6,4 | 7,0 |
| Estonia | -35,5 | -3,3 | 9,8 | 12,2 |
| Ireland | 2,7 | -5,0 | -7,9 | 71,1 |
| Greece | 0,0 | -7,4 | -0,9 | -53,9 |
| Spain | 4,3 | -3,5 | -7,0 | : |
| France | 4,3 | -0,3 | 3,6 | 77,4 |
| Italy | -1,0 | 0,5 | 6,8 | 41,9 |
| Cyprus | -6,7 | -0,7 | 7,3 | : |
| Latvia | -41,6 | -8,9 | 6,5 | -32,9 |
| Lithuania | -31,1 | -4,9 | 18,8 | 86,2 |
| Luxembourg | 9,0 | 14,9 | 15,4 | 7,4 |
| Hungary | -16,9 | -5,8 | 10,2 | -22,1 |
| Malta | -13,7 | -3,9 | 45,7 | 38,1 |
| Netherlands | -0,1 | 3,9 | 7,1 | -71,3 |
| Austria | -9,5 | 3,7 | 5,5 | 40,4 |
| Poland | -34,4 | 162,1 | -26,3 | 54,8 |
| Portugal | -7,9 | -7,3 | -16,8 | : |
| Romania | -21,0 | -26,6 | 14,8 | -53,9 |
| Slovenia | 7,6 | -23,3 | -1,6 | 432,0 |
| Slovakia | -23,9 | -15,5 | 16,1 | -17,2 |
| Finland | -4,1 | 3,0 | 16,7 | 460,6 |
| Sweden | -10,8 | 18,8 | -5,1 | -16,7 |
| United Kingdom | -2,5 | -0,2 | : | : |
| Croatia | : | : | : | : |
| FYR Macedonia | -16,9 | -10,6 | 4,5 | 65,5 |
| Turkey | 7,7 | : | 45,6 | : |
| Iceland | 2,8 | 18,4 | 14,4 | 116,5 |
| Liechtenstein | 7,0 | 2,9 | 292,5 | : |
| Norway | 2,4 | 20,5 | 5,1 | 28,0 |

Source: Eurostat (UOE)

For country specific notes see:

http://epp.eurostat.ec.europa.eu/portal/page?_pageid=0,1136184,0_45572595&_dad=portal&_schema=PORTAL

(14 in primary, 10 in secondary). It ranged from more than 17 students per teacher in Germany to seven students in Portugal (in 2005). The student to teacher ratio tends to be higher in lower levels of education. The average in the EU for primary school level was about 14 students per teacher, while for upper secondary education it was around 13 students per teacher. There are fewer students per teacher in secondary education, compared to primary. The case of the UK is important with a difference of more than 12 students in the ratio of primary and upper secondary. Data on investment in education as a percentage of GDP show the financial effort countries are making as regards investment in education.

Table 2.13: Ratio of students to teachers

| Data for 2006 | Ratio of students to teachers | | | |
|----------------|-------------------------------|---------|---------|---------|
| | ISCED 1-3 | ISCED 1 | ISCED 2 | ISCED 3 |
| Belgium | 10,9 | 12,6 | 9,4 | 10,2 |
| Bulgaria | 12,9 | 15,8 | 12,3 | 11,7 |
| Czech Republic | 13,4 | 17,3 | 12,3 | 11,9 |
| Denmark | 11,9 | : | 11,9 | : |
| Germany | 17,2 | 18,7 | 15,5 | 19,5 |
| Estonia | 13,3 | 14,1 | 12,3 | 13,3 |
| Ireland | 16,9 | 19,4 | : | 14,6 |
| Greece | 9,2 | 10,6 | 8 | 8,3 |
| Spain | 12,0 | 14,2 | 12,5 | 7,8 |
| France | 14,3 | 19,4 | 14,2 | 10,3 |
| Italy | 10,7 | 10,7 | 10,3 | 11 |
| Cyprus | 14,0 | 16,8 | 11,6 | 12,7 |
| Latvia | 11,2 | 11,8 | 10,5 | 11,7 |
| Lithuania | 9,0 | 10,7 | 8,5 | : |
| Luxembourg | : | : | : | : |
| Hungary | 10,9 | 10,4 | 10,2 | 12,3 |
| Malta | 10,6 | 12,1 | 8,4 | 17,4 |
| Netherlands | 15,5 | 15,3 | : | 15,8 |
| Austria | 11,7 | 13,9 | 10,4 | 11,3 |
| Poland | 12,1 | 11,4 | 12,6 | 12,7 |
| Portugal | 7,0 | 10,8 | 8,2 | : |
| Romania | 14,7 | 17,1 | 12,2 | 15,7 |
| Slovenia | 12,9 | 14,9 | 10,2 | 14 |
| Slovakia | 14,9 | 18,6 | 13,7 | 14,2 |
| Finland | 14,7 | 15,9 | 10,0 | 18,0 |
| Sweden | 12,4 | 12,1 | 11,4 | 13,8 |
| United Kingdom | 14,5 | 20,7 | 17,0 | 7,9 |
| Croatia | 13,7 | 17,7 | 12,8 | 11,8 |
| FYR Macedonia | 16,5 | : | : | 17,3 |
| Turkey | 23,2 | 26,7 | : | 15,8 |
| Iceland | 10,7 | 10,6 | : | 10,8 |
| Liechtenstein | 9,1 | 10,5 | 7,3 | 11,4 |
| Norway | : | : | : | : |

Source: Eurostat (UOE)

Note: Data for DK, FR, MT, PT, FI, UK refer to 2005

For country specific notes see:

http://epp.eurostat.ec.europa.eu/portal/page?_pageid=0,1136184,0_45572595&dad=portal&schema=PORTAL

Investment in primary education as a percentage of GDP has stagnated in the EU in the period 2001-05. However, since the primary population decreased at the same time by over 7% and the economy expanded by 7%, investment per primary pupil increased by nearly 15 % in this

period. In New Member States a decline in cohort size and rapid economic growth imply an opportunity to increase spending per pupil considerably in real terms. In the Czech Republic for example the stagnation in the share of GDP invested in primary education in 2001-05 is a result of a 40% real increase in spending per pupil, a 22% decline in the number of pupils and a cumulated GDP growth of 17%.

In 2005 in primary education Slovenia, Luxembourg and Cyprus showed the highest investment levels relative to GDP, while the Czech Republic Germany and Slovakia show the lowest levels. In these two countries low spending levels go hand in hand with a high number of students per teacher.

Table 2.14: Annual expenditure on private and public education institutions as a % of GDP

| | ISCED 1 | | ISCED 2-4 | |
|----------------|-------------|------------|-------------|------------|
| | 2001 | 2005 | 2001 | 2005 |
| EU-27 | 1.16 | 1.2 | 2.27 | 2.3 |
| Belgium | 1.37 | 1.4 | 2.60 | 2.6 |
| Bulgaria | 0.73 | 0.9 | 1.59 | 2.1 |
| Czech Republic | 0.69 | 0.7* | 2.09 | : |
| Denmark | 1.88 | 1.9 | 2.87 | 3.0 |
| Germany | 0.68 | 0.7 | 2.30 | 2.3 |
| Estonia | 1.55 | : | 2.35 | : |
| Ireland | 1.37 | 1.6 | 1.63 | 2 |
| Greece | 1.03 | 1.1 | 1.38 | 1.4 |
| Spain | 1.10 | 1.1 | 1.77 | 1.7 |
| France | 1.13 | 1.1 | 2.79 | 2.7 |
| Italy | 1.17 | 1.1 | 2.42 | 2.1 |
| Cyprus | 1.71 | 3.2 | 2.76 | (5.3) |
| Latvia | 1.09 | 0.8 | 2.97 | 2.8 |
| Lithuania | : | 0.7 | 3.73 | 2.6 |
| Luxembourg | 1.63 | 2.1 | 1.62 | 1.7 |
| Hungary | 0.95 | 1.1 | 2.13 | 2.4 |
| Malta | 1.16 | : | 2.12 | : |
| Netherlands | 1.28 | 1.4 | 1.91 | 2.1 |
| Austria | 1.12 | 1.0 | 2.62 | 2.5 |
| Poland | 2.69 | 1.7 | 1.23 | 2 |
| Portugal | 1.70 | 1.7 | 2.38 | 2.2 |
| Romania | 1.17 | 1.3 | 0.87 | 0.8 |
| Slovenia | 2.74 | 2.7 | 1.84 | 1.4 |
| Slovakia | 0.59 | 0.7 | 2.05 | 1.9 |
| Finland | 1.31 | 1.3 | 2.42 | 2.6 |
| Sweden | 1.98 | 1.8 | 2.76 | 2.7 |
| United Kingdom | 1.17 | 1.4 | 2.26 | 2.5 |
| Croatia | : | 2.1 | : | 1.0 |
| FYR Macedonia | : | : | : | : |
| Turkey | 1.77 | : | 0.70 | : |
| Iceland | 2.39 | 2.6 | 2.53 | : |
| Liechtenstein | : | 0.7 | : | 1.1 |
| Norway | 3.34 | 1.8 | 1.43 | 2.3 |

Source: Eurostat (UOE), *= 2004 data

For country specific notes see:

http://epp.eurostat.ec.europa.eu/portal/page?_pageid=0,1136184,0_45572595&dad=portal&schema=PORTAL

Another reason is short duration of primary education (for example in Germany). In Poland spending declined in only 4 years by nearly 1% of GDP, in line with a strong decline in the number

of primary pupils. In the EU as a whole spending as a % of GDP has been stable since 2001.

As regards secondary education Cyprus, Denmark, Latvia and France show the highest investment levels in terms of % of GDP, while Greece and Slovenia, and in particular Romania show relatively low levels. The difference between investment in primary and secondary levels is largest in the Czech Republic, France, Cyprus and Portugal²⁰. Slovenia is the only Member State to have a higher level of investment in primary than secondary education.

Table 2.15: Spending per student and relative to GDP per capita (2005)

| | Spending per student in 1000 EUR PPS | | Expenditure per student/ GDP per capita compared with EU average (EU 27=100), 2004 | |
|----------------|--------------------------------------|------------|--|------------|
| | ISCED 1 | ISCED 2-4 | ISCED 1 | ISCED 2-4 |
| EU-27 | 4.5 | 5.9 | 100 | 100 |
| Belgium | 5.6 | 6.5 | 105 | 95 |
| Bulgaria | 1.7 | 1.6 | 95 | 78 |
| Czech Republic | 2.3 * | 3.9* | 72 | 95 |
| Denmark | 7.2 | 8.0 | 127 | 109 |
| Germany | 4.2 | 6.6 | 84 | 96 |
| Estonia | : | : | : | : |
| Ireland | 4.8 | 6.1 | 75 | 77 |
| Greece | 3.8 | 4.9 | 87 | 95 |
| Spain | 4.7 | 6.1 | 97 | 102 |
| France | 4.5 | 7.7 | 89 | 119 |
| Italy | 5.6 | 6.3 | 128 | 109 |
| Cyprus | 5.2 | 8.3 | 119 | 151 |
| Latvia | 2.5 | 2.5 | 108 | 92 |
| Lithuania | 1.8 | 2.2 | 73 | 78 |
| Luxembourg | : | : | : | : |
| Hungary | 3.7 | 3.2 | 116 | 91 |
| Malta | 2.5* | 3.5* | 80 | 85 |
| Netherlands | 5.3 | 6.6 | 94 | 89 |
| Austria | 6.9 | 8.3 | 115 | 115 |
| Poland | 2.8 | 2.4 | 119 | 83 |
| Portugal | 3.8 | 5.1 | 113 | 117 |
| Romania | 1.1 | 1.3 | : | : |
| Slovenia | 6.6 | 4.6 | 172 | 91 |
| Slovakia | 2.4 | 2.3 | 72 | 74 |
| Finland | 4.7 | 6.2 | 95 | 99 |
| Sweden | 6.4 | 6.9 | 122 | 102 |
| United Kingdom | 5.6 | 7.0 | 97 | 90 |
| Croatia | : | : | : | : |
| FYR Macedonia | : | : | : | : |
| Turkey | : | : | : | : |
| Iceland | 7.0* | 7.0* | 127 | 99 |
| Liechtenstein | 7.0 | 7.7 | : | : |
| Norway | 7.6 | 9.3 | 103 | 79 |

Source: Eurostat (UOE), *= 2004 data

For country specific notes see:

http://epp.eurostat.ec.europa.eu/portal/page?_pageid=0.1136184.0.45572595&_dad=portal&_schema=PORTAL

Overall investment levels are similar in the USA and Japan, the differences between primary and secondary level are, however, smaller in these two countries.

When analyzing data on “spending” per pupil it should be considered that these, although expressed in purchasing power parities, are affected by differences in relative wage levels between countries (wages represent by far the largest part of spending). The New Member States, where wages tend to be considerably lower, higher level of investment in primary than secondary education. Even if corrected for purchasing power, GDP per capita levels are still much lower in new Member States than in the old Member States, they hence show relatively low levels of spending per pupil. Examples are Bulgaria and Romania. This is for some countries even the case when one looks at expenditure compared to GDP per capita, implying that teacher salaries are low in these countries compared to other professions.

This is again the case for Bulgaria, but even some Member States like the Netherlands and the UK show low figures. This is partly related to student-teacher ratios (the two countries show a relatively high number of students per teacher) and wage levels of teachers compared to other professions. The highest levels of spending per primary pupil in 2005 were observed in Denmark, followed by Austria and Slovenia. On a secondary level Austria and Cyprus show the highest levels, followed by Denmark. Concerning GDP per capita Cyprus, France and Portugal spend most. Surprisingly, concerning GDP per capita, investment levels in Japan and the USA are very similar to those in the EU.

It is also interesting to note that there is no strong correlation between investment levels and student output as measured in performance tests like PISA. Finland and Ireland, the two best EU performers in PISA reading literacy, show a below EU-average level of investment per pupil relative to GDP per capita.

3. DEVELOPING VOCATIONAL EDUCATION AND TRAINING

3.1 Institutional settings in the European vocational educational and training systems

3.2 Monitoring performance and progress of vocational education and training

3.2.1 Participation in initial vocational education and training

3.2.2 Provision of continuing vocational training in enterprises

3.3 Investment of enterprises in continuing vocational training.

3.4 Improving the image and attractiveness of vocational education and training

3.4.1 Learning outcomes of vocational education and training students

3.4.2 Other outcomes of vocational training

MAIN MESSAGES**Developing Vocational Education and Training**

- **Vocational programmes are becoming more attractive in many countries largely because of the availability of more vocational programmes giving access to higher level studies.** However in United Kingdom, Belgium and Norway, at least half of the VET students are enrolled in upper secondary programmes that provide only access to the labour market. In Denmark, Spain and Iceland over 40% of the students are enrolled in such programmes.
- **Reduced participation and duration of continuous vocational training (CVT).** It has decreased, compared to 1999, in nine countries and especially in Norway, the UK and Denmark. Participation in CVT varied between 14% of employees in Greece and almost 60% in the Czech Republic. Most of the new Member States experienced increasing participation, and are catching up with the EU average.
- Results from the PISA survey shows that for countries where data are available, students in pre-vocational and vocational programmes under-perform in mathematics compared to students enrolled in general programmes.

The Copenhagen process for enhanced co-operation in vocational education and training (VET) suggests that reform and investment should focus on improving its image and attractiveness, increasing participation, and improving its quality and flexibility.

The 2008 Joint progress report of the Council and the Commission confirmed that reforms in education and training are moving forward in many areas, but more substantial efforts are required especially in the development of national lifelong learning strategies. The report indicates four major transversal policy objectives covered which are essential to the implementation of lifelong learning: elaboration of national qualifications frameworks or systems, implementing measures to assess and validate non-formal and informal learning, establishment of lifelong guidance systems and initiatives to strengthen trans-national mobility. Combined, these measures promote flexible learning pathways, enabling individuals to transfer their learning outcomes from one learning context to another and from one country to another (Council, 2008b).

With reference to the explicit objective of the Copenhagen process of improving the image and attractiveness of VET, this chapter will analyse participation and progression patterns in initial VET. The participation rate in vocational strands of upper secondary education will be analysed as a proxy reference to the core indicator on upper secondary completion rates of young people (which is analysed in chapter 2 Developing School Education in this report). The chapter will further look into the participation, duration and cost of continuing vocational training (CVT), based on the provisional results of the third Continuing Vocational Training Survey (CVTS 3). Furthermore some PISA results on literacy of 15 year old students in mathematics, reading and science by programme orientation will be discussed.

3.1 Institutional settings in the European vocational educational and training systems

The education and training landscape in the European Union has evolved in past decades and the distinctions between educational pathways of higher education (less or more labour market oriented: 5A and 5B²¹) have become blurred as a result of changing social, economic and political priorities. Vocational programmes differ from academic ones not only with regard to their curriculum, but also in that they generally prepare

pupils for specific types of occupations and, frequently, for direct entry into the labour market.

VET takes a variety of forms in different countries but also within countries: it can be organised as pre-vocational training to prepare young people for transition to a VET programme at upper secondary level. Initial VET normally leads to a certificate at upper secondary level. It can be school-based, company-based, or a combination of both as in the dual system. In some European countries education and work largely occur consecutively, while in others they are concurrent. Work-study programmes, which are relatively common in the Scandinavian countries but also in the Netherlands, Germany and Austria, offer coherent vocational training routes to recognised occupational qualifications. School based VET can also lead to recognized occupational qualifications in for example Austria and Norway, whereas in other European countries formal learning and work are rarely associated.

An aspect of the institutional settings of the European education and training systems is the existence of the national qualification frameworks. Qualifications achieved in VET programmes that are based on learning outcomes increase their relevance to the labour market. Although qualifications are all on the same level, they have quite different forms of delivery and assessment rules. However, it should be noted that the mapping of qualifications is rather subject to political negotiations than underpinned by research, this fact leading to several inconsistencies across countries as to what is meant by the term 'qualification'.

Some of the inconsistencies which currently exist across the information covering participation in or completion of a certain level of education is expected to be solved with the introduction of the European Qualifications Framework (EQF). The EQF is seen as an element of education policy at European level to have major impacts on VET (see Annex for more details about EQF and some other outcomes of European cooperation in the field of VET). EQF is defined as a common European reference framework for the different countries' qualification systems. Member States are invited to refer their qualifications levels and certificates to the EQF levels and to 'self align' their national qualifications frameworks against the EQF by 2010.

The EQF is intended to provide a general, shared understanding of qualifications allowing broad comparisons between countries. Moreover, the positioning of two or more qualifications at the

same level should be taken as indicating only that they are comparable in terms of the general level of learning outcomes; it does not indicate that they have the same purpose and content, nor does it take account of any structural or operational features. As a result, matching the qualifications as described in EQF with other classification systems (e.g. ISCED) for analytical purposes, will remain a difficult exercise.

3.2 Monitoring performance and progress in vocational education and training

The Helsinki Communiqué on the future priorities of enhanced European cooperation in vocational education and training states that *'adequate and consistent data and indicators are the key to understanding what is happening in VET, to strengthening mutual learning, to supporting research and to laying the foundations for evidence-based training policy'* (European Commission, 2006e).

However, as a result of reporting practices, identifying the most appropriate indicators for VET based on the information available in the statistical frameworks remains a difficult exercise.

In the coherent framework of indicators adopted by the Education Council in May 2007 there is no direct reference to indicators which monitor the developments in VET. To a certain extent VET is covered by some of the 16 proposed indicators (Council, 2007a) For example: participation of adults in lifelong learning, upper secondary completion rates of young people, early school leavers, literacy in reading mathematics and science; for other indicators which could be used as proxy measures for developments in VET (such as adult skills, language skills or learning to learn skills), data will become available in the new surveys which will be launched.

3.2.1 Participation in initial vocational education and training

Demand for secondary education continues to grow in EU countries; with the exception of three countries in all other Member States the enrolment rates went up in 2006 compared to 2000; the increase was sizeable in countries like Greece, Malta, Denmark and Lithuania. The upper secondary enrolment rates of EU countries were above 85% in all Member States and well above 90% in sixteen Member States.²²

In the past years changing labour market and economic conditions have resulted in a clear demand for more and better quality of VET in most European countries. In the school year 2005/2006 at the EU level, the proportion of students who were enrolled in vocational programmes at the upper secondary level of education (ISCED level 3) decreased with 6% to 51.7% (down from 55% in 2000/2001); this decrease represent more than three million fewer VET students than in 2000²³. Among the Member States the proportion of students who were enrolled in vocational programmes at the upper secondary level of education ranged from 13% in Cyprus to nearly 80% in the Czech Republic (*see chart 3.1*). High proportions of students (over two thirds or close) following a vocational programme at the upper secondary level of education are also registered in Austria, the Czech Republic, the Benelux countries, Slovakia, Slovenia, Finland and Romania.

The proportion of students enrolled in VET programmes at ISCED level 3 increased in 13 countries between 2000 and 2006. Countries like Italy, Malta, Spain, Finland and Sweden witnessed a considerable increase and in Portugal the share of pupils in vocational programmes increased to one third of the students although from a very low level. In most of the new Member States, however, the trend has been towards an increased proportion of students following general and academic education. Poland for example decreased its share with almost 30% from 64 to 44; In Hungary it increased in the period, but from a relatively low share in 2000. In the UK, Lithuania Poland and France all reduced the share of students enrolled in VET programmes with more than 20% in the same period.

The share of students in pre vocational and vocational programmes at ISCED 2 level is low or non-existing in most Member States. However in Belgium and the Netherlands, more than one in four students is enrolled in vocational programmes. Vocational programmes are predominant at ISCED level 4 where over 90% of the full-time equivalent students follow vocational programmes.

The structural differences in the education systems need to be further investigated in order to see whether they might help explaining the different levels of participation in VET between countries and of the recent change.

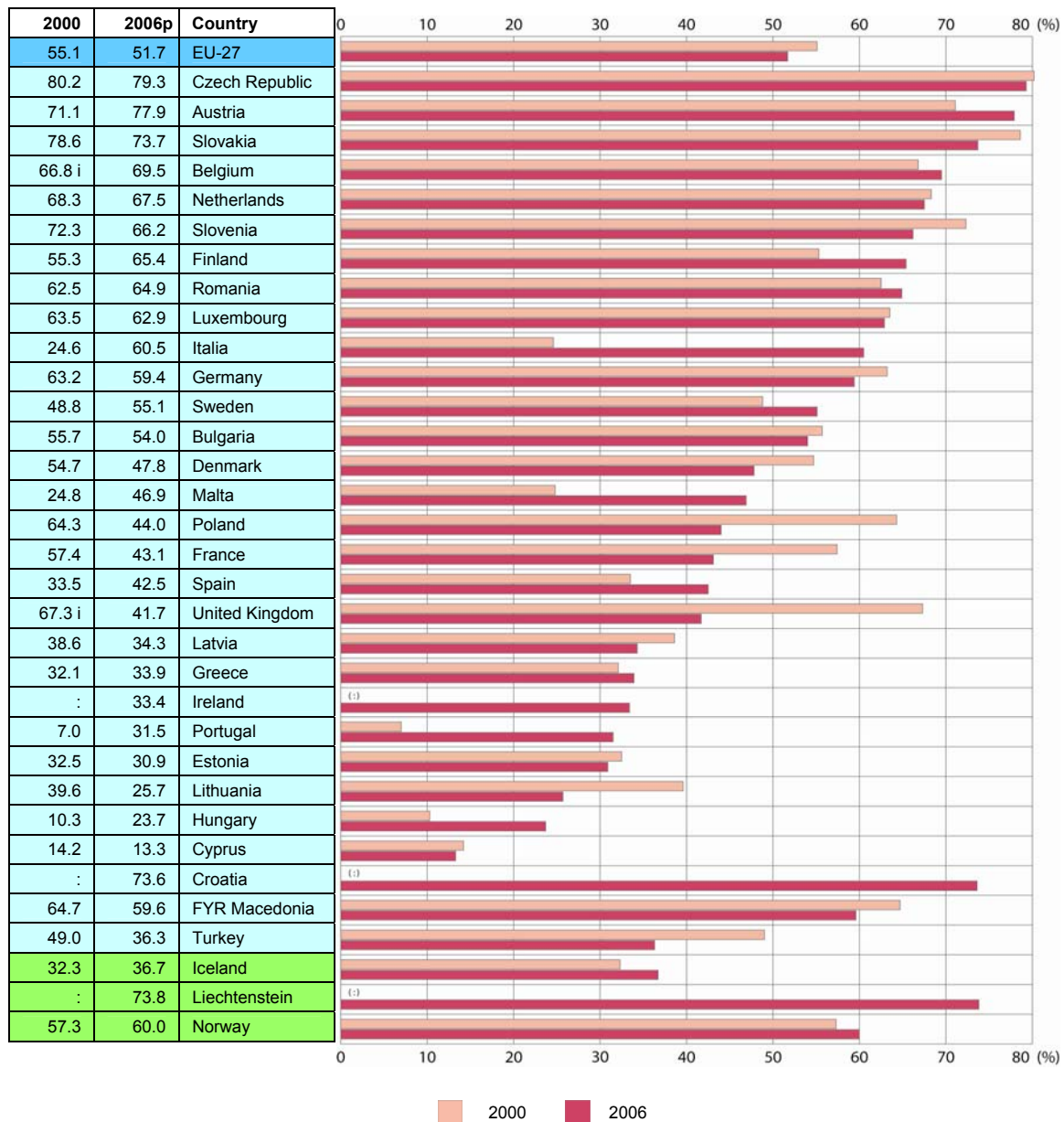
The demographic changes will have a continuing impact on education and training systems in the European countries. In many EU countries there will be fewer youths in compulsory schooling over the

next decade whereas in others, earlier demographic downturns will affect demand for later stages of education and the numbers entering the labour market. The population projections indicates that between 2005 and 2015 in some European countries the population aged 15-to-19 (which could be consider as a typical age group for initial VET) will

fall by 30%, cutting demand for upper secondary education.²⁴ Hence the next few years will offer a window of opportunity in countries where reduced cohort ease the demand for school places and allow access and quality issues to be addressed more easily.

Chart 3.1: Participation patterns in initial VET in EU countries

Students in vocational programmes (pre-vocational and vocational streams) at ISCED level 3 as percentage of all ISCED 3 students



Data source: Eurostat (UOE),

(:) Not available, (i) See information notes, (p) Provisional data

(i) BE: Excluding the students of German speaking community;

UK: ISCED 3 vocational programmes include ISCED 4. Pre-vocational programmes are included in vocational. Only students participating in courses equal to or longer than a semester are included at ISCED level 3 and 4.

For additional notes see: http://epp.eurostat.ec.europa.eu/portal/page?_pageid=0.1136184.0_45572595&_dad=portal&_schema=PORTAL

3.2.2 Provision of continuing vocational training in enterprises

Monitoring the provision of CVT is mainly done with reference to participation rate (calculated as a

proportion of employees receiving training in a given period) and training hours per employee. Table 3.1 shows participation rates for 27 European countries based on the CVTS 3.

Table 3.1: Participation in continuing vocational training in EU countries. 1999-2005
Participants in continuing vocational training courses as percentage of employees in all enterprises (d)

| | EU 27 | BE | BG | CZ | DK | DE | EE | IE | EL | ES | FR | IT | CY | LV | LT | LU | HU |
|-------|-------|----|----|--------|----|----|----|----|----|----|----|----|----|----|----|----|----|
| 1999 | 40 | 41 | 13 | 42 | 53 | 32 | 19 | 41 | 15 | 25 | 46 | 26 | : | 12 | 10 | 36 | 12 |
| 2005p | 33 | 40 | 15 | 59 | 35 | 30 | 24 | : | 14 | 33 | 46 | 29 | 30 | 15 | 15 | 49 | 16 |
| | MT | NL | AT | PL | PT | RO | SI | SK | FI | SE | UK | HR | MK | TR | IS | LI | NO |
| 1999 | : | 41 | 31 | 16 (i) | 17 | 8 | 32 | : | 50 | 61 | 49 | : | : | : | : | : | 48 |
| 2005p | 32 | 34 | 33 | 21 | 28 | 17 | 50 | 38 | 39 | 46 | 33 | : | : | : | : | : | 29 |

Data source: Eurostat (CVTS), Extraction date June 2008

(:) Missing or not available, (d) See definitions, (i) Data refers to Pomorskie region only, (p) Provisional data

(d) A participant in courses is a person who attended one or more CVT courses, at any time during the reference year; participants are counted only once, irrespective of the number of times they attended courses;

In 2005 the participation in CVT courses (as measured by the number of participants in CVT courses as percentage of employees in all enterprises) on average was 33% (down from 40% in 1999) in the participating EU countries. The share varied from 14% in Greece and 15% in Bulgaria, Latvia and Lithuania to 59% in the Czech Republic. Participation in CVT has decreased in 2005 compared to 1999 in nine countries for which data exists (BE, DK, DE, EL, NL,, FI, SE, UK, NO). There are different patterns of participation among the Member States; an increased proportion of the employees participate in CVT courses in most of the new Member States which are now catching up in participation with old Member States. Portugal and Spain show considerable increases in participation during the reference period.

The time spent on CVT (as measured by average hours spent in CVT courses per employee) varies between 3 in Greece and 16 in Luxembourg. It has followed the same pattern as the share of participation and increased in nearly all new Member States for which data exists (CZ, EE, HU, LT, PL, RO, SL) (see table 3.2). Hence, with some exceptions, the relative position of countries is the same irrespective to the measure used. The Czech Republic, Luxembourg, France, Slovenia and Sweden appear to be the most training intensive countries in 2005 (with participation rates above 45% and 13 hours and more per employee). At the other end of the distribution we find several new Member States (Latvia, Bulgaria, Lithuania, Hungary, Romania) and Greece.

Comparing the training intensity expressed by the average hours spent in CVT courses per participant, in 19 of the 24 countries where data are comparable, the numbers of hours dropped between 1999 and 2005. Specifically in the southern countries where the training intensity was rather high in 1999, and did compensate to some extent for the low

participation, the decrease is remarkable (Greece, Spain, Portugal). Only in Sweden, Poland, Slovenia and Germany the hours per participant increased slightly. In Belgium the figures are identical in 1999 and in 2005. (see table 3.2)

Table 3.2 Training duration in EU countries. 1999 and 2005

Average hours spent in CVT courses per employee and per participant (d)

| | Per employee | | Per participant | |
|----------------|--------------|-------|-----------------|-------|
| | 1999 | 2005p | 1999 | 2005p |
| EU 27 | : | 9 | : | 27 |
| Belgium | 13 | 12 | 31 | 31 |
| Bulgaria | 4 | 4 | 35 | 30 |
| Czech Republic | 10 | 14 | 25 | 23 |
| Denmark | 22 | 10 | 41 | 30 |
| Germany | 9 | 9 | 27 | 30 |
| Estonia | 6 | 7 | 31 | 27 |
| Ireland | 17 | : | 40 | : |
| Greece | 6 | 3 | 39 | 25 |
| Spain | 11 | 9 | 42 | 26 |
| France | 17 | 13 | 36 | 28 |
| Italy | 8 | 7 | 32 | 26 |
| Cyprus | : | 7 | : | 22 |
| Latvia | 4 | 4 | 34 | 26 |
| Lithuania | 4 | 5 | 41 | 32 |
| Luxembourg | 14 | 16 | 39 | 33 |
| Hungary | 5 | 6 | 38 | 37 |
| Malta | : | 11 | : | 35 |
| Netherlands | 15 | 12 | 37 | 36 |
| Austria | 9 | 9 | 29 | 27 |
| Poland | 4* | 6 | 28 | 30 |
| Portugal | 7 | 7 | 38 | 26 |
| Romania | 3 | 5 | 42 | 31 |
| Slovenia | 8 | 14 | 24 | 29 |
| Slovakia | : | 12 | : | 32 |
| Finland | 18 | 10 | 36 | 25 |
| Sweden | 18 | 15 | 31 | 34 |
| United Kingdom | 13 | 7 | 26 | 20 |
| Norway | 16 | 9 | 33 | 32 |

Data source: Eurostat (CVTS)

(p): Provisional data, (:): Missing or unavailable

As the results from the CVTS 3 illustrates, the Member States exhibit different levels of CVT. The report *Employment in Europe 2007* (European Commission 2007g) argues that government intervention in CVT at the initiative of the enterprise can be justified to ensure that the two traditional objectives of education and training are reached, namely efficiency and equity.

3.3 Investment of enterprises in continuing vocational training

An important issue for most countries is the allocation of resources for education and training. As mentioned in the 2008 Joint Interim Report the level, of efficiency and sustainability of funding remain critical and most governments seem to recognise that the necessary reforms cannot be accomplished within current levels and patterns of investment in education and training (European Commission, 2007f). (See chapter 8 for further discussion on investment in education)

As shown in table 3.3, in 2005 the training expenditures of European employers are reported between 60 Euro per employee in Latvia and 993 in Denmark (in Purchasing Power Standards). In 2005 the average figure had dropped by nearly 30% from 633 Euro to 461 Euro. Some countries have had a strong increase for example Slovenia with an increase from 167 to 517 Euro. Romania, Hungary, Lithuania and Poland also increased their investments substantially in the period. But how significant are these data in economic terms?

In the standard theory of human capital, employers and employees share the cost and benefits of training when training is firm-specific and/or training is general but there are multiple skills and each firm employs a specific-combination of skills (Lazear, 2003). When training is perfectly general, employees will pay for the full cost of training if the labour market is competitive, while employers might pay for part or all of it if labour markets are imperfectly competitive. But how large are their investments in economic terms? The average of the Member States corresponds to 1.6% of total labour costs and varying from 0.6% in Greece, to 2.7% in Denmark. In more than half of the participating countries the share of CVT courses in the total labour costs dropped between 1999 and 2005. The decrease was remarkable in Norway and the Netherlands (1.0 and 0.8 percentage points respectively). Only one third of countries (a majority of new Member States) have seen increases in the cost of CVT courses as a proportion of total labour costs. In Hungary the share increased

from 1.2% to 2.6%. Country rankings by training expenditure follow closely those by participation and average hours spent in CVT courses.

Table 3.3 Total cost of CVT courses per employee in EU countries. 1999 and 2005.

Total cost of CVT courses per employee in all enterprises (in PPS Euro) (i)

| | 1999 | 2005p |
|----------------|------------|------------|
| EU 27 | 633 | 461 |
| Belgium | 675 | 696 |
| Bulgaria | 134 | 69 |
| Czech Republic | 250 | 327 |
| Denmark | 1 132 | 993 |
| Germany | 506 | 486 |
| Estonia | 197 | 199 |
| Ireland | 600 | : |
| Greece | 223 | 137 |
| Spain | 385 | 367 |
| France | 753 | 862 |
| Italy | 563 | 430 |
| Cyprus | : | 317 |
| Latvia | 90 | 60 |
| Lithuania | 65 | 111 |
| Luxembourg | 592 | 868 |
| Hungary | 144 | 405 |
| Malta | : | 380 |
| Netherlands | 875 | 692 |
| Austria | 365 | 545 |
| Poland | 97* | 171 |
| Portugal | 240 | 229 |
| Romania | 41 | 86 |
| Slovenia | 167 | 517 |
| Slovakia | : | 259 |
| Finland | 698 | 423 |
| Sweden | 868 | 776 |
| United Kingdom | 628** | 351 |
| Croatia | : | : |
| FYR Macedonia | : | : |
| Turkey | : | : |
| Iceland | : | : |
| Liechtenstein | : | : |
| Norway | 666 | 421 |

Data source: Eurostat (CVTS), Extraction date June 2008, (:) Missing or not available, (i) See information notes, (p) Provisional data, (*) Data refers to Pomorskie region only; (**) UK data are not comparable with other countries due to the omission of indirect cost in the total labour cost; (i) Data for 2005 are estimated by adding the corrected direct costs and labour costs of participants

For some of the Member States (12) it is possible to compare the results from the first survey carried out in 1993 with those of the surveys carried out in 1999 and 2005. In all countries except Greece, the spending on CVT courses as a proportion of total labour costs increased from 1993 to 1999. But the positive trend did not continue in these countries from 1999 to 2005.

Table 3.4: Total cost of CVT courses as percentage of total labour cost in all enterprises. 1993, 1999 and 2005

| | 1993 | 1999 | 2005p |
|----------------|------|-------|-------|
| EU 27 | : | 2.3 | 1.6 |
| Belgium | 1.4 | 1.6 | 1.6 |
| Bulgaria | : | 1.0 | 1.1 |
| Czech Republic | : | 1.9 | 1.9 |
| Denmark | 1.3 | 3.0 | 2.7 |
| Germany | 1.2 | 1.5 | 1.3 |
| Estonia | : | 1.8 | 1.6 |
| Ireland | 1.5 | 2.4 | : |
| Greece | 1.1 | 0.9 | 0.6 |
| Spain | 1.0 | 1.5 | 1.2 |
| France | 2.0 | 2.4 | 2.3 |
| Italy | 0.8 | 1.7 | 1.3 |
| Cyprus | : | : | 1.3 |
| Latvia | : | 1.1 | 0.8 |
| Lithuania | : | 0.8 | 1.2 |
| Luxembourg | 1.3 | 1.9 | 2.0 |
| Hungary | : | 1.2 | 2.6 |
| Malta | : | : | 1.8 |
| Netherlands | 1.8 | 2.8 | 2.0 |
| Austria | : | 1.3 | 1.4 |
| Poland | : | 0.8* | 1.3 |
| Portugal | 0.7 | 1.2 | 1.1 |
| Romania | : | 0.5 | 1.1 |
| Slovenia | : | 1.3 | 2.0 |
| Slovakia | : | : | 1.8 |
| Finland | : | 2.4 | 1.5 |
| Sweden | : | 2.8 | 2.1 |
| United Kingdom | 2.7 | 3.6** | 1.3 |
| Norway | : | 2.3 | 1.3 |

Data source: Eurostat (CVTS), Extraction date June 2008

(:) Missing or not available, (*) Data refers to Pomorskie region only; (**) UK data are not comparable with other countries due to the omission of indirect cost in the total labour cost;

One particular issue related to the cost of training is to capture educational expenditures at the workplace. The companies' net training costs are sizeable lower than the gross expenditure with the trainees as these are also productive workers which mean that accounting for the economic benefits reduces the gross costs considerably; it is worth investigating why so many firms choose not to train apprentices. Some studies investigating the cost-benefit ratio of apprenticeship training in companies have indicated that most apprentices offset the cost of their training during their apprenticeship period on the basis of the productive contribution of the work they perform. In countries with apprenticeship systems, as long as training regulations and the market situation permit a cost-effective training of apprentices, companies do not need specific labour market regulations or institutions to offer training (Wolter S.C, J. Schweri and S. Muehleemann, 2006).

3.4 Improving the image and attractiveness of vocational education and training

The major importance of vocational education and training for individuals, enterprises and society is widely acknowledged, and is perceived as a key element of lifelong learning. Although the secondary and tertiary levels of education are reflecting the growing need to enhance human capital by raising levels of skills among the population, VET sometimes suffers from being poorly integrated in the education system. As recommended in the 2008 Joint Interim Report, further work must be done to improve the quality and attractiveness of VET and progress must be made in reducing obstacles to progression between VET and further or higher education (Council, 2008b).

The Council issued recommendations for more than half of the Member States relating to education and training, lifelong learning and skills development. In half of these cases, the recommendations address the need for further reforms of national education and training systems (reducing the number of early school leavers, reforming VET systems, developing lifelong learning strategies, implementing spending targets) while in the other cases, the recommendations address skills issues linked specifically to labour market needs and labour supply (training of older workers, skills levels of disadvantaged groups such as migrants).

One way to grasp the image and increased attractiveness of initial VET is to look at the students participation patterns by programme destination. In several European countries there has been a shift in provision and participation, away from vocational programmes giving access only to the labour market or other programmes at the same level to programmes that also give access to studies at the next levels. However in United Kingdom, Belgium or Norway half of the VET students (or more) are enrolled in upper secondary programmes that are designed to provide only access to the labour market and in Denmark, Spain, Malta and Iceland over 40% of the students are enrolled in this type of programme.

At the EU level the proportion of students who are enrolled in Type-A programmes at ISCED level 3 (which are designed to give access to vocational studies at the next level) went up by 4 percentage points to almost 61% in 2005 compared to 2000. The increase was made on the expense of the Type-C programmes for which the enrolments dropped by 4 percentage points between in the same period

whereas the proportion of students enrolled in Type-B programmes has remained constant over this period.

Table 3.5 Enrolment in upper secondary education (ISCED 3) by programme destination. 2005

| | Enrolment | | |
|----------------|-------------|------------|-------------|
| | 3A | 3B | 3C |
| EU 27 | 60.8 | 8.8 | 30.4 |
| Belgium | 49.5 | : | 50.5 |
| Bulgaria | 99.0 | : | 1.0 |
| Czech Republic | 70.3 | 0.4 | 29.3 |
| Denmark | 52.1 | : | 47.9 |
| Germany | 39.7 | 59.7 | 0.6 |
| Estonia | 10: | : | : |
| Ireland | 71.4 | : | 28.6 |
| Greece | 64.0 | : | 36.0 |
| Spain | 57.5 | : | 42.6 |
| France | 57.5 | 10.4 | 32.1 |
| Italy | 80.8 | 2.9 | 16.3 |
| Cyprus | 100 | : | : |
| Latvia | 91.1 | 0.1 | 8.8 |
| Lithuania | 99.4 | : | 0.6 |
| Luxembourg | 59.6 | 15.5 | 24.8 |
| Hungary | 76.8 | : | 23.2 |
| Malta | 57.6 | : | 42.4 |
| Netherlands | 61.8 | : | 38.2 |
| Austria | 43.6 | 47.1 | 9.3 |
| Poland | 88.3 | : | 11.7 |
| Portugal | 10: | : | : |
| Romania | 72.8 | : | 27.2 |
| Slovenia | 32.6 | 44.4 | 23.0 |
| Slovakia | 80.7 | : | 19.3 |
| Finland | 10.0 | : | : |
| Sweden | 94.8 | : | 5.2 |
| United Kingdom | 43.6 | : | 56.4 |
| Croatia | 72.3 | : | 27.7 |
| FYR Macedonia | 90.5 | : | 9.5 |
| Turkey | 90.7 | : | 9.3 |
| Iceland | 50.6 | 0.6 | 48.8 |
| Liechtenstein | 36.0 | 62.7 | 1.2 |
| Norway | 39.2 | : | 60.8 |

Source: UOE, Eurostat

For notes see:

http://epp.eurostat.ec.europa.eu/portal/page?_pageid=0.1136184.0_45572595&dad=portal&schema=PORTAL

The access to CVT courses remains unequal with older workers (aged 55 and over) less likely than young people to participate in CVT courses. Denmark, Finland and Norway are the only countries where workers aged 55 years and over participate more than those aged less than 25, while in Slovakia and the Czech Republic the percentages are the same for these two age groups. (see table 3.6). The older age group has an increased risk of social exclusion and income inequality than younger age-groups. Hence participation in CVT courses could help to avoid earlier exit from the labour market for this age-group which affects negatively the social protection systems.

Learning tends to lead to later learning. Inequality of opportunity in education is likely to be amplified by unequal opportunities in training. Estimates for the European Union confirm that the probability of employees to participate in CVT rises with the level of schooling. (European Commission 2007g)²⁵

Table 3.6 Training incidence by age in EU countries, 2005.

| | -25 yrs | 25-54 | 55+ |
|----------------|-----------|-----------|-----------|
| EU 27 | 29 | 33 | 24 |
| Belgium | 35 | 41 | 28 |
| Bulgaria | 15 | 16 | 8 |
| Czech Republic | 54 | 60 | 54 |
| Denmark | 29 | 35 | 36 |
| Germany | 25 | 32 | 21 |
| Estonia | 25 | 26 | 15 |
| Ireland | : | : | : |
| Greece | 13 | 14 | 7 |
| Spain | 30 | 35 | 25 |
| France | : | : | : |
| Italy | 22 | 30 | 22 |
| Cyprus | 22 | 31 | 15 |
| Latvia | 16 | 15 | 8 |
| Lithuania | 17 | 15 | 9 |
| Luxembourg | 42 | 51 | 31 |
| Hungary | 12 | 17 | 9 |
| Malta | 29 | 34 | 24 |
| Netherlands | 26 | 38 | 23 |
| Austria | 36 | 34 | 21 |
| Poland | 16 | 22 | 13 |
| Portugal | 26 | 29 | 18 |
| Romania | 17 | 18 | 12 |
| Slovenia | 54 | 51 | 44 |
| Slovakia | 32 | 40 | 32 |
| Finland | 25 | 43 | 34 |
| Sweden | 39 | 50 | 37 |
| United Kingdom | 34 | 34 | 26 |
| Croatia | : | : | : |
| FYR Macedonia | : | : | : |
| Turkey | : | : | : |
| Iceland | : | : | : |
| Liechtenstein | : | : | : |
| Norway | 23 | 31 | 24 |

Data source: Eurostat (CVTS 3) Extraction date June 2008.

(:) missing or not available

3.4.1 Learning outcomes of vocational education and training students

Currently there is a lack of existing surveys measuring the learning outcome of VET. Direct internationally comparable results on learning outcomes of students (i.e. student achievements in basic subjects and competencies) are only available from TIMSS and PISA.²⁶ The PISA survey makes it possible to identify the score of 15 year-old students in foundation skills such as literacy and numeracy. For some countries (10 EU countries) PISA reports on the performance in mathematics divided into different programme orientations. For the mathematical literacy domain, the 15 year-old students enrolled in general programmes perform better than students enrolled in pre-vocational and vocational programmes. In the Netherlands, Belgium, Greece and Hungary students enrolled in general programmes have a performance advantage of more than 60 points. The OECD underlines that "given that vocational and general tracking can often reflect social segregation in the education systems, it is also important to examine differences in performance after adjusting for socio-economic factors." (OECD 2007, p. 275). After adjusting for the socio-economic factors the performance gap is reduced for all countries where data are available. In Luxembourg and Portugal (not significant) students

in vocational programmes perform better than students in general programmes for the mathematical literacy domain.²⁷

One should be aware however that internationally comparable large scale assessments programmes often concentrate on general competences (e.g. reading, information processing, numeracy and problem solving) whereas many employers argue that, in vocational education, the assessment domains should be sector- or work-specific skills, which are highly contextualised. In order to measure learning outcomes and to be able to measure if progress has been accomplished in development of skills there is an increasing need to conduct surveys which focus as well on the assessment of vocational skills and competences.

3.4.2 Other outcomes of vocational training

Avoiding early labour market difficulties is particularly important for youth as a rich literature shows that long unemployment experiences may have persistent effects on employment likelihood and wages later in life. Cooke (Cooke, L.P, 2003) analysed initial wage levels based on school quality and training track for two cohorts of non-university young adults. He found that vocational certification did predict higher wages for youth from different school tracks; for cohorts in which general education was more prevalent, formal vocational certification was an important predictor of higher initial wages for both high and low quality school tracks. By comparing the earnings five, ten and 13 years after labour market entry, he concluded that the returns to specific vocational training manifest in higher initial wages with apprenticeship predicting higher changes in wages within a time period. This pattern of higher initial returns holds for subsequent vocational certification can suggest the support for lifelong learning

While some research shows no beneficial effect of an extra year of basic vocational education on the long-term wages (suggesting equal gains from an extra year in vocational school as from an extra year of work experience (Oosterbeek H. and D. Webbink, 2007)) other evidences shows that the magnitude of the economic returns from CVT is sizeable compared to the benefits of formal education. The private returns of CVT measured as the effects on wages are roughly similar to the benefits of an additional year spent in formal education which are estimated at 5-15% (European Commission, 2006f). The results are debated in the literature, especially due to the duration of CVT which is shorter than the duration of formal

education. Also, estimating the private returns in terms of wages is subject to various methodological and technical issues (for instance the participants in CVT are likely to have different characteristics which can be assessed differently (e.g. higher levels of schooling but also higher abilities). Along this line, some empirical studies show that the wage effects are generally lower for workers with low educational attainment than for their more educated counterparts (Bassanini et al., 2005).

Recent empirical findings provide further support for the idea that apprenticeships have a positive effect on early career unemployment outcomes. The dual systems²⁸ have proven quite successful in giving young people a good start in the labour market. OECD data shows that Austria, Denmark and Germany are among the countries with the lowest share of youth experiencing repeated unemployment spells; in Germany and Austria, where the apprenticeship system is well developed, more than half of those leaving school find a job without experiencing any unemployment (OECD, 2006a).

Evidence shows that effects of apprenticeship training on long-term employment outcomes and on post-apprenticeship wages are however more mixed. Van der Velden *et al.* (2001) show that European countries with apprenticeship systems enjoy better youth employment patterns, particularly in terms of larger employment share in skilled occupations and in high-wage sectors, than those with little or no apprenticeship. Along similar lines, Gangl (2003) carried out a study of labour market outcomes of different types of school work-based qualifications including apprenticeships for 12 European countries. He found that apprenticeships perform rather favourably both compared to school-based education at the same level of training and across different qualification levels. Gangl also reports that, after controlling for institutional and structural factors, apprenticeship systems produce a significant reduction in early career unemployment rates. Ryan (2001) and Steedman (2005) put forward the argument that part of this effect may come through a better matching of training to labour market demand that results from apprenticeship training.

Regarding social returns, education has nonpecuniary benefits in terms of crime reduction or higher civic participation because it mainly improves the non-cognitive abilities of individuals for example motivation and discipline. Less evidence exists regarding to the social returns of CVT. Some results shows that CVT may induce positive externalities in the sense of individual

learning opportunities (for instance one employee may benefit from another's knowledge acquired in the context of training). However, these positive externalities generated by participation in CVT are likely to be primarily within a company and difficult to be accounted for in the society as such. Moreover these externalities concern to a lesser extent the CVT for the employed but may be more significant when the employed persons become unemployed (European Commission, 2007g).

Appendix**Policy overview: Copenhagen-Maastricht-Helsinki***Some concrete outcomes of the European cooperation in vocational education and training*

| Common European tools | Policy objective - contribution to Education and Training 2010 | Stage of development (2008) |
|---|--|---|
| The European Qualifications Framework (EQF) | EQF contributes to the transparency, comparability and portability of citizens' qualifications. It is a common European reference framework which links countries' qualifications systems together, acting as a translation device to make qualifications more readable and understandable across different countries and systems in Europe. | The Recommendation on the European Qualifications Framework for lifelong learning was signed on 23 April 2008 by the Presidents of the European Parliament and of the Council. The recommendation invites Member States to relate their qualifications systems to EQF by 2010, and to refer all new qualification certificates, diplomas and Europass documents by 2012 to the appropriate EQF level. |
| A European Credit system for VET (ECVET) | ECVET aims at facilitating European mobility in VET and access to lifelong learning for young and adult learners. It supports the learners while building individual learning pathways leading to qualifications. It provides a common methodological framework based on units of learning outcomes so as to facilitate transfer of credits between qualifications and VET systems. | The European Commission has finalised its proposal for a recommendation of the European Parliament and of the Council on the establishment of the European Credit system for Vocational Education and Training (ECVET) on 09 April 2008. An agreement on the ECVET recommendation is expected by the end of 2008. |
| Common Quality Assurance Framework for VET | To promote cooperation on quality assurance in VET between Member States by providing a guarantee for quality assurance in VET. Member States will be encouraged to exchange models and methods in this field. | The European Commission adopted on 9 April 2008 a proposal for the recommendation of the European Parliament and of the Council concerning the establishment of a European Quality Assurance Reference Framework for Vocational Education and Training (EQARF-VET). |
| A single Community framework for the transparency of qualifications and competences (Europass) | To improve transparency of qualifications and competences which will subsequently facilitate mobility throughout Europe for lifelong learning purposes, thereby contributing to developing quality education and training and facilitating mobility for occupational purposes, both between countries and across sectors. | Adopted by a Decision of the European Parliament and of the Council in December 2004. Europass is implemented in 32 countries. The Europass website, developed by Cedefop, recorded 10 millions visits. 2.5 million CVs were completed online. A first external evaluation, conducted in 2007, concluded that the Europass initiative is achieving its objectives as a mobility tool for citizens and helps them to make their competences and qualifications easier to understand learning contexts and the labour market. The Commission prepared a communication to the Council and the European Parliament. |
| Common European principles for identification and validation of non-formal and informal learning | Common European principles are necessary to encourage and guide development of high-quality, trustworthy approaches and systems for identification and validation of non-formal and informal learning. | The Education Council has endorsed a set of common European principles for identification and validation of non-formal and informal learning. A European Inventory on validation of non-formal and informal learning has been set up to support implementation of the common principles and to promote mutual learning between European countries. The Cedefop Virtual Community on non-formal learning provides a platform for dissemination of and further exchanges on the common principles and their further development. |
| Lifelong guidance | Guidance throughout life contributes to achieving the European Union goals of economic development, occupational and geographical mobility and human capital and workforce development. Provision of guidance within the education and training system, and especially in schools or at school level, has an essential role to play in ensuring that individuals' educational and career decisions are firmly based and in assisting them to develop effective self-management of their learning and career paths. | The Resolution adopted by the Council in 2004 invites Member States to examine national guidance provision in education, training and employment. A template for action to support Member States in this process was devised. Additionally, a <i>Career guidance handbook for policymakers</i> was published by the OECD and the Commission in December 2004. It provides common principles and other tools to improve services at national, local and company levels. The European lifelong guidance policy network ELGPN was established in 2007 to assist the Member States and the Commission in moving European cooperation on lifelong guidance forward in both education and the employment sectors. The purpose is to promote cooperation at Member States level on lifelong guidance and to propose appropriate structures and support mechanisms in implementing the priorities identified in the Resolution (2004) |
| VET statistics | Adequate and consistent data and indicators are the key to understanding what is happening in VET, to strengthening mutual learning, to supporting research and to laying the foundations for evidence-based training policy. | Cooperation is underway between different Commission DGs (EAC, JRC/CRELL and Eurostat) and Community agencies (Cedefop and Eurydice) with the aim of developing a framework for reporting on VET. |

Source: European Commission (Directorate General Education and Culture), Cedefop (www.cedefop.europa.eu)

4. DEVELOPING HIGHER EDUCATION

4.1 Quality of higher education institutions

4.1.1 Two international university rankings

4.1.2 Limits of existing rankings

4.2 Investment in higher education

4.3 Graduates in higher education graduates

4.3.1 Higher education graduates: Core indicators

4.3.2 Graduates in mathematics, science and technology: EU Benchmark for 2010

4.4 Mobility of higher education students

4.4.1 International student mobility

4.4.2 Erasmus mobility

Appendix

MAIN MESSAGES

Developing Higher Education

- About 19 million students were in 2006 enrolled in higher education in the EU, nearly 3 million or 18% more than in 2000.
- Nearly 4 million students in the EU graduated from higher education in 2006. This increase of 37% since 2000 is about twice that of the general student population (partly a result of the strong growth of second degrees caused by the introduction of the Bologna structure).
- 197 universities from 18 Member States were among the 500 leading universities of the world in 2007, according to the Shanghai university ranking. The top end of the ranking, however, remains dominated by the US.
- The EU spends 100 billion Euro less each year on higher education than the US.
- Public spending in higher education in the EU, at 1,13% of GDP, is close to US levels (1.32%) and well ahead of Japan (0.65%), but private spending on higher education in the EU, at 0.23% of GDP, is much higher in both Japan (0.76 of GDP) and the US (1.91%) .
- There are wide differences in public spending on higher education across the EU. In the Nordic countries it is over 2% of GDP, while in several southern and eastern European countries it is less than 1%.
- In 2006 there were about 200 000 more mathematics, science and technology graduates (+29%) than in 2000. This already exceeds the benchmark of a 15% increase for 2010. However, growth is even stronger in some major competitor countries. China had in 2006 already more than twice as many new tertiary mathematics, science and technology graduates as the EU.
- Although gender balance has been achieved for the field of mathematics and statistics, little progress has been made to reduce the overall imbalance in science and technology graduates. There continues to be a very low share of female graduates in engineering, manufacturing, construction and computing. However, women predominate in life sciences.
- 1.7 million students in the EU have foreign citizenship, twice the figure of 2000, the great majority of which are European. The share of students with a foreign citizenship increased by 4 percentage points since 2000.
- Over 600 000 EU students now study abroad, an increase of about 50% compared to 2000. ¾ of these study in another EU country.
- About 1.7 million students have taken part in the Erasmus mobility scheme since it started in 1987. Participation in Erasmus continues to increase, currently at 3.2% a year.

One important instrument with which the EU complements the work of Member States on higher education is Erasmus, which supports and encourages Europe-wide mobility of students and teachers. Erasmus celebrated its 20th year in 2007. It facilitates the recognition of studies abroad by supporting several initiatives, including the European Credit Transfer System (ECTS), the Diploma Supplement and the network of National Academic Recognition Information Centres (NARIC).

In 1999 ministers from 29 European countries signed the Bologna Declaration (today 46 countries are participating in this process), with the aim of establishing a European area of higher education by 2010.²⁹

The growing attention given to higher education is reflected in a series of Commission Communications in recent years on:

- the role of universities in the Europe of knowledge (June 2004) (European Commission, 2003a);
- mobilising the brainpower of Europe: (April 2005) (European Commission, 2005a);
- delivering on the modernisation agenda for universities (May 2006) (European Commission, 2006c);

EU Ministers confirmed their commitment to modernising universities in the Council Resolution on modernising universities for Europe's competitiveness in a global knowledge economy of 23 November 2007.³⁰

In addition a Communication on the EIT was adopted:

- the European Institute of Technology: further steps for its creation (June 2006) (European Commission, 2006d).

The European Institute of Technology (EIT) is a new flagship project of the Commission which aims at reinforcing the innovation capacity of Member States and the Community. It addresses several issues already highlighted in the modernisation agenda, notably the fragmentation of the European higher education and research system, the lack of excellence in certain areas and the low level of involvement of business in education and research. It is expected to boost Europe's innovation capacity by supporting full integration of the knowledge triangle (innovation, research and education) and pooling resources

from universities, research organisations and business partners. While the EIT is not meant to address issues exclusive to higher education, the EIT's governance, working methods and relationship with business are expected to inspire change for the better throughout Europe.

There are currently several quantitative EU objectives relating to higher education:

- *The benchmark of an increase in the number of mathematics, science and technology graduates by at least 15% by 2010 (compared with 2000) while at the same time reducing the gender imbalance (European Council, 2003a).*
- *The objective of investing 2% of GDP in higher education (currently 1.3%), put forward by the Commission. (European Commission, 2006c).*
- *The goal of 3 million Erasmus students by 2012 (Decision of November 2006 on an action programme in the field of lifelong learning) (European Council, 2006c).*

The Barcelona objective of spending 3% of GDP on research and development by 2010 has implications for higher education, since about 22% of R&D spending in Europe goes into university-based research. In 2006 R&D spending had reached 1.84%.

In March 2008 the European Council called for the removal of barriers to the free movement of knowledge by creating a fifth freedom based on :

- -Enhancing the cross-border mobility of researchers, as well as students, scientists, and university teaching staff
- -making the labour market for European researchers more open and competitive, providing better career structures, transparency and family-friendliness,
- -further implementing higher education reforms (European Council, 2008a, p.5).

The first sub chapter looks at quality at institutional level, while the next three subchapters analyses the core indicator on monitoring progress of higher education reforms by looking into graduates of higher education as wells financing of higher education and student mobility.

4.1 Quality of higher education institutions

4.1.1 Two international university rankings

The quality of higher education institutions is a permanent concern for education policies. The Council Recommendation 98/561/EC of 24 September 1998 on European cooperation in quality assurance in higher education (European Council, 2006d) has led to the creation of the European Network (now Association) for Quality Assurance in Higher Education (ENQA) in 2000. Quality assurance was also among the action lines of the Bologna process launched in 1999. In 2005, Bologna Ministers meeting in Bergen, Norway, adopted the European Standards and Guidelines for Quality Assurance in the European Higher Education Area, which provided the basis, together with a new Recommendation, of Council and Parliament (European Council, 2006d), for the establishment of European Quality Assurance Register in Higher Education (EQAR) in March 2008.

At the same time international rankings have evolved in recent years, receiving growing media attention.

There are currently two worldwide university rankings: the *Academic Ranking of World Universities* (ARWU) from Shanghai's Jiao Tong University, released for the first time in 2003 (latest ranking all areas: August 2007, by subject field: February 2008) and the World University Ranking (WUR) from the Times Higher Education Supplement (THES), first released in 2004 (latest ranking: autumn 2007).

In the *Academic Ranking of World Universities* institutions are ranked on their academic and research performance, based on the number of Nobel prize winners, highly cited researchers, articles published in Nature and Science, articles in the expanded Science Citation Index (SCI) and the Social Science Citation Index (SSCI), plus a composite indicator of academic performance weighted by the size of the institution.³¹ In the THES *World University Ranking* (WUR), the opinion of scientists and international employers plays a crucial role. Around 5,101 researchers and employers are asked to indicate the best universities. This "peer review" counts for 50% in the total score of each university. In addition, the following other criteria are applied: research impact in terms of citations per faculty member, staff/student ratio, percentage of students and staff recruited internationally. Both the ARWU and WUR assessments of research performance

consider only academic research output (i.e. scientific articles and other academic publications covered in the SCI, SSCI and ESI). This means, in particular, that, regardless of the correctness of either ranking of academic research performance, both ignore any output of research activities other than publications (including all commercial output, such as patents, and all non-commercial non-academic output, such as advice to policy-makers).

Table 4.1 shows the performance of countries in these two international university rankings, focusing more specifically on the Shanghai ranking. In 2007, according to the ARWU, EU-27 had 197 of the top 500 universities, while 166 were in the United States and 32 in Japan. Germany and the United Kingdom had the highest numbers of top institutions in Europe. Out of the new Member States only Poland, Hungary, Czech Republic and Slovenia have universities in the top 500. Considering the number of relevant institutions, the Netherlands, which has only 13 comprehensive universities but 12 institutions on the list, Sweden (11 out of 17) and Denmark (4 out of 9) perform particularly well. Europe has a solid base of medium to good quality universities and a higher share of its 4 000 higher education institutions (which include around 700 universities³²) in the top 500 than the USA (in 2005 the USA had 4 387 higher education institutions, of which 413 awarded doctorates).³³ This picture is confirmed if the number of universities in the top 500 is related to the number of tertiary students (as shown in table 4.1). The EU has slightly more top 500 universities per 100 000 students than the United States and Japan. Denmark, Austria, Sweden and the Netherlands perform particularly well on this point. (See table 4.1).

However, if only the top 200 or top 100 universities are considered, the performance of the European higher education system lags behind the United States. Out of the top 100 universities, 54 are located in the United States and only 29 in the EU. The USA leads especially in terms of institutions at the very top: it has 17 of the ARWU top 20 universities. Top of the list comes Harvard University, a private institution, which had endowment assets of \$ 25 billion in 2005, making it the richest university in the world. Stanford University in California (endowment assets in 2005: \$12 billion) is ranked third.

The EU has only two institutions in the top 20: Cambridge, ranked fourth, and Oxford, ranked

tenth. Japan has one (Tokyo University, ranked 20th).

Table 4.1: Results of two university rankings, 2007 (ARWU and THES)

| Number of universities in the | Academic Ranking of World Universities (ARWU) | | | World University Ranking (THES) |
|-------------------------------|---|---|-----------|---------------------------------|
| | Top 500 | Number in top 500 per 100 000 tertiary students | Top 100 | Top 100 |
| EU-27 | 197 | 1.05 | 29 | 34 |
| Belgium | 7 | 1.77 | 0 | 1 |
| Bulgaria | 0 | 0 | 0 | 0 |
| Czech Rep. | 1 | 0.30 | 0 | 0 |
| Denmark | 4 | 1.75 | 1 | 1 |
| Germany | 41 | 1.79 | 6 | 3 |
| Estonia | 0 | 0.00 | 0 | 0 |
| Ireland | 3 | 1.61 | 0 | 1 |
| Greece | 2 | 0.31 | 0 | 0 |
| Spain | 9 | 0.50 | 0 | 0 |
| France | 23 | 1.04 | 4 | 2 |
| Italy | 23 | 1.13 | 0 | 0 |
| Cyprus | 0 | 0 | 0 | 0 |
| Latvia | 0 | 0 | 0 | 0 |
| Lithuania | 0 | 0 | 0 | 0 |
| Luxembourg | 0 | 0 | 0 | 0 |
| Hungary | 2 | 0.46 | 0 | 0 |
| Malta | 0 | 0 | 0 | 0 |
| Netherlands | 12 | 2.07 | 2 | 4 |
| Austria | 7 | 2.77 | 0 | 1 |
| Poland | 2 | 0.09 | 0 | 0 |
| Portugal | 2 | 0.54 | 0 | 0 |
| Romania | 0 | 0 | 0 | 0 |
| Slovenia | 1 | 0.87 | 0 | 0 |
| Slovakia | 0 | 0 | 0 | 0 |
| Finland | 5 | 1.62 | 1 | 1 |
| Sweden | 11 | 2.60 | 4 | 1 |
| United K. | 42 | 1.80 | 11 | 19 |
| Croatia | 0 | 0 | 0 | 0 |
| FYR Maced. | 0 | 0 | 0 | 0 |
| Turkey | 1 | 0.04 | 0 | 0 |
| Iceland | 0 | 0 | 0 | 0 |
| Liechtenstein | 0 | 0 | 0 | 0 |
| Norway | 4 | 1.86 | 1 | 0 |
| Japan | 32 | 0.78 | 6 | 4 |
| USA | 166 | 0.95 | 54 | 37 |
| China | 25 | 0.11 | 0 | 3 |
| India | 2 | 0.02 | 0 | 0 |
| Russia | 2 | 0.02 | 1 | 0 |

Data source: <http://www.arwu.org/> <http://www.thes.co.uk/>

Additional note: The number of students enrolled refers to 2006, Source: UNESCO, Eurostat.

The ARWU ranking by broad subject field (see table 4.2) reveals that in 2008, in medicine and natural sciences the EU takes similar shares of the top 100 or so institutions, but its share is lower in engineering and social science.

Table 4.2: Ranking of world universities by broad subject fields (ARWU), 2007

| | Number of universities in the: | | | | |
|--------------|--------------------------------|-----------|-----------|-----------|-----------|
| | Top 106 | Top 104 | Top 106 | Top 108 | Top 110 |
| | ENG | SOC | LIFE | MED | SCI |
| EU-27 | 22 | 17 | 26 | 32 | 30 |
| Japan | 7 | 1 | 3 | 2 | 7 |
| USA | 48 | 72 | 62 | 62 | 60 |
| Australia | 4 | 3 | 4 | 3 | 1 |
| Canada | 6 | 6 | 5 | 6 | 2 |
| China | 9 | 1 | 0 | 0 | 0 |
| India | 1 | 0 | 0 | 0 | 0 |
| Russia | 0 | 0 | 0 | 0 | 1 |

Data source: University of Shanghai, <http://ed.sjtu.edu.cn/ARWU-FIELD.htm>

Additional notes :

SCI: Natural Sciences and Mathematics.

ENG: Engineering/Technology and Computer Sciences.

LIFE: Life and Agriculture Science.

SOC: Social Sciences

MED: Clinical Medicine and Pharmacy

4.1.2 Limits of existing rankings

There are considerable differences between the ARWU ranking and the *WUR* ranking (see Chart 4.1 in appendix). The United States hosts only 57 of the top 200 universities in the *WUR* ranking compared with 88 in the ARWU ranking. There are even greater differences in terms of specific institutions. For instance, the university of Oslo ranks 69th in the ARWU ranking but 188th in the *WUR* ranking.

University rankings apply a wide range of criteria for measuring excellence. There is still no clear consensus about the indicators that should be used to measure the “quality” of HEIs. Quality of teaching is not taken into account in the ARWU ranking and the assessment of research activities focuses mostly on academic research output.³⁴ Social sciences and humanities are at a comparative disadvantage as academic research performance is measured bibliometrically. The bibliometric methods used are often not up to state-of-the-art standards in bibliometric practice (Van Raan, A.J.F., 2005 and European Commission, 2007b, Section 3.3.2 of the annex). The weight assigned to each indicator is arbitrary (see Table A 4-1 in annex). For all these reasons, caution is needed with interpretation of these results.

In response to these critics, the Centre for Higher Education Development (CHE) offers an alternative to the two worldwide rankings. Indeed, the CHE provides an assessment of German-speaking universities in Germany, Austria and Switzerland, which takes account of the diversity in terms of languages, subject areas, profiles,

student services, research and teaching quality of the institutions.³⁵ The CHE ranking does not (i) rank institutions, but rather departments, (ii) weight or aggregate individual indicator scores. Moreover, programmes are not listed in a numerical order but placed in 3 categories (top, intermediate, and bottom).³⁶

In addition, in May 2006 the International Ranking Expert Group (IREG) established the *Berlin principles* on quality and good practice in HEI ranking. The Berlin principles consist of 16 descriptive principles and symbolize the beginning of a system of evaluation of ranking indicators.

In the long term the OECD project to set up a PISA type skills assessment for higher education students (a feasibility study on this is being carried out in 2008) will provide additional material for assessing the quality of output of universities as regards teaching.

Ranking activities should furthermore consider that there is a variety of types of higher education institutions. The European Commission currently has a research project on the typology of higher education institutions.

Some researchers have shown that spending on higher education correlates with the incidence of top ranking universities. The impact is even bigger if there is a certain level of autonomy for institutions.

4.2 Investment in higher education

Rising participation rates and hence a growing number of students in tertiary education and the goal of a higher quality of institutions imply a need for a proper funding of higher education. The Commission has proposed the goal of investing 2% of GDP (current level: 1.3%) in higher education (public and private combined).

Table 4.3 shows public expenditure on tertiary education institutions as a percentage of GDP in 2004 (for all activities, including both education and research). Total public investment in higher education in 2004 was around 1.13% of GDP in EU-27. In Denmark, Sweden and Finland total public spending alone already surpasses the goal proposed by the Commission of investing 2% of GDP (from all sources) in higher education. On the other hand the share is below 0.8%% in Italy, Latvia, Malta and Romania.

Spending on higher education is more strongly affected by participation rates than compulsory education (where all pupils of a cohort participate in education, while in tertiary there are strong differences in the shares of young people participating). Public spending on higher education, as a percentage of GDP, in the EU increased by 0.08 percentage points between 2001 and 2004. Total public expenditure on higher education as a percentage of GDP increased in 12 EU countries while decreasing in 13. The biggest increases were in Greece and Cyprus.

Table 4.3: Public expenditure on tertiary education as a percentage of GDP (2001, 2004)

| Country | Public | | Of which direct public spending | Of which on R&D In % of direct spending |
|----------------|-------------|-------------|---------------------------------|---|
| | 2001 | 2004 | 2004 | 2004 |
| EU-27 | 1.05 | 1.13 | 0.95 | |
| Belgium | 1.34 | 1.29 | 1.09 | 30.1 |
| Bulgaria | 0.82 | 0.81 | 0.72 | 3.0 |
| Czech Republic | 0.79 | 0.95 | 0.89 | 17.5 |
| Denmark | 2.71 | 2.53 | 1.75 | 26.1 |
| Germany | 1.10 | 1.16 | 0.95 | 36.2 |
| Estonia | 1.03 | 0.88 | 0.87 | 0 |
| Ireland | 1.22 | 1.11 | 0.94 | 29.7 |
| Greece | 1.17 | 1.46 | 1.26 | 17.9 |
| Spain | 0.97 | 0.97 | 0.90 | : |
| France | 0.99 | 1.21 | 1.12 | 34.5 |
| Italy | 0.80 | 0.78 | 0.65 | 55.8 |
| Cyprus | 1.14 | 1.48 | 1.09 | 12.5 |
| Latvia | 0.89 | 0.68 | 0.58 | 20.5 |
| Lithuania | 1.34 | 1.06 | 0.88 | : |
| Luxembourg | : | : | : | : |
| Hungary | 1.08 | 1.02 | 0.86 | 20.5 |
| Malta | 0.88 | 0.55 | 0.23 | 0.0 |
| Netherlands | 1.27 | 1.35 | 0.98 | 35.1 |
| Austria | 1.35 | 1.42 | 1.14 | 33.4 |
| Poland | 1.04 | 1.15 | 1.13 | 15.8 |
| Portugal | 1.03 | 0.84 | 0.79 | : |
| Romania | 0.79 | 0.70 | 0.65 | : |
| Slovenia | 1.45 | 1.35 | 1.01 | 15.3 |
| Slovakia | 0.82 | 0.99 | 0.88 | 9.7 |
| Finland | 1.99 | 2.07 | 1.71 | 33.4 |
| Sweden | 2.03 | 2.09 | 1.47 | 43.4 |
| UK | 0.81 | 1.02 | 0.77 | 17.8 |
| Croatia | : | 0.82 | 0.78 | : |
| FYR Macedonia | : | : | : | : |
| Turkey | 1.17 | : | 0.91 | : |
| Iceland | 1.08 | 1.41 | 1.08 | : |
| Norway | 1.85 | 2.43 | 1.42 | 26.4 |
| United States | 1.48 | 1.32 | 0.54 | : |
| Japan | 0.55 | 0.65 | 1.05 | : |

Source: Eurostat (UOE data collection). Spending on the tertiary level includes R&D spending at universities.

Additional notes:

Direct public expenditure does not include transfers to private entities. If public and private spending are added up, it is preferable to use direct public expenditure (instead of total expenditure) to avoid double-counting.

For more country specific notes see: http://epp.eurostat.ec.europa.eu/portal/page?_pageid=0,1136184,0_45572595&_dad=portal&_schema=PORTAL

Public investment accounts for more than 85% of the amount spent on tertiary education institutions in Europe. Cyprus and Latvia are the two EU-27 countries with the lowest share of public funding: up to 60% of the amount invested in higher education institutions there comes from private sources. Conversely, in Denmark, Greece, Malta and Finland higher education institutions are almost entirely funded by public resources.

Table 4.4: Private and total expenditure on tertiary education as a percentage of GDP

| Country | Private payments to educational institutions | Household payments | Total private | Total private plus direct public |
|----------------|--|--------------------|---------------|----------------------------------|
| | 2004 | 2004 | 2004 | 2004 |
| EU-27 | 0.23 | 0.11 | 0.35 | 1.30 |
| Belgium | 0.12 | 0.17 | 0.28 | 1.37 |
| Bulgaria | 0.51 | 0.26 | 0.77 | 1.49 |
| Czech Republic | 0.16 | 0.11 | 0.26 | 1.15 |
| Denmark | 0.06 | 0.76 | 0.82 | 2.57 |
| Germany | 0.15 | 0.05 | 0.19 | 1.14 |
| Estonia | : | : | : | : |
| Ireland | 0.20 | : | : | 0.94 |
| Greece | 0.03 | 0.05 | 0.08 | 1.34 |
| Spain | 0.29 | : | : | 1.19 |
| France | 0.21 | 0.08 | 0.29 | 1.41 |
| Italy | 0.28 | 0.14 | 0.42 | 1.07 |
| Cyprus | 1.19 | 0.14 | 1.33 | 2.42 |
| Latvia | 0.67 | 0.40 | 1.07 | 1.65 |
| Lithuania | 0.46 | : | : | 1.38 |
| Luxembourg | : | : | : | : |
| Hungary | 0.23 | : | : | 1.09 |
| Malta | 0.02 | : | : | 0.25 |
| Netherlands | 0.29 | 0.07 | 0.35 | 1.33 |
| Austria | 0.08 | : | : | 1.22 |
| Poland | 0.42 | 0.06 | 0.48 | 1.61 |
| Portugal | 0.13 | : | : | 0.92 |
| Romania | : | : | : | : |
| Slovenia | 0.33 | : | : | 1.34 |
| Slovakia | 0.20 | 0.27 | 0.48 | 1.08 |
| Finland | 0.07 | : | : | 1.78 |
| Sweden | 0.19 | : | : | 1.66 |
| UK | 0.33 | 0.17 | 0.50 | 1.27 |
| Croatia | : | : | : | : |
| FYR Macedonia | : | : | : | : |
| Turkey | 0.10 | : | : | : |
| Iceland | 0.11 | : | : | 1.19 |
| Norway | : | : | : | : |
| United States | 1.91 | : | : | 2.45 |
| Japan | 0.76 | 0.04 | 0.80 | 1.85 |

Source: Eurostat (UOE)

Additional notes:

ISCED 5-6: tertiary education.

Direct public expenditure does not include transfers to private entities. If public and private spending are added up, it is preferable to use direct public expenditure (instead of total expenditure) to avoid double-counting. Data for Poland combine ISCED levels 1 and 2 and ISCED levels 3 and 4.

For more country specific notes see: http://epp.eurostat.ec.europa.eu/portal/page?_pageid=0,1136184,0_45572595&_dad=portal&_schema=PORTAL

Member States show great differences in the share of public spending on higher education going to research and development. Those Member States

that show high overall levels of R&D spending show also high shares of R&D in investment on higher education. The large Member States and the Nordic countries often show R&D shares of above 30%.

While public investment in tertiary-level education in EU-27 is only slightly below the level in the USA it is nearly twice as high as in Japan. However, private investment in higher education is much higher in both the USA and Japan. As a result, total investment on higher education institutions in Europe (for all activities, including both education and research) is far below the level in the United States (245%).

4.3 Graduates in higher education

The emerging knowledge based society requires a high supply of highly skilled people. High private returns to tertiary education evidenced by high wage levels and low graduate unemployment rates for tertiary graduates as a whole show that there is still a strong demand for tertiary graduates (especially in the field of science and engineering, but also in other fields like languages and economics) in the economy.

It is thus not surprising that **higher education graduates** has been identified by the Council Conclusions of May 2007 as a field to be covered by core indicators for measuring progress in education and training.

Whilst analysing available Eurostat statistics on graduates, it should be noted that the total number of graduates and the growth rates double count graduates at various degree levels and also include the impact of the introduction of short-study cycles (if only first-degree graduates were considered the compound growth rate for 2000-2006 would be a few percentage points lower). Double-counting of graduates has already been a problem before the introduction of Bologna in some countries because of the specific features of the educational system. With Bologna double counting will be more systematic and statistics become more comparable. Since both first, second and third degrees are included (the second degrees currently account for about 20% of graduates, new PhDs for 2%), the data on graduates cover the total number of graduates during the year concerned, not the number of first-time graduates.

General student population trends

The student-age population has declined slightly in the recent past (-1.4% between 2000 and 2006),

with large differences in trends between Member States. In 2006 about 32 million people in the EU (49% female and 51% male) were between 20 and 24 years old, the typical tertiary student age bracket.

Table 4.5: Tertiary students (2000-2006)

| | Number of tertiary students (in 1000) | | | Growth per year |
|----------------|--|--------------|--------------|--------------------|
| | 2000 | 2005 | 2006 | 2000-06 |
| EU-27 | 15920 | 18530 | 18783 | 2.8 |
| Belgium | 356 | 390 | 394 | 1.7 |
| Bulgaria | 261 | 238 | 244 | -1.2 |
| Czech Republic | 254 | 336 | 337 | 4.9 |
| Denmark | 189 | 232 | 229 | 3.2 |
| Germany | 2055 | 2269 | 2290 | 1.8 |
| Estonia | 54 | 68 | 68 | 4.1 |
| Ireland | 161 | 187 | 186 | 2.5 |
| Greece | 422 | 647 | 653 | 7.5 |
| Spain | 1829 | 1809 | 1789 | -0.4 |
| France | 2015 | 2187 | 2201 | 1.5 |
| Italy | 1770 | 2015 | 2029 | 2.3 |
| Cyprus | 10 | 20 | 21 | 12.1 |
| Latvia | 91 | 131 | 131 | 6.2 |
| Lithuania | 122 | 195 | 199 | 8.5 |
| Luxembourg | 2 | : | 3 | 2.0 |
| Hungary | 307 | 436 | 439 | 6.1 |
| Malta | 6 | 9 | 9 | 8.3 |
| Netherlands | 488 | 565 | 580 | 2.9 |
| Austria | 261 | 244 | 253 | -0.5 |
| Poland | 1580 | 2118 | 2146 | 5.2 |
| Portugal | 374 | 381 | 367 | -0.3 |
| Romania | 453 | 739 | 835 | 10.7 |
| Slovenia | 84 | 112 | 115 | 5.4 |
| Slovakia | 136 | 181 | 198 | 6.5 |
| Finland | 270 | 306 | 309 | 2.3 |
| Sweden | 347 | 427 | 423 | 3.3 |
| United Kingdom | 2024 | 2288 | 2336 | 2.5 |
| Croatia | : | 135 | 137 | : |
| FYR Macedonia | 37 | 49 | 48 | : |
| Turkey | 1015 | 2106 | 2343 | 15.0 |
| Iceland | 10 | 15 | 16 | 8.3 |
| Liechtenstein | 0.5 | 0.5 | 0.6 | : |
| Norway | 191 | 214 | 215 | 2.0 |

Source: Eurostat (UOE)

Number of students = total number of full-time and part-time students. DE, SI: data exclude ISCED level 6. 2000: RO: Data exclude ISCED level 6; MK: Data exclude ISCED level 5A second degrees and ISCED level 6; BE: Data exclude independent private institutions and German-speaking community; CY, LU, LI: most students study abroad and are therefore not included. MT, UK: growth for 2000-2005

Many Member States reported an increase over this period, but southern European countries (where birth rates dropped in the 1980s) and some of the new Member States recorded a decrease.

Southern European countries and many new Member States (where the number of births dropped sharply after 1989) will see a further decline in their student-age population up to 2010. Despite the slight decline in the number of young people in the EU, the increase in the tertiary education participation rate and in the number of students from outside Europe studying in the EU (currently nearly 0.8 million) led to growth of 17.8% in the number of tertiary students in the EU

over the period 2000-2006 or, on average, 2.8% per year. In 2006 the number of students increased by 1.2%, less than in previous years, to 18.7 million (of whom 55% were female). In 2005 there were 4.1 million new entrants to tertiary studies in the EU, compared with 3.7 million in 2000 and with a one year cohort in the student-age bracket of about 6.4 million.

4.3.1 Higher education graduates: Core indicators

The number of tertiary graduates has increased in the EU 27 since 2000 by 37% or 5.4% per year and hence nearly twice as fast as the general student population.

Table 4.6: Tertiary graduates (2000-2006)

| | Number of tertiary graduates (in 1000) | | | Growth per year |
|----------------|---|---------------|---------------|--------------------|
| | 2000 | 2005 | 2006 | 2000-06 |
| EU-27 | 2873.4 | 3753.5 | 3938.5 | 5.4 |
| Belgium | 68.2 | 79.6 | 81.5 | 3.0 |
| Bulgaria | 46.7 | 46.0 | 45.4 | -0.5 |
| Czech Republic | 38.4 | 55.1 | 69.3 | 10.3 |
| Denmark | 39.0 | 49.7 | 47.5 | 3.3 |
| Germany | 302.1 | 343.9 | 415.3 | 5.4 |
| Estonia | 7.7 | 11.8 | 11.5 | 6.9 |
| Ireland | 42.0 | 59.7 | 59.2 | 5.9 |
| Greece | : | 59.9 | : | : |
| Spain | 260.2 | 288.2 | 286.0 | 1.6 |
| France | 508.2 | 664.7 | 643.6 | 4.0 |
| Italy | 202.3 | 297.6 | 279.5 | 6.6 |
| Cyprus | 2.8 | 3.7 | 3.9 | 5.7 |
| Latvia | 15.3 | 26.1 | 26.4 | 9.5 |
| Lithuania | 25.2 | 41.5 | 43.3 | 9.4 |
| Luxembourg | : | : | : | : |
| Hungary | 59.9 | 73.7 | 69.8 | 2.6 |
| Malta | 2.0 | 2.7 | 2.7 | 6.2 |
| Netherlands | 76.9 | 106.7 | 117.4 | 16.5 |
| Austria | 25.0 | 32.9 | 34.8 | 5.7 |
| Poland | 350.0 | 501.4 | 504.1 | 6.3 |
| Portugal | 54.3 | 70.0 | 71.8 | 4.8 |
| Romania | 67.9 | 156.6 | 174.8 | 17.1 |
| Slovenia | 11.5 | 15.8 | 17.1 | 6.8 |
| Slovakia | 22.7 | 36.3 | 40.2 | 10.0 |
| Finland | 36.1 | 39.3 | 40.6 | 2.0 |
| Sweden | 42.4 | 57.6 | 60.8 | 6.2 |
| United Kingdom | 504.1 | 633.0 | 640.2 | 3.9 |
| Croatia | : | 19.5 | 20.7 | : |
| FYR Macedonia | 3.9 | 5.7 | 6.5 | 8.9 |
| Turkey | 190.1 | 271.8 | 373.4 | 11.9 |
| Iceland | 1.8 | 2.9 | 3.4 | 11.2 |
| Liechtenstein | : | 0.13 | 0.13 | : |
| Norway | 29.9 | 31.9 | 33.5 | 1.9 |

Source: Eurostat (UOE)

One of the reasons for this is the Bologna Process with a higher share of students taking second degrees. In the field of MST for example, the number of second degree graduates from academic programmes (ISCED 5 A) has more than doubled since 2000 to reach about 133 000 in 2005, while the number of first degrees in this period grew only by 16%.

As regards the overall number of graduates growth was particularly strong (more than 10% per year) in the Czech Republic, The Netherlands, Romania and Slovakia.

The number of tertiary graduates per 1000 young people aged 20-29 has increased in the EU by about 30% in the period 2000-2005 to reach about 56 today. Countries with a high number of graduates per 1000 young people (> 80) include Ireland, Lithuania and the UK.

Table 4.7: Tertiary graduates in third countries

| | Students (1000) | | Graduates (1000) | | Growth per year, % |
|-------------|-----------------|--------|------------------|--------|--------------------|
| | 2000 | 2005 | 2000 | 2005 | |
| Belarus | 460 | 529 | 77.6 | 102.0 | 5.6 |
| Moldova | : | 119 | 16.9 | 16.1 | -1.0 |
| Russia | 8020 | 9 020 | 1190.6 | 1813.3 | 8.8 |
| Ukraine | 2130 | 2 605 | 424.6 | 470.8 | 2.1 |
| Armenia | : | 87 | 11.4 | 12.0 | 1.0 |
| Azerbaijan | : | 129 | 24.8 | 31.6 | 5.0 |
| Georgia | : | 174 | 21.4 | 24.0 | 2.3 |
| Algeria | : | 717 | : | 91.8 | : |
| Morocco | 276 | 367 | 27.3 | 48.2 | 12.0 |
| Tunisia | 180 | 315 | 19.6 | 28.6 | 7.9 |
| Libya | 290 | 375 | : | : | : |
| Egypt | : | 2 495 | 342.3 | : | : |
| Lebanon | : | 166 | 14.4 | 25.7 | 12.3 |
| Palest. | : | 127 | 11.6 | 12.6 | 1.7 |
| Israel | 256 | 311 | 62.4 | 76.7 | 4.2 |
| Australia | 845 | 1 015 | 168.9 | 250.5 | 8.2 |
| Canada | 1 221 | 1 327 | 225.1 | : | : |
| Korea | 2 838 | 3 210 | 493.0 | 608.0 | 4.3 |
| India | 9 404 | 11 777 | : | : | : |
| China | 7 364 | 21 336 | 1776 | 2400 | 6.2 |
| Mexico | 1 963 | 2385 | 299.1 | 380.4 | 4.9 |
| Brazil | 2 781 | 4 275 | 348.0 | 564.0 | 10.1 |
| USA | 13202 | 17488 | 2151.0 | 2639.0 | 3.5 |
| Japan | 3982 | 4085 | 1081.4 | 1067.9 | -0.2 |
| EU-27 | 15 920 | 18 530 | 2873.4 | 3753.5 | 5.5 |
| World (Mio) | 103 | 137.9 | : | : | : |

Data source: Eurostat, UNESCO, data on graduates: China: data for 2006 instead 2005 and ISCED 5A only, Ukraine, Armenia: 2001 instead 2000, Egypt 2002 instead of 2000, Canada: 1999 instead 2000, Algeria 2004 instead 2005

The comparison with other countries shows an even stronger growth in graduates in emerging economies like Russia, China and Brazil. This is partly a result of a strong growth in the tertiary student population.

The world tertiary student population has grown by a third since 2000 to reach 138 million in 2005. Since 1950 (6.5 million, of which 40% in the US, 1900: only 0.5 million world wide, 1960: 12.1 million, 1970: 28.1 million, 1980: 51 million, 1990: 68.6 million) it has grown by a factor of 20. Growth has been particularly strong in China, where the number of tertiary students has tripled since 2000 (in 1950 China had only 120 000) to reach 23.4 million in 2006. China now has more

students than the EU or North America and the four BRIC countries (Brazil, Russia, China, India) have more than the EU, North America and Japan combined. Today developing and emerging minorities represent the majority of tertiary students worldwide.

Table 4.8: Tertiary graduates by ISCED level, 2000-05

| | Number of tertiary graduates Per 1000 population aged 20-29/25-34 | | | |
|----------------|---|------------|----------------------------------|------------|
| | ISCED 5 and 6 (/population 20-29) | | ISCED 6 only (/population 25-34) | |
| | 2000 | 2005 | 2000 | 2005 |
| EU-27 | 43e | 56e | 1.1 | 1.3 |
| Belgium | 51.4 | 61.4 | 0.8 | 1.2 |
| Bulgaria | 38.1 | 40.9 | 0.3 | 0.5 |
| Czech Republic | 22.4 | 37.0 | 0.6 | 1.1 |
| Denmark | 54.0 | 77.9 | 1.0 | 1.3 |
| Germany | 31.0 | 35.7 | 2.1 | 2.6 |
| Estonia | 34.0 | 60.0 | 0.6 | 0.7 |
| Ireland | 70.4 | 86.9 | 0.9 | 1.2 |
| Greece | : | 37.1 | : | 0.7 |
| Spain | 39.5 | 43.8 | 0.9 | 0.9 |
| France | 64.3 | : | 1.2 | 1.2 |
| Italy | 24.8 | 41.6 | 0.4 | : |
| Cyprus | 28.6 | 30.9 | 0.1 | 0.0 |
| Latvia | 46.7 | 78.2 | 0.1 | 0.4 |
| Lithuania | 51.8 | 86.7 | 0.9 | 0.7 |
| Luxembourg | 12.1 | : | : | : |
| Hungary | 37.5 | 48.1 | 0.5 | 0.7 |
| Malta | 36.9 | 45.3 | 0.1 | 0.1 |
| Netherlands | 36.1 | 54.4 | 1.0 | 1.3 |
| Austria | 24.1 | 31.9 | 1.4 | 2.0 |
| Poland | 58.1 | 77.8 | : | 1.0 |
| Portugal | 30.5 | 45.1 | 1.6 | 2.5 |
| Romania | 19.4 | 45.8 | : | 1.1 |
| Slovenia | 39.0 | 53.6 | 1.0 | 1.2 |
| Slovakia | 25.4 | 39.4 | 0.6 | 1.2 |
| Finland | 56.3 | 58.1 | 2.7 | 3.1 |
| Sweden | 38.0 | 53.9 | 2.5 | 2.4 |
| United Kingdom | 66.4 | 83.5 | 1.3 | 2.0 |
| Croatia | : | 31.6 | : | 0.6 |
| FYR Macedonia | 12.2 | 17.7 | 0.1 | 0.3 |
| Turkey | 14.7 | 20.3 | 0.2 | 0.2 |
| Iceland | 42.7 | 68.4 | 0.0 | 0.3 |
| Liechtenstein | : | 30.0 | : | 0.8 |
| Norway | 48.9 | 56.6 | 1.0 | 1.3 |

Data source: Eurostat (UOE)

For more country specific notes see:

http://epp.eurostat.ec.europa.eu/portal/page?_pageid=0.1136184.0.45572595&_dad=portal&_schema=PORTAL

However, the EU in 2005 still had over 1 million more tertiary graduates than either the US or China. Given the strong growth in student numbers China might, however, overtake the EU in the coming years to become world's leading producer of tertiary graduates (China already leads in terms of MST graduates). Russia, Japan and India are other countries that produce more than 1 million graduates per year. Unfortunately for India precise data are lacking, but it is believed to produce around 2 million tertiary graduates per year.

The number of tertiary graduates is also growing quickly in North African and Middle East countries. Though in absolute terms, number in these countries are still small. Growth is less strong in neighbouring countries to the east of the EU (except Russia), partly a result of demographic trends with a shrinking cohort size and of emigration.

Table 4.9: Tertiary 5A graduates 2005 by first and second degree

| | Number of tertiary graduates (in 1000) | | Growth per year 2000-2005, 5A | |
|----------------|--|------------------|-------------------------------|---------------|
| | 5A First degree | 5A Second degree | First degree | Second degree |
| EU-27 | 2209.2 | 834.4 | 4.3 | 12.3 |
| Belgium | 24.7 | 13.4 | 1.8 | 9.8 |
| Bulgaria | 25.5 | 16.0 | 2.9 | -3.5 |
| Czech Republic | 38.4 | 5.3 | 8.5 | 9.2 |
| Denmark | 31.2 | 10.0 | 5.5 | 2.8 |
| Germany | 197.8 | 16.4 | 2.1 | : |
| Estonia | 5.8 | 1.5 | 13.2 | 17.1 |
| Ireland | 26.5 | 12.2 | 6.4 | 10.3 |
| Greece | 35.2 | 5.5 | : | : |
| Spain | 195.9 | : | -1.1 | : |
| France | 273.5 | 180.2 | -1.8 | 25.9 |
| Italy | 291.3 | : | 12.8 | : |
| Cyprus | 0.67 | 0.13 | 7.6 | 27.9 |
| Latvia | 15.0 | 6.8 | 2.2 | : |
| Lithuania | 19.2 | 8.6 | 13.3 | 6.1 |
| Luxembourg | : | : | : | : |
| Hungary | 57.2 | 10.3 | 4.0 | -2.1 |
| Malta | 1.5 | 0.48 | 5.9 | -1.4 |
| Netherlands | 90.0 | 13.8 | 5.2 | 22.8 |
| Austria | 21.9 | 0.63 | 7.7 | 37.7 |
| Poland | 287.6 | 202.2 | 6.7 | 8.2 |
| Portugal | 50.3 | 2.4 | 1.8 | : |
| Romania | 97.6 | 44.2 | 9.7 | : |
| Slovenia | 6.2 | 0.9 | 4.7 | 9.4 |
| Slovakia | 27.1 | 6.3 | 6.1 | : |
| Finland | 36.5 | 0.66 | 5.2 | 1.2 |
| Sweden | 46.0 | 3.5 | 6.2 | 36.2 |
| United Kingdom | 306.4 | 176.0 | 2.6 | 9.5 |
| Croatia | 9.7 | 0.97 | : | : |
| FYR Macedonia | 5.1 | 0.2 | 9.3 | 12.3 |
| Turkey | 150.4 | 27.6 | 4.8 | 22.0 |
| Iceland | 2.5 | 0.29 | 11.2 | 23.6 |
| Liechtenstein | 0.13 | 0 | : | : |
| Norway | 25.0 | 5.1 | 2.2 | 10.7 |

Source: Eurostat (UOE)
For more country specific notes see:
http://epp.eurostat.ec.europa.eu/portal/page?_pageid=0_1136184_0_45572595&_dad=portal&_schema=PORTAL

The number of graduates has also expanded in Australia, where more and more mobile students from Asia study and graduate (in 2005 390 000 Chinese students studied abroad).

The number of ISCED 6 graduates per 1000 young people aged 25-34 is relatively high (> 2.0) in Germany, Portugal, Finland, Sweden, Austria and the UK. Breaking down data on the number of ISCED 5A graduates by first and second degree gives an indication on the impact of the move to the Bologna bachelor/master degree structure.

ISCED 5A second degrees, a typical result of the move to the BA/MA structure increased by over 78% since 2000 compared to only 23% for first degrees. Countries with a strong growth of ISCED 5A second degrees include Austria, Sweden, the Netherlands, France and Cyprus. Countries where the first degree of ISCED 5A showed a strong growth in the same period include Italy, Estonia and Lithuania.

4.3.2 Graduates in mathematics, science and technology – EU Benchmark for 2010.

European benchmark (European Council, 2003a)
The total number of graduates in mathematics, science and technology in the European Union should increase by at least 15% by 2010 while at the same time the level of gender imbalance should decrease.³⁷

Science and technology are vital to the knowledge-based and increasingly digital economy. The issue of increasing the intake to these studies, particularly to technological fields, has been emphasised on numerous occasions. The Council underlined the importance of this goal in May 2003 when it adopted the benchmark of increasing the number of mathematics, science and technology graduates by at least 15% by 2010. Furthermore, it underlined that education of an adequate supply of science specialists was all the more important in the light of the goal set by the Barcelona European Council of increasing overall spending on research and development (R&D) to 3% of GDP by 2010 (European Commission, 2003b). The European Council declared that “special attention must be given to ways and means of encouraging young people, especially women, in scientific and technical studies as well as ensuring the long-term recruitment of qualified teachers in these fields.” (European Council, 2001b). Studies have been launched by the Commission to identify good practice.³⁸

The number of tertiary MST students has increased by more than 29% since 2000. Growth has been particularly strong in Malta, Poland, Lithuania, Romania and Cyprus.

For some countries, however, the number of MST students stagnated or even declined. The latter was the case in Austria (due to introduction of tuition fees in 2001/02 and breaks in series), Ireland and Bulgaria. In Japan the number of MST

students declined by 1.6% in 2006, in the US it increased by 1.1%. In the EU MST students accounted in 2006 for nearly a fourth of the total student population.

Table 4.10: Tertiary MST students (2000-2006)

| | Number of tertiary MST students (in 1000) | | | Growth per year |
|----------------|---|-------------|-------------|-----------------|
| | 2000 | 2005 | 2006 | 2000-06 |
| EU-27 | 4000e | 4595 | 4514 | 2.5 |
| Belgium | 74.6 | 64.5 | 68.8 | -1.3 |
| Bulgaria | 64.5 | 63.3 | 63.2 | -0.4 |
| Czech Republic | 74.5 | 98.1 | 77.4 | 0.6 |
| Denmark | 38.3 | 43.0 | 41.5 | 1.4 |
| Germany | 587.2 | 696.9 | 708.2 | 3.2 |
| Estonia | 11.4 | 15.3 | 15.3 | 5.0 |
| Ireland | 45.3 | 42.1 | 41.0 | -1.6 |
| Greece | : | 208.0 | 93.6 | : |
| Spain | 525.1 | 540.0 | 522.5 | -0.1 |
| France | : | : | 522.5 | : |
| Italy | 433.2 | 476.1 | 475.8 | 1.6 |
| Cyprus | 1.8 | 3.6 | 3.9 | 13.4 |
| Latvia | 15.1 | 19.2 | 20.0 | 4.8 |
| Lithuania | 33.4 | 48.6 | 48.0 | 6.2 |
| Luxembourg | 0.4 | : | 0.6 | 6.8 |
| Hungary | 65.7 | 77.7 | 77.6 | 2.8 |
| Malta | 0.7 | 1.3 | 1.4 | 12.3 |
| Netherlands | 80.8 | 87.3 | 85.3 | 0.9 |
| Austria | 73.9 | 59.0 | 61.2 | -3.1 |
| Poland | 285.2 | 417.2 | 477.3 | 9.0 |
| Portugal | 102.2 | 112.1 | 107.4 | 0.8 |
| Romania | 124.2 | 184.9 | 191.3 | 7.5 |
| Slovenia | 19.7 | 23.8 | 24.2 | 3.5 |
| Slovakia | 38.1 | 47.9 | 50.3 | 4.7 |
| Finland | 97.9 | 116.3 | 115.4 | 2.8 |
| Sweden | 106.0 | 110.6 | 109.8 | 0.6 |
| United Kingdom | 477.4 | 509.8 | 510.5 | 1.3 |
| Croatia | : | 32.2 | 32.4 | : |
| FYR Macedonia | 12.0 | 12.6 | 12.4 | 0.5 |
| Turkey | 301.0 | 450.6 | 488.2 | 8.4 |
| Iceland | 1.7 | 2.3 | 2.4 | 6.1 |
| Liechtenstein | : | 0.1 | 0.2 | : |
| Norway | 26.9 | 34.9 | 33.5 | 3.7 |

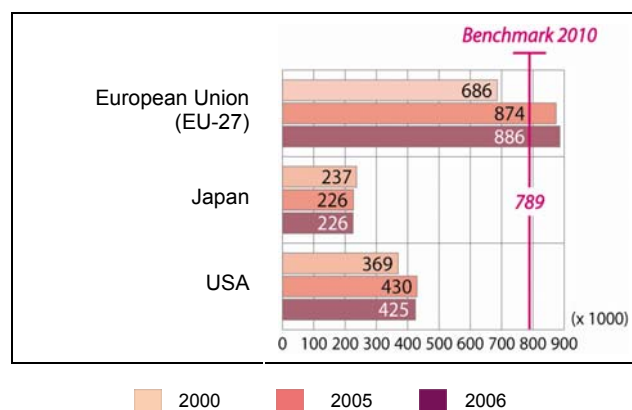
Data source: Eurostat (UOE)

Additional notes:

Number of students means the total number of full-time and part-time students Austria: Break in time series in 2003; before 2003 Austria reported students studying more than one field in each of the fields in which they were enrolled, leading to double-counting; since 2003 students have been allocated to only one field. The EU total for 2003 includes Greece (with 2002 data).

As a result of the growth rate of 4.4% per year since 2000, EU-27 had already achieved the growth aspect of the benchmark before 2005. After strong growth in previous years, the increase decelerated somewhat in 2006, the total reaching about 886 000 graduates. Taking 2000 (i.e. the 1999/2000 academic year) as the base year (when there were 686 000 graduates), the target growth of 15% implies an absolute increase of some 100 000 graduates by 2010 or of about 10 000 graduates per year. However, up to now much higher growth rates and an increase of 200 000 MST graduates have been achieved.

Chart 4.1: Total number of tertiary (ISCED level 5A, 5B and 6) graduates in mathematics, science and technology, 2000-2006

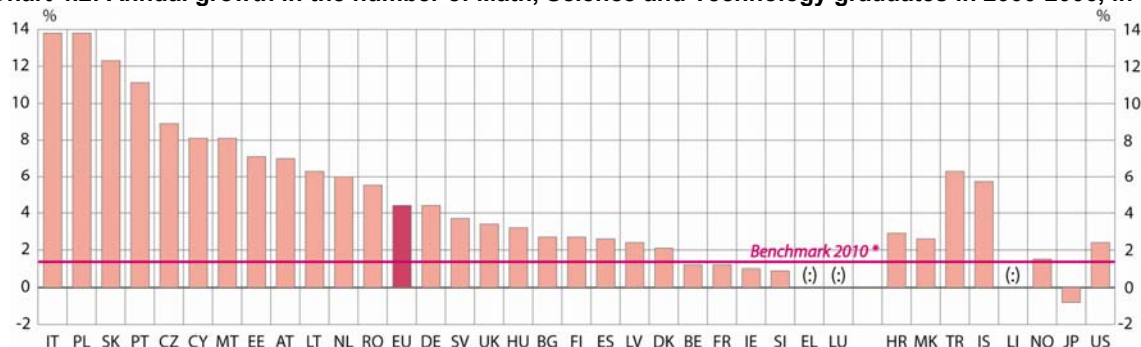


Data source: Eurostat (UOE)

In 2006 Cyprus and Poland showed the strongest growth in the numbers of MST graduates (>20%), followed by the Czech Republic, Austria, Germany and Hungary. Despite the general positive trend, Denmark, Ireland, Estonia, France and Latvia showed a considerable decrease (-5% and more) in numbers in 2006. However, the number of MST graduates is rising particularly fast in emerging economies like China, where it has more than quadrupled since 2000 to nearly 2 million in 2006 (Chinese figures also include ISCED 4 and hence are somewhat overstated). The availability of a large pool of MST graduates in low-wage countries is having a growing impact on high-technology industries worldwide and increasingly affecting the comparative advantage (relative abundance of highly skilled workers) of developed countries.

The average number of graduates in mathematics, science and technology (ISCED levels 5A, 5B and 6) in the EU was 10.2 per 1000 inhabitants aged 20-29 in 2000 and 13.0 in 2006. Related to a one-year age cohort, this implies that about 13% of young people take a degree in MST (the real figure is about 15% lower because of double-counting of graduates at various levels). Relative growth was slightly stronger than the absolute growth in the number of graduates, because the size of the population aged 20-29 declined slightly over this period. Ireland, France, Lithuania, Finland, Sweden and the UK showed a relatively high number of MST graduates, with over 15 per 1000, whereas Hungary and Greece recorded only 5.8 per 1000 (Malta and Cyprus have only limited university systems).

Chart 4.2: Annual growth in the number of Math, Science and Technology graduates in 2000-2006, in %



Date source : Eurostat (UOE)

* Benchmark 2010 expressed as average annual growth (15% in the period 2000-2010 = 1.4 % per year)

Table 4.12: Graduates in MST

| | Number of graduates (in 1000) | | | Per 1000 inhabitants aged 20-29 | Growth in graduates per year | Growth in graduates |
|----------------|----------------------------------|-------|-------|---------------------------------------|------------------------------------|------------------------|
| | 2000 | 2005 | 2006 | 2006 | 2000-2006 | 2006 |
| EU-27 | 686.2 | 873.5 | 886.1 | 13.0 | 4.4 | 1.4 |
| Belgium | 12.9 | 14.1 | 13.8 | 10.6 | 1.2 | -2.0 |
| Bulgaria | 8.1 | 9.7 | 9.5 | 8.5 | 2.7 | -2.4 |
| Czech Republic | 9.4 | 13.2 | 15.6 | 10.0 | 8.9 | 18.8 |
| Denmark | 8.5 | 9.4 | 8.6 | 13.8 | 2.1 | -8.1 |
| Germany | 80.0 | 93.5 | 103.7 | 10.7 | 4.4 | 11.0 |
| Estonia | 1.5 | 2.4 | 2.2 | 11.2 | 7.1 | -6.3 |
| Ireland | 14.5 | 16.8 | 15.3 | 21.4 | 1.0 | -8.8 |
| Greece | : | 16.3 | : | 10.1 (05) | : | : |
| Spain | 65.1 | 78.5 | 75.9 | 11.5 | 2.6 | -3.3 |
| France | 154.8 | 179.0 | 166.3 | 20.7 | 1.2 | -7.1 |
| Italy | 46.6 | 88.9 | : | 12.4 (05) | 13.8 | : |
| Cyprus | 0.3 | 0.4 | 0.5 | 4.3 | 8.1 | 27.0 |
| Latvia | 2.4 | 3.3 | 3.0 | 8.9 | 2.4 | -8.0 |
| Lithuania | 6.6 | 9.0 | 9.5 | 19.5 | 6.3 | 4.7 |
| Luxembourg | 0.1 | : | : | : | : | : |
| Hungary | 7.2 | 7.9 | 8.7 | 5.8 | 3.2 | 10.8 |
| Malta | 0.2 | 0.2 | 0.3 | 5.0 | 8.1 | : |
| Netherlands | 12.5 | 16.9 | 17.6 | 9.0 | 6.0 | 4.3 |
| Austria | 7.5 | 10.1 | 11.3 | 10.8 | 7.0 | 11.7 |
| Poland | 39.2 | 70.8 | 85.4 | 13.3 | 13.8 | 20.5 |
| Portugal | 10.1 | 18.7 | 19.0 | 12.6 | 11.1 | 1.7 |
| Romania | 17.1 | 35.3 | 35.6 | 10.5 | 5.5 | 0.8 |
| Slovenia | 2.6 | 2.9 | 2.8 | 9.5 | 0.9 | -4.4 |
| Slovakia | 4.7 | 9.4 | 9.5 | 10.3 | 12.3 | 0.9 |
| Finland | 10.1 | 11.8 | 11.9 | 17.9 | 2.7 | 1.0 |
| Sweden | 13.0 | 15.3 | 16.1 | 15.1 | 3.7 | 5.3 |
| United Kingdom | 140.6 | 139.8 | 138.7 | 17.8 | 3.4 | -0.8 |
| Croatia | : | 3.5 | 3.7 | 6.0 | 2.9 | 5.6 |
| FYR Macedonia | 1.2 | 1.3 | 1.4 | 4.3 | 2.6 | 7.3 |
| Turkey | 57.1 | 76.5 | 82.4 | 6.2 | 6.3 | 7.7 |
| Iceland | 0.4 | 0.4 | 0.5 | 11.3 | 5.7 | 14.0 |
| Liechtenstein | : | 0.1 | 0.05 | 10.4 | : | -17.9 |
| Norway | 4.8 | 5.1 | 5.3 | 9.3 | 1.5 | 4.0 |
| United States | 369.4 | 429.7 | 424.8 | 10.3 | 2.4 | -1.1 |
| Japan | 236.7 | 226.4 | 225.8 | 14.4 | -0.8 | -0.2 |

Source: DG EAC, calculations based on Eurostat (UOE) data

Average annual growth calculated on the basis of years without breaks and for which data were available.

The EU total for 2006 includes an estimate for Greece and Italy (same figure used as in year before), therefore the totals might not correspond to those in the tables following this one.

Additional notes:

BE: Data for the Flemish community exclude second qualifications in non-university tertiary education; the data also exclude independent private institutions (although the number is small) and the German-speaking community.

EL: No data available for 2000-2003. EU total includes an estimate for Greece for this period. Number of graduates per 1000 young people relates to 2005.

IT: Growth was calculated for the period 2000-2005. The number of graduates per 1000 young people relates to 2005.

CY: Data exclude tertiary students graduating abroad. Over half of the total number of Cypriot tertiary students study abroad. The fields of study available in Cyprus are limited.

LU: Luxembourg had in the reference period no complete university system, since most MST students study and graduate abroad.

HU: 2004: Changes in data collection on graduates by fields led to breaks in the time series.; AT: 2000: ISCED level 5B refers to the previous year.

PL: Data for 2000 exclude advanced research programmes (ISCED level 6).

RO: 2000 data exclude second qualifications and advanced research programmes (ISCED level 6). There is therefore a break in the series in 2004.

SE: 2004: Changes in data collection on graduates by fields led to breaks in the time series.

UK: National data used for 2000; LI: 2003-2004 data exclude tertiary students graduating abroad. The fields of study available in Liechtenstein are limited.

Since the number of MST students increased up to 2006, the number of graduates will probably continue to increase in the next few years. However, long-term demographic trends, especially the strong decline in birth rates in the new Member States after 1989, might also pose the risk of stagnation or decline in the number of MST students and graduates after 2010, despite the increase in higher education participation rates.

In 2006 growth in the number of MST graduates already slowed to 1.4%, while growth in student numbers decelerated to 0.8%. A further deceleration in coming years is likely.

Growth in graduates by field.

Growth since 2000 has been very strong in computing (nearly 80%), while engineering, manufacturing and architecture showed medium level growth rates. Growth was slow in mathematics and statistics and in life sciences (Table 4.13). In physical science there has been even a slight decline in the number of graduates since 2000.

Table 4.13: Growth in the number of graduates by field (EU-27)

| ISCED fields | Graduates (in 1000) | | Growth (in %) |
|------------------------------|---------------------|-------|---------------|
| | 2000 | 2006 | 2000-06 |
| Life sciences (42) | 91.6 | 92.5 | 1.0 |
| Physical science (44) | 86.9 | 82.2 | -5.4 |
| Mathematics, statistics (46) | 37.5 | 43.9 | 17.2 |
| Computing (48) | 83.9 | 151.0 | 79.9 |
| Engineering (52) | 264.4 | 301.7 | 14.1 |
| Manufacturing (54) | 32.0 | 46.1 | 44.1 |
| Architecture, building (58) | 88.8 | 111.9 | 26.0 |

Data source: Eurostat; in the case of physical science and computing, no data are available for Romania. Includes estimates for Greece for 2000 (see tables A4.1- A4.5 in the Annex)

However, it has to be taken into account that computing has also some of the elements taught in physical science and in mathematics. The low growth or decline in these fields can partly be attributed to a shift to informatics. There is also a trend to new interdisciplinary studies difficult to classify that impacts on the growth of certain fields.

Table 4.14 shows the growth in MST graduates by type of programme. The academic programmes requiring an ISCED level 5A second degree grew strongly between 2000 and 2006, partly a result of the Bologna process, while the number of new PhDs increased only moderately

In 2006 some 44 000 or about 5% of MST graduates in the EU were ISCED level 6 (PhD) graduates, compared with 20 600 in the USA (4.8%) and only 6 300 in Japan (2.8%). This was an increase of over 29% compared with 2000.

The increase in MST graduates has, however, not been reflected in sufficient employment of researchers in many Member States, as a by no means negligible share opt for a non-science and non-engineering career or for jobs in other countries (European Commission, 2005b, p. 12). It is hence important to create conditions conducive to a thriving research environment in Europe and to avoid a loss of European MST graduates to other sectors of the economy and other parts of the world.

Table 4.14: Growth in the number of MST graduates by type of programme

| ISCED field | Graduates (in 1000) | | Growth (in %) |
|--|---------------------|-------|---------------|
| | 2000 | 2006 | 2000-2006 |
| Academic programmes, all first degrees (5A) | 452.4 | 547.2 | 21.0 |
| Academic programmes, second degree (5A) | 56.8 | 138.1 | 143.4 |
| Occupation-oriented programmes, first qualification (5B) | 131.3 | 149.9 | 14.2 |
| Occupation-oriented programmes, second qualification (5B) | 2.1 | 0.4 | -81 |
| Second stage leading to an advanced research qualification (6) | 34.4 | 44.4 | 29.1 |

Source: Eurostat (UOE), Note: PHD/Doctorate in 2006 represented 94% of all ISCED 6 degrees

Despite the high number of new MST PhDs produced by the EU, the EU has fewer researchers on the labour market than the USA, both in absolute terms and as a proportion of the total labour force (1.30 million researchers in EU-27 in 2006 or 5.6 per 1000 labour force, compared with 1.39 million in the USA or 9.3 per 1000 labour force – European Commission, Forthcoming). This is partly a result of the comparatively high amount of financing available for research activities and higher education in the USA compared with the EU and partly of the less attractive career prospects (European Commission, 2004a) (in 1999 about 116 000 EU-born science and engineering (S&E) employees were working in the USA out of a total 3.5 million S&E employees) (European Commission, 2003c, p. 46). This seems to indicate a need for further efforts fully to tap the potential offered by the increasing numbers of MST graduates. Reaching the spring 2002 Barcelona European Council objective of spending 3% of GDP on research and development by 2010 would imply a significant increase in the resources for research and research posts and hence an increased need for researchers. In 2006 the EU countries spent on average only 1.84% of their GDP on R&D, compared to 3.2 % in Japan (2003) and 2.67% in the USA (2004).

Gender imbalance among graduates in MST

The share of female MST graduates shows the level of gender balance. Bulgaria and Estonia, have the highest share of female graduates (>40%) while the biggest increases (> 5 percentage points) since 2000 have been in Estonia, Cyprus, Hungary and Slovakia. At EU level the female share of MST graduates increased slightly, from 30.7 % in 2000 to 31.6% in 2006. Since there was little change in the share of female MST students over the period 2000-2006, no significant improvements in the gender balance in MST graduates (who will be drawn from these students) are likely in the next few years. However, the share of women amongst MST students is lower than amongst MST graduates, implying a lower dropout rate for women. The share of female MST students has hardly changed since 2000 (EU-27: 2000: 29.6%, 2006: 29.8%). There are considerable differences within countries between the shares of female MST students and of female MST graduates, implying differences in dropout rates between men and women and also between countries.

Table 4.15: Females as a proportion of all MST graduates

| | Females as a proportion of all MST graduates | | |
|----------------|--|-------------|-------------|
| | 2000 | 2005 | 2006 |
| EU-27 | 30.7 | 31.3 | 31.6 |
| Belgium | 25.0 | 27.3 | 26.5 |
| Bulgaria | 45.6 | 41.1 | 41.2 |
| Czech Republic | 27.0 | 27.4 | 26.5 |
| Denmark | 28.5 | 33.9 | 34.1 |
| Germany | 21.6 | 24.4 | 28.6 |
| Estonia | 35.7 | 43.5 | 42.9 |
| Ireland | 37.9 | 30.5 | 29.1 |
| Greece | : | 40.9 | : |
| Spain | 31.5 | 29.6 | 30.0 |
| France | 30.8 | 28.4 | 27.9 |
| Italy | 36.6 | 37.0 | 36.1 |
| Cyprus | 31.0 | 38.1 | 35.9 |
| Latvia | 31.4 | 32.8 | 32.4 |
| Lithuania | 35.9 | 35.2 | 31.6 |
| Luxembourg | : | : | : |
| Hungary | 22.6 | 30.0 | 27.9 |
| Malta | 26.3 | 30.1 | 25.9 |
| Netherlands | 17.6 | 20.3 | 18.4 |
| Austria | 19.9 | 23.3 | 24.5 |
| Poland | 35.9 | 36.3 | 39.2 |
| Portugal | 41.9 | 39.9 | 39.7 |
| Romania | 35.1 | 40.0 | 38.6 |
| Slovenia | 22.8 | 26.2 | 25.7 |
| Slovakia | 30.1 | 35.3 | 34.8 |
| Finland | 27.3 | 29.7 | 28.5 |
| Sweden | 32.1 | 33.8 | 34.4 |
| United Kingdom | 32.1 | 30.8 | 30.8 |
| Croatia | : | 32.7 | 35.3 |
| FYR Macedonia | 41.6 | 46.9 | 46.0 |
| Turkey | 31.1 | 28.5 | 29.8 |
| Iceland | 37.9 | 37.2 | : |
| Liechtenstein | : | 28.6 | 19.6 |
| Norway | 26.8 | 26.0 | 28.4 |
| United States | 31.8 | 31.1 | 31.3 |
| Japan | 12.9 | 14.7 | 14.6 |

Data source: Eurostat (UOE)

Gender imbalance is especially pronounced in engineering (18% female graduates) and computing (20%) and, to a lesser extent, in architecture and building (36%), whereas in mathematics and statistics there is gender balance since 2000. On the other hand, in the field of life sciences women clearly predominate (62%).

While males predominate in MST, it should be added that there is an imbalance in favour of women in the student population as a whole (in 2006, 55% of tertiary students in the EU were female, who thus outnumbered men by 1.9 million). This imbalance is even more pronounced among graduates – 56.7% of graduates in EU-27 were female in 2000 and their share increased further to 58.9% in 2006.³⁹ The high share of women in other fields shows that there is clear potential to increase the female share in MST too.

Table 4.16: Percentage of female graduates by field

| ISCED field | % female graduates | | Countries with the highest female graduates (2006) |
|--------------------------|--------------------|------|--|
| | 2000 | 2006 | Highest 2 |
| Life sciences | 61.2 | 62.1 | Cyprus 83.3 Latvia 79.0 |
| Physical science | 38.9 | 44.7 | Bulgaria 64.0 Poland 63.7 |
| Mathematics, statistics | 49.4 | 51.2 | Latvia 81.0 Poland 72.7 |
| Computing | 23.9 | 19.6 | Bulgaria 49.9 Finland 35.5 |
| Engineering | 15.6 | 18.3 | Romania 32.9 Bulgaria 32.2 |
| Manufacturing Processing | 40.7 | 46.2 | Denmark 86.7 Lithuania 79.9 |
| Architecture, building | 32.1 | 35.6 | Greece 49.6 Italy 45.4 |

Data source: Eurostat (UOE)

4.4 Mobility of higher education students

Student mobility contributes not only to personal development and fulfilment but also to enhancing competence in fields like languages and intercultural understanding and, hence, to employability on an increasingly international labour market. Moreover, student mobility helps to develop European citizenship and European awareness. By increasing understanding of cultural and linguistic diversity, it promotes creation of a European Area of Education and Training.

Bearing in mind the potential of mobility as an economic and social good, the conclusions of the Lisbon Council of March 2000 specifically requested measures to foster the mobility of students, teachers, trainers and research staff (European Council, 2000a, paragraph 26).

In 2001 a joint recommendation by the European Parliament and the Council acknowledged the positive contribution made by mobility to society as a whole and called for increased political cooperation to eliminate obstacles to movement.⁴⁰ The recommendation was followed up by substantial action, at both Community and national level, and has led to a series of positive results (European Commission, 2004a).

The Community puts its policies on education into practice through the various channels of its mobility programmes, especially the Erasmus scheme, which has supported over 1.5 million students to date, and the Leonardo da Vinci scheme for vocational training. Mobility has also been an important feature in major recent policy initiatives like the Bologna process, which is intended to create a European Higher Education

Area (an objective set for 2010) and to have a demonstrable positive impact on the mobility of higher education students in Europe.

However, the need to increase the level of mobility for learning purposes should not detract attention from the *quality* of mobility. The Erasmus University Charter and the Erasmus Student Charter were introduced in 2003 to enhance the organisational arrangements for the mobility of students. The Working Group on Mobility produced a draft charter on the quality of mobility in summer 2004, which was developed into a formal Commission proposal for a recommendation in September 2005 (European Council, 2005a), as called for by the Education Council in November 2004. The recommendation consists of ten guidelines, addressed mainly to the sending and receiving organisations responsible for mobility.

The 2006 Joint Interim Report of the Council (European Council, 2006d) and the Commission on Implementation of the Detailed Work Programme states that despite some promising moves, for example on the quality of mobility, there are not enough national strategies on mobility. The main source of support continues to be from EU programmes. In addition, countries generally tend to promote mobility for incoming more than for outgoing students (European Commission, 2006b). In a broader context, the Kok Report (Kok, 2004) on progress towards the Lisbon goals also concluded that disincentives to mobility persist in Europe, among them administrative and legal impediments, underfunding of universities and the problem of recognition of qualifications. Efficient ways to promote mobility should draw on the well developed European instruments to facilitate recognition (ECTS, Diploma and Certificate Supplement and study levels compatible with Bologna) and provide information on all relevant aspects of mobility via the Internet (Lanzendorf et al., 2005).

One cause for concern is that the EU might attract and retain fewer talented minds because of such disincentives. With this in mind, EU Ministers of Education have already set the objective of turning the EU into “the most favoured destination of students, scholars and researchers from other world regions.” (European Commission, 2002b). To this end, in 2006 they adopted the ERASMUS Mundus programme to improve the quality of higher education and promote intercultural understanding through

cooperation with third countries (European Council, 2003b and 2003c).

The analysis which follows will analyse mobility on the basis of four indicators:

- *Foreign students enrolled in tertiary education (ISCED levels 5 and 6) as a percentage of all students enrolled in the country of destination, by nationality (European country or other countries);*
- *Percentage of students (ISCED levels 5 and 6) from the country of origin enrolled abroad (in a European country or other countries);*
- *Inward mobility of Erasmus students; and*
- *Outward mobility of Erasmus students.*

The indicators are restricted to geographical mobility because at the moment it is difficult to find suitable data to construct indicators for areas such as the quality of mobility. Nevertheless, the above-mentioned indicators yield useful information on, for example, the disparate student mobility levels of individual EU countries, the relative attractiveness of host countries within the EU and the level of demand from both students and teachers/trainers for Erasmus places.

The first two indicators focus on mobility, as reflected in the UOE data, the other two on mobility under the European programmes. The two data sets are, to a certain extent, complementary, since exchange programmes and short stays abroad, such as Erasmus and Leonardo, should, in principle, be excluded from the UOE data collection if they last less than one year. However, the indicators selected for monitoring progress on mobility suffer from a number of significant shortcomings, which are listed below. Data are, however, expected to improve in the medium to long term.

In the past the UOE⁴¹ data collection focused on tertiary students with foreign citizenship.⁴² However, this is not the same thing as mobile students. Firstly, many tertiary students with foreign citizenship are not really mobile students, since they may have lived all their life in the country where they are studying.⁴³ Consequently, a country with a liberal naturalisation policy may have a lower percentage of “foreigners” enrolled in its institutions. Second, a growing number of families live outside the country of which they are citizens; therefore students with home citizenship can now also be classified as “incoming” and, hence, mobile students.⁴⁴

The two indicators on mobility under the European mobility programmes obviously do not cover the full range of mobility. Most mobility under the Erasmus programme is regarded as credit mobility, as it is temporary and takes the form of going to another country to gain knowledge and experience to add to that learned at home. By contrast, degree mobility is aimed at gaining a degree abroad.⁴⁵

In response to these deficiencies, the Commission has established strategies to improve the accuracy and completeness of the data. In the short term, a new study is gathering more comprehensive information on mobility in 32 European countries (Kelo, Teichler and Wächter et al., 2006). In 2005 the UOE data collection was revised to make it possible to identify “physical mobility” (i.e. non-resident students) more accurately and, in some cases, to combine these figures with “cultural mobility” (i.e. non-citizens). The first results from this exercise, based on data from 2003/2004, have been available since spring 2006. These more accurate data on mobility will continue to be collected in UOE, and more and more countries will be able to submit the data once their national data collections have been adapted to this new request. However, there are still many gaps and more complete data will not be available until the medium term.

4.4.1 International student mobility

Foreign students in higher education

About 1.7 million students with foreign citizenship were enrolled in tertiary education in EU-27 in 2006 (the 2005/06 academic year). This compares with 788 000 in 2000. The average annual increase over the period 2000-2006 was 13.4%. Growth in the number of foreign students was faster than growth in overall student numbers.

An increasing share of tertiary students in Europe comes from outside Europe. The number of students from China grew six-fold from fewer than 20 000 in 2000 to 113 000 in 2006, while the number of students from India quintupled at the same time. One reason for the growth in the number of overseas students is the more restrictive visa policy introduced in the USA after 2001.

Table 4.17: Foreign tertiary students as % of all tertiary students (ISCED levels 5 and 6) enrolled in the country (2000-2006)

| | Foreign tertiary students | | Non-resident tertiary students | Annual growth in number of foreign tertiary students |
|----------------|-------------------------------|------------|--------------------------------|--|
| | as % of all tertiary students | | | |
| | 2000 | 2006 | 2006 | 2000-2006 |
| EU-27 | 5.0 | 8.9 | : | 13.4 |
| Belgium | 10.9 | 11.9 | 6.3 | 3.3 |
| Bulgaria | 3.1 | 3.7 | : | 1.7 |
| Czech Rep. | 2.3 | 6.3 | 5.1 | 24.7 |
| Denmark | 6.8 | 8.4 | 5.3 | 6.8 |
| Germany | 9.1 | 11.4 | : | 5.7 |
| Estonia | 1.6 | 3.2 | 1.4 | 16.4 |
| Ireland | 4.6 | : | : | : |
| Greece | : | 2.5 | : | : |
| Spain | 1.4 | 2.9 | 0.7 | 12.3 |
| France | 6.8 | 11.2 | 10.8 (05) | 10.4 |
| Italy | 1.4 | 2.4 | : | 11.8 |
| Cyprus | 19.4 | 27.4 | 25.1 | 18.6 |
| Latvia | 6.6 | 1.1 | 1.1 | -21.3 |
| Lithuania | 0.4 | 0.6 | 0.6 | 14.7 |
| Luxembourg | : | 42.2 | : | 9.7 |
| Hungary | : | 3.3 | 2.8 | : |
| Malta | 5.6 | 7.2 | 0 | 10.5 |
| Netherlands | 2.9 | 6.4 | 4.7 | 17.3 |
| Austria | 11.6 | 15.5 | 12.0 | 4.4 |
| Poland | 0.4 | 0.5 | : | 10.9 |
| Portugal | 3.0 | 4.7 | : | 7.3 |
| Romania | 2.8 | 1.4 | : | -1.1 |
| Slovenia | 0.9 | 1.2 | 0.9 | 10.2 |
| Slovakia | 1.2 | 0.9 | 0.8 | 1.7 |
| Finland | 2.1 | 2.9 | : | 8.2 |
| Sweden | 7.4 | 9.8 | 5.0 | 8.4 |
| UK | 11.0 | 32.5 | 14.4 | 22.7 |
| Croatia | : | 0.6 | 2.5 | : |
| FYR Maced. | 0.7 | 0.4 | 0.4 | -4.7 |
| Turkey | 1.7 | 0.8 | : | 1.3 |
| Iceland | 4.2 | 4.6 | : | 10.0 |
| Liechtenstein* | : | : | : | : |
| Norway | 4.6 | 6.7 | 1.9 | 8.6 |
| Japan | 1.5 | 3.2 | 2.9 | 13.9 |
| United States | 3.6 | : | 3.3 | : |

Source: For EU, EEA and acceding countries: UOE data collection. For other countries: UNESCO Institute of Statistics

Additional notes: DE, SI: Students in advanced research programmes (ISCED level 6) in these countries are excluded.
RO 2000: data exclude ISCED level 6.

The number of students from other parts of the world varies between countries. In Cyprus, France, Malta and Portugal more than 80% of foreign students come from outside the EU, while the corresponding figures in Austria, the Czech Republic, Estonia and Greece were under 40%.

There are several reasons for the high proportion of students from other parts of the world studying in EU-27. Firstly and most importantly, the indicator analysed is students with foreign citizenship and not mobile students *per se*; many of these students may have lived all their life in the country where they are studying (see section on quality of data). Another reason could be the wide variety of teaching languages in Europe,

attracting students from all over the world. Finally, students from former colonies of European countries may study in the former colonial countries with which they have cultural and historical ties and whose language they share.

Table 4.18: Main countries of origin of non-national students in the EU

| | Foreign students in EU-27 (in 1000) | | |
|-------------------|-------------------------------------|---------------|---------------|
| | 2000 | 2005 | 2006 |
| Total | 787.9 | 1201.0 | 1690.4 |
| Europe | 383.8 | 496.2 | 566.3 |
| - EU 27 | 315.8 | 395.7 | 449.5 |
| - other Europe | 68.0 | 100.5 | 116.6 |
| - of which Russia | 12.5 | 24.0 | 27.7 |
| Africa | 134.2 | 203.0 | 241.3 |
| Morocco | 38.2 | 48.6 | 47.9 |
| Algeria | 14.9 | 23.7 | 23.2 |
| Nigeria | 3.5 | 10.2 | 19.3 |
| Asia | 183.0 | 348.9 | 376.1 |
| China | 18.6 | 109.2 | 113.5 |
| India | 6.6 | 25.0 | 33.1 |
| Japan | 10.7 | 12.3 | 12.7 |
| America | 63.0 | 95.2 | 110.4 |
| USA | 22.7 | 27.1 | 29.8 |
| Canada | 5.8 | 7.9 | 10.1 |
| Brazil | 6.8 | 9.7 | 11.3 |
| Oceania | 2.9 | 3.9 | 7.4 |
| Australia | 2.1 | 2.9 | 5.3 |

Source: Eurostat (UOE collection)

Higher education students enrolled outside their country of origin

In 2005, world wide 2.7 million students (slightly more than 2% of all students) were enrolled outside their country of citizenship, of whom 2.3 million (84%) were studying in the OECD area. The United States received most foreign students (in absolute terms) with 22% of the total. However, the share of the United States in total foreign students reported to the OECD decreased by 3 percentage points between 2000 and 2005. The UK (12%), Germany (10%), France (9%), Spain (2%), Belgium (2%), Italy (2%), Austria (1%), Sweden (1%) and the Netherlands (1%) account for a combined total of 40%. Australia is in fifth place with 6%. Together, these countries host nearly 68% of all foreign students (OECD, 2007a, pp.298-305).

For most EU countries, the majority of outgoing students are enrolled in another EU country (see Table 4.19). The only exception is the UK, where the majority of students studying abroad are studying outside the EU. In 2006 on average about 3% of EU students were studying abroad, with four out of five in other EU countries.

Table 4.19: Percentage of all tertiary students (ISCED levels 5 and 6) enrolled outside their country of origin

| | Students (ISCED 5-6) studying in another EU-27, EEA or Candidate country - as % of all students | | |
|----------------|---|------------|------------|
| | 2000 | 2005 | 2006 |
| EU-27 | 2.1 | 2.3 | 2.6 |
| Belgium | 2.4 | 2.6 | 2.5 |
| Bulgaria | 3.2 | 8.7 | 8.9 |
| Czech Republic | 1.3 | 1.8 | 2.0 |
| Denmark | 2.7 | 2.3 | 2.6 |
| Germany | 1.8 | 2.2 | 2.8 |
| Estonia | 2.5 | 3.6 | 4.1 |
| Ireland | 9.4 | 9.3 | 13.8 |
| Greece | 12.4 | 6.0 | 5.5 |
| Spain | 1.1 | 1.1 | 1.3 |
| France | 1.8 | 2.1 | 2.4 |
| Italy | 1.7 | 1.5 | 1.7 |
| Cyprus | 46.5 | 56.5 | 53.2 |
| Latvia | 1.3 | 1.7 | 2.2 |
| Lithuania | 1.8 | 2.6 | 3.0 |
| Luxembourg | 74.5 | : | 80.8 |
| Hungary | 1.7 | 1.5 | 1.7 |
| Malta | 8.2 | 7.8 | 10.0 |
| Netherlands | 1.9 | 1.8 | 2.1 |
| Austria | 3.8 | 4.4 | 4.6 |
| Poland | 0.9 | 1.3 | 1.6 |
| Portugal | 2.3 | 2.9 | 3.7 |
| Romania | 1.5 | 2.3 | 2.2 |
| Slovenia | 2.2 | 2.0 | 2.1 |
| Slovakia | 3 | 8.6 | 10.2 |
| Finland | 3.2 | 2.7 | 3.0 |
| Sweden | 2.7 | 2.3 | 2.7 |
| United Kingdom | 0.6 | 0.4 | 0.7 |
| Croatia | : | 6.3 | 6.4 |
| FYR Macedonia | 6.2 | 11.9 | 11.9 |
| Turkey | 3.3 | 1.6 | 1.6 |
| Iceland | 16.9 | 17.0 | 17.4 |
| Liechtenstein | : | 76.6 | 73.6 |
| Norway | 4.7 | 4.8 | 4.9 |

Source: Eurostat (UOE)

Additional notes: DE, SI: Students in advanced research programmes (ISCED level 6) in these countries are excluded.

Countries diverge greatly in terms of the proportion of their students enrolled abroad. In general, the larger countries have a lower proportion of students studying abroad than the smaller countries.

Table 4.20: Flow of students into and out of the EU, 2005

| | Outgoing | Incoming | Balance |
|--------------------------------|-------------|----------|---------|
| EU-27 | 392 | 392 | 0 |
| EEA/candidate countries | 7.9 | 62.8 | 54.9 |
| USA | 59.6 | 24.9 | -34.7 |
| Other | 54 | 712 | 658 |

Source: Eurostat (UOE collection), for 'other' 2003 result

This may be attributable to the greater number and range of universities in the larger countries.

Another possible explanation is that students from smaller countries may be more likely to go abroad because they have already acquired the language of one of the larger countries. However, one major factor in the high mobility levels of students from countries such as Cyprus and Luxembourg is simply the absence or lack of capacity of third-level institutions in the students' own country. By way of illustration: 75% of Luxembourg's students are enrolled abroad. Cyprus follows with 56.5% of its students at foreign institutions; Ireland is third with 8.8% and Slovakia comes fourth with 8.6%. At the other end of the scale come Spain, the UK and Poland, with less than 1.5% of their students enrolled abroad.

Flow of students

The EU-27 is a net receiver of students (table 4.20): over 650 000 more students with non-EU citizenship study in the EU than the number of EU citizens studying outside the EU. In 2005, 67% of students with foreign citizenship in the EU were from countries outside the EU. This figure included 5% from EEA and candidate countries, 2 % from the USA and 60% from other parts of the world. Two thirds of foreign students study in Germany, France and the UK.

Some countries have more students with foreign citizenship than the number of citizens which they themselves send abroad. Within the EU this is the case for Belgium, France, Germany, Austria, Spain, Sweden and the UK. The UK is the Member State with the lowest proportion of its outgoing students heading for other countries in EU-27, with 45% of its students studying in EU-27. The USA is a net receiver of students from EU-27. More than twice as many students go to the USA from the EU as from the USA to the EU. More than 20% of the outgoing students from the Czech Republic, Sweden and the UK study in the USA.

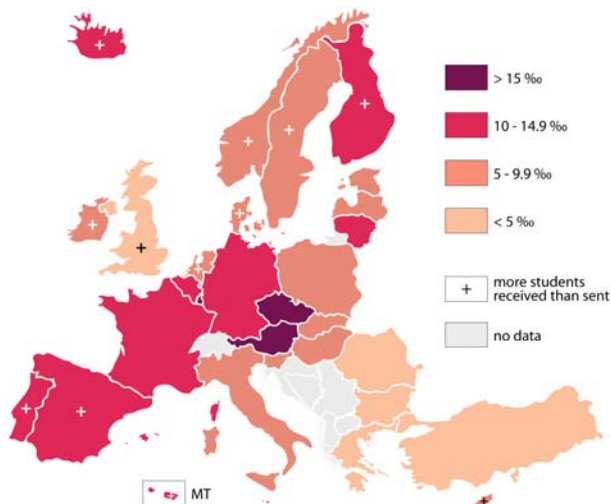
4.4.2 Erasmus mobility

A large proportion of overall mobility is supported through Community programmes such as Erasmus (see table 4.21 and chart 4.3). A number of interesting trends can be observed in participation rates. The total number of Erasmus students increased by 3.2 % in 2006/07 (2.3% in EU) compared with the previous year. This was much lower than the increase in former years. The increase was, however, substantial in many new Member States and notably in the candidate country Turkey. This increase should be seen in the context of the increasing number of European

universities taking part in the Erasmus programme. In fact today almost all European universities are taking part in Erasmus.

In 2006/07 Erasmus led to mobility on the part of 0.8% of the student population in EU and EEA countries. In practice, mobility under Erasmus would have to more than double, i.e. affect more than 2% of students per year, to reach a participation rate of 10% (since then, during a period of four to five years' formal study, 10% of the student population would be affected).

Chart 4.3: Outward mobility of Erasmus students, 2006/07 (students sent per 1000 students)



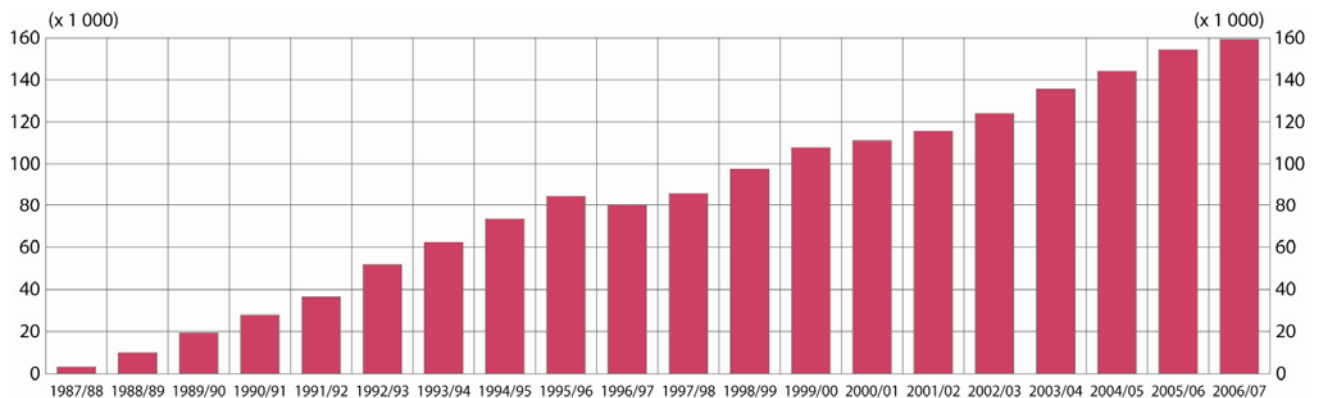
Source: DG Education and Culture (Erasmus programme)

Table 4.21: Mobility of Erasmus students, 2006/07

| | Students sent | Students received | Per 1000 students 2005/06 | |
|---------------|----------------|-------------------|---------------------------|-------------------|
| | 2006/07 | 2006/07 | Students sent | Students received |
| EU-27 | 153 396 | 155 070 | 8.2 | 8.3 |
| Belgium | 5119 | 5021 | 13.0 | 12.7 |
| Bulgaria | 938 | 296 | 3.9 | 1.2 |
| Czech Rep. | 5079 | 2812 | 15.1 | 8.3 |
| Denmark | 1587 | 4278 | 6.9 | 18.7 |
| Germany | 23884 | 16766 | 10.4 | 7.3 |
| Estonia | 572 | 460 | 8.4 | 6.7 |
| Ireland | 1524 | 3972 | 8.2 | 21.4 |
| Greece | 2465 | 1726 | 3.8 | 2.6 |
| Spain | 22322 | 27008 | 12.5 | 15.1 |
| France | 22981 | 20155 | 10.4 | 9.2 |
| Italy | 17195 | 14319 | 8.5 | 7.1 |
| Cyprus | 129 | 209 | 6.3 | 10.1 |
| Latvia | 807 | 330 | 6.2 | 2.5 |
| Lithuania | 2082 | 692 | 10.5 | 3.5 |
| Luxembourg | 170 | 24 | 63.0 | 8.9 |
| Hungary | 3028 | 1569 | 6.9 | 3.6 |
| Malta | 125 | 325 | 13.3 | 34.6 |
| Netherlands | 4502 | 6446 | 7.8 | 11.1 |
| Austria | 4032 | 3565 | 15.9 | 14.1 |
| Poland | 11219 | 3274 | 5.2 | 1.5 |
| Portugal | 4424 | 4586 | 12.0 | 12.5 |
| Romania | 3350 | 792 | 4.0 | 0.9 |
| Slovenia | 972 | 700 | 8.5 | 6.1 |
| Slovakia | 1346 | 610 | 6.8 | 3.1 |
| Finland | 3773 | 5860 | 12.2 | 19.0 |
| Sweden | 2532 | 7194 | 6.0 | 17.0 |
| UK | 7235 | 16153 | 3.2 | 7.1 |
| Turkey | 4438 | 1321 | 1.9 | 0.6 |
| Iceland | 189 | 327 | 12.0 | 20.8 |
| Liechtenstein | 44 | 31 | 73.3 | 51.7 |
| Norway | 1257 | 2575 | 5.9 | 12.0 |

Source: European Commission, DG Education and Culture

Chart 4.4: Mobility of students in the Erasmus programme



| | 1987/88 | 1989/90 | 1994/95 | 1999/00 | 2000/01 | 2002/03 | 2003/04 | 2004/05 | 2005/06 | 2006/07 | Total |
|--|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|-----------|
| EU-27 | | | 72 341 | 106 418 | 109 933 | 122 777 | 134 190 | 141 391 | 149 933 | 153 396 | 1 503 951 |
| Turkey | - | - | - | - | - | - | - | 1142 | 2852 | 4438 | 8432 |
| Iceland, Liechtenstein and Norway | - | - | 1066 | 1248 | 1159 | 1180 | 1396 | 1504 | 1636 | 1490 | 18149 |
| Total (EU-27 + EEA + CC) | 3 244 | 19 456 | 73 407 | 107 666 | 111 092 | 123 957 | 135 586 | 144 037 | 154 421 | 159 324 | 1 683 928 |

Source: European Commission, DG Education and Culture

Appendix:**Table App.4.1 Overview on national University rankings in EU countries**

| Country | Since | Main information |
|----------|--------------|--|
| Austria | 2004, yearly | http://www.university-ranking.de/ see below |
| Germany | 1998, yearly | <p>The DAAD, together with the Centre for Higher Education Development (CHE) and the German weekly news magazine "DIE ZEIT", makes the most comprehensive and detailed university ranking in Germany. More than 280 higher education institutions in Germany, Austria and Switzerland were examined by CHE – Centre for Higher Education Development. Austrian universities are included in the ranking in 2004 and Swiss universities are included in 2005 (German-speaking universities). The CHE ranking is going to be extended to Netherlands and Flanders.</p> <p>What's special about the CHE University Ranking?</p> <ul style="list-style-type: none"> • Not an overall ranking, but a detailed analysis: the ranking deliberately chooses not to add the results of the survey together to produce an overall points score. • League Groups instead of League Positions: the CHE University Ranking has no "league positions" for the individual universities but instead places the universities into one of three groups: Top Group, Middle Group or Bottom Group. CHE's League Group approach ensures that the top and the bottom groups are statistically significantly different from the arithmetic mean. • The ranking is subject specific <p>Ranking criteria: Academic studies and teaching, equipment, research, overall opinion students and professors, study location and higher education institution, job market and career orientation</p> <p>http://www.university-ranking.de/</p> |
| Hungary | 2008 | <p>Diploma 2008, joint publication of a national journal, the HVG and the National Higher Education Information Centre (OFIK).</p> <p>Ranking criteria: staff quality, student quality, popularity, satisfaction, prestige.</p> <p>http://www.felvi.hu/index.ofi?mfa_id=459&hir_id=8655&oldal=2</p> |
| Italy | 2000, yearly | <p>La guida della Repubblica: published by La Repubblica newspaper in collaboration with CENSIS.</p> <p>Ranking criteria: didactic, student's progression, research outcomes, staff characteristics, internationalisation of the faculty.</p> <p>http://www.repubblica.it/speciale/2007/guida_universita/</p> |
| Poland | 1992, yearly | <p>Perspektywy is the Polish organisation providing rankings in cooperation with 'Rzeczpospolita', a Polish newspaper.</p> <p>Ranking criteria: prestige, intellectual power, studying conditions, internationalisation of the university.</p> <p>http://www.perspektywy.pl/index.php?mid=rankingi</p> |
| Romania | 2005, yearly | <p>Romanian universities ranking: produced by Ad-Astra, one ONG</p> <p>Ranking criteria: publications by teaching staff indexed in a particular year in the ISI Science Citation Index Expanded, ISI Social Sciences Citation Index and the ISI Arts & Humanities Citation index.</p> <p>http://www.ad-astra.ro/universitati/universities.php</p> |
| Slovakia | 2005, yearly | <p>Slovakian universities ranking : published by the Academic Ranking and Rating Agency (ARRA)</p> <p>Ranking criteria: publications, proportion of PhD students, staff/student ratios, admission criteria, labour market outcomes for graduates, spending, grant funding.</p> <p>http://www.arra.sk/index.php?module=pagemaster&PAGE_user_op=view_page&PAGE_id=9&MMN_position=5:5</p> |

| | | |
|-----------------|---|--|
| Spain | In 2000 and 2005 | <p>Ranking found in 2000 and 2005: conducted by a team of Spanish researchers based in the United States and Spain</p> <p>Ranking criteria: context (GDP of the region, age of the institution in years, public or private, number of schools as an indirect measure of the range of studies Resources (Faculty/student ratios, number of books per student), organization (Ratio of students enrolled in long versus short undergraduate programs, percentage of women on faculty, performance.</p> <p>De Miguel, J.M, Vaquera, E. and Sanchez, D. "Spanish Universities and the Ranking 2005 Initiative," Higher Education in Europe 30 2 (2005): 199-215.</p> |
| The Netherlands | X, yearly | <p>Ranking criteria: around 90 criteria: student's opinion, student's progression, cost per student, information on the city where the institution is located, etc.</p> <p>Each selected study programme is placed in one of three categories: highest score (green), average score (yellow), and lowest score (red).</p> <p>http://www.studychoice123.nl/web/site/default.aspx?m=about</p> |
| UK | <p>Good University Guide : 15 year, yearly</p> <p>Guardian University Guide: yearly</p> | <p><u>Several league tables. 2 examples</u></p> <p>TOP universities league table 2008, Good University Guide 2008 ed. John O'Leary</p> <p>Ranking criteria: Student satisfaction, research assessment, entry standards, student-staff ratio, library/computing spend, facilities spend, good honours, graduate prospects, completion.</p> <p>http://www.thegooduniversityguide.org.uk/single.htm?jpg=6605</p> <p>UK, Guardian University Guide</p> <p>Ranking criteria: Teaching quality - as rated by graduates of the course, feedback - as rated by graduates of the course, spending per student, staff/student ratio, job prospects, value added - comparing students' degree results with their entry qualifications, entry score.</p> <p>http://education.guardian.co.uk/universityguide2008/story/0,,2067150,00.html</p> |

Table App.4.2 Weights used in the ARWU and WUR rankings

Shanghai Jiao Tong University Rankings (ARWU), 2007

| Criterion | Indicator | Weight |
|----------------------|--|--------|
| Research output | Articles published in Nature & Science over the four previous years | 20% |
| Research output | Articles in the expanded Science Citation Index and the Social Science Citation Index during the previous year | 20% |
| Quality of education | Alumni winning Nobel prizes and field medals | 10% |
| Quality of staff | Staff winning Nobel prizes and field medals | 20% |
| Quality of staff | Highly cited researchers | 20% |
| Size of institution | Performance relative to size | 10% |

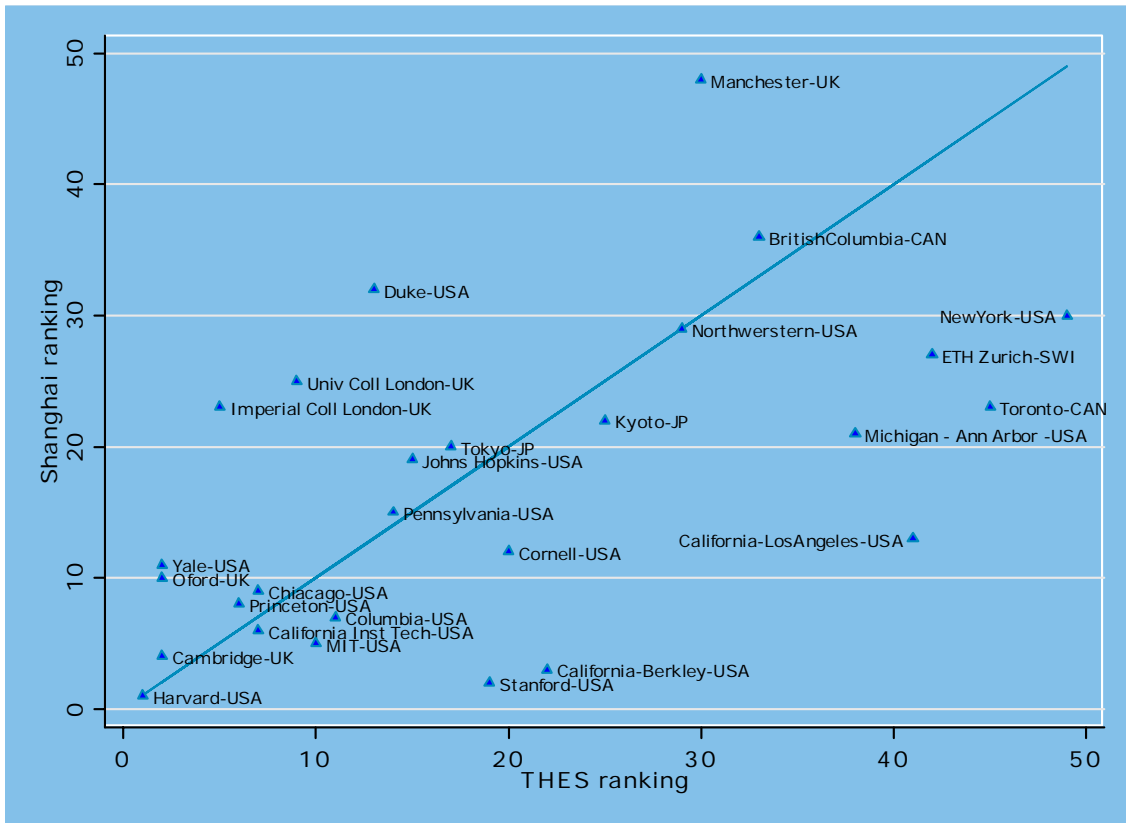
Source: <http://www.arwu.org/rank/2007/ranking2007.htm>. The indicators and weights used in 2003 are slightly different from those used in 2007 and 2006.

Table App.4.3 Times Higher Education Supplement Rankings (WUR), 2007

| Criterion | Indicator | Weight |
|---------------------------------|--|--------|
| Quality of faculty | Peer review, 5,101 academics | 40% |
| Quality of research output | Total citation/ Full Time Equivalent faculty | 20% |
| Quality of graduates | Employers' opinion, 1,471 recruiters | 10% |
| Quality of teaching environment | Full Time Equivalent faculty/student ratio | 20% |
| International faculty | Percentage of international staff | 5% |
| International students | Percentage of international students | 5% |

Source: <http://www.thes.co.uk/>

Chart App.4.1: Comparing the position of the top 50 universities in the ARWU and WUR rankings



5. KEY COMPETENCES FOR LIFELONG LEARNING

5.1 Reading, Mathematics and Science Literacy

5.1.1 Low performers: European Benchmark

5.2 Language skills: Learning and Teaching

5.3 ICT skills of young and adults

5.4 Civic skills and Active citizenship

5.4.1 Impact of education on active citizenship

MAIN MESSAGES**Key Competences for Lifelong Learning**

The proportion of low performers in reading literacy aged 15 has increased significantly, from 21.3% in 2000 to 24.1% in 2006. This should be seen against a benchmark for 2010 which anticipates a significant reduction of 20%.

Foreign language teaching in secondary education is increasing. In lower secondary education the average number of foreign languages learned per pupil is 1.4, and 1.6 in upper secondary general education. 86% of pupils were learning English in 2006. Although the bases are much lower, the number of pupils learning Spanish has increased by 50%, French by 22% and German by 5%.

Internet and computer use continues to increase. But the increase in daily use by highly educated people is much more marked than among the less educated. So the e-gap remains.

Recent research shows that increased educational attainment has a very positive effect on Active Citizenship. Higher education attainment has by far the biggest effect.

The Lisbon European Council of 2000 and the Barcelona European Council of 2002 both drew attention to the importance of basic skills. In 2002 the Council adopted a Resolution acknowledging the importance of acquiring basic skills. The Council adopted a benchmark of reducing the percentage of low-achieving 15-year-olds in reading literacy in the European Union by at least 20% by 2010, compared to 2000.

The Recommendation of the European Parliament and the Council on Key competences for lifelong learning of December 2006 (Council, 2006a) stated that “As globalisation continues to confront the European Union with new challenges, each citizen will need a wide range of key competences to adapt flexibly to a rapidly changing and highly interconnected world.” The Recommendation defined a framework with a combination of knowledge, skills and attitudes which all individuals need for personal fulfilment and development, active citizenship, social inclusion and employment. The framework consists of eight competences: (i) communication in the mother tongue; (ii) communication in foreign languages; (iii) mathematical competence and basic competences in science and technology; (iv) digital competence; (v) learning to learn; (vi) social and civic competences; (vii) sense of initiative and entrepreneurship; and (viii) cultural awareness and expression.

Five of these competences (literacy in reading, mathematics and science, language skills, learning to learn skills, ICT skills and civic skills) were identified as part of the coherent framework of indicators and benchmarks (Council, 2007a).

This chapter analyses the key competences where data are available. For the area of literacy in reading, mathematics and science, data come from the OECD PISA survey. In the area of language skills no data are currently available, hence the available data on the teaching of foreign languages in the Member States will be examined. Concerning ICT skills, available data from PISA and Eurostat on the use of and the attitudes to ICT will be examined and in the case of Active Citizenship data from the IEA CIVED will be analysed. The areas where there is no data yet will

require development of new indicators. (See part C)

5.1 Reading, Mathematics and Science Literacy

5.1.1 Low performers: European benchmark

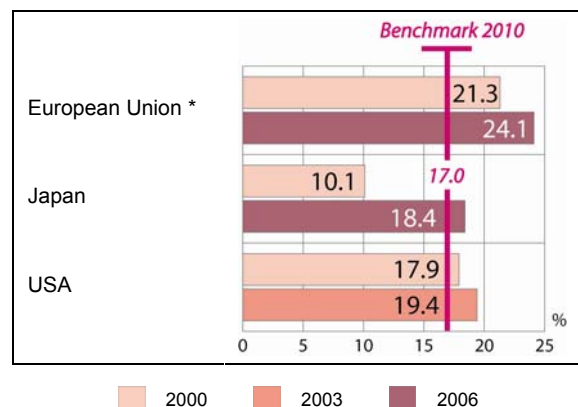
Acknowledging the importance of acquiring basic skills, the Council adopted in 2003 a specific benchmark targeting low performance in reading literacy. The benchmark to be reached by 2010 is to reduce the percentage of low-achieving 15-year-olds in reading literacy in the European Union by at least 20%, compared to year 2000.

European benchmark

By 2010 the percentage of low-achieving 15-year-olds in reading literacy in the European Union should have decreased by at least 20% compared with 2000.

Low achievers in reading on the PISA reading literacy scale

Indicator: Percentage of pupils with reading literacy proficiency level 1 and lower on the PISA reading literacy scale



Data source: OECD, PISA 2003 and 2006 database.

The benchmark is based on an indicator taken from the PISA survey, which makes it possible to identify the share of pupils who have a low level of foundation skills such as literacy and numeracy. Reading literacy is defined in PISA as “understanding, using and reflecting on written texts, in order to achieve one’s goal, to develop one’s goals, to develop one’s knowledge and potential and to participate in society.” Pupils performing at level 2 are able to locate straightforward information, make low-level inferences of various types, work out

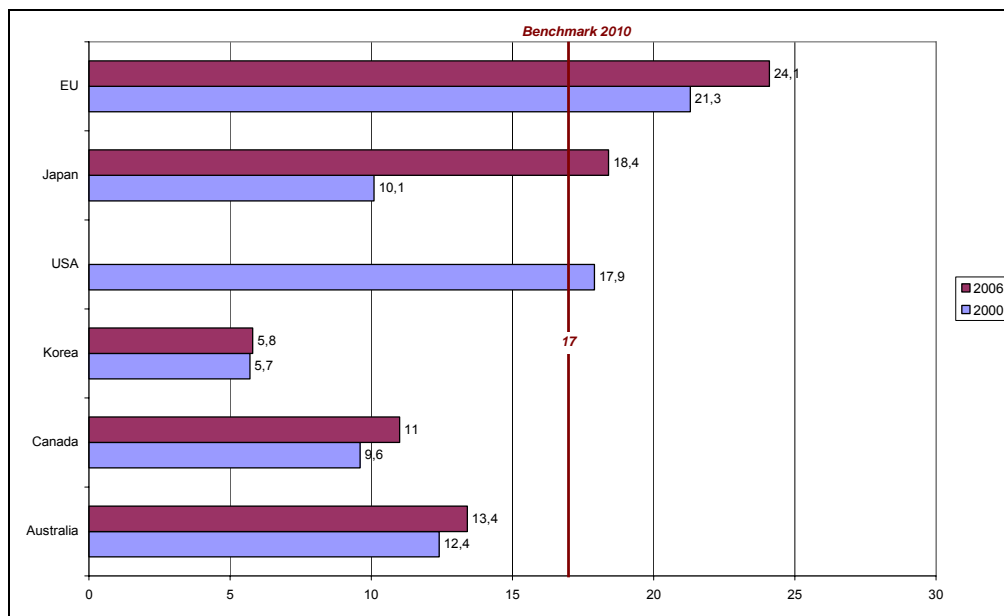
what a well defined part of a text means and use some outside knowledge to understand it (PISA 2006). Pupils who fail to reach level 2 can therefore be considered to be inadequately prepared for the challenges of the knowledge society and for lifelong learning. The benchmark measures the share of pupils with reading literacy proficiency level 1 or lower on the PISA reading literacy scale.

Chart 5.1 below shows the situation regarding the benchmark on low achievers in reading literacy. Reaching the European benchmark implies that the share of low achievers in the EU⁴⁶ will decrease from 21.3% in 2000 to 17% in 2010. In fact, the number of low achievers

in the EU increased from 21.3% in 2000 to 24.1% in 2006, a rise of more than 13%. A 30% reduction would now be needed to reach the benchmark. Clearly effective and innovative measures are required.

Compared to countries outside Europe, the average of participating EU countries has a relatively high share of low performers, though both the USA⁴⁷ and, especially, Japan showed a significant increase in the share of low performers from 2000 to 2006. The share of low performers in Korea, Canada and Australia was relatively stable in the period, and all these countries are at a level far below the EU benchmark of 17% low achievers.

Chart 5.1: Low achievers in reading on the PISA reading literacy scale in the EU and selected third countries. 2000, and 2006.
(PISA reading literacy scale)



Data source: OECD PISA 2000 and 2006 database

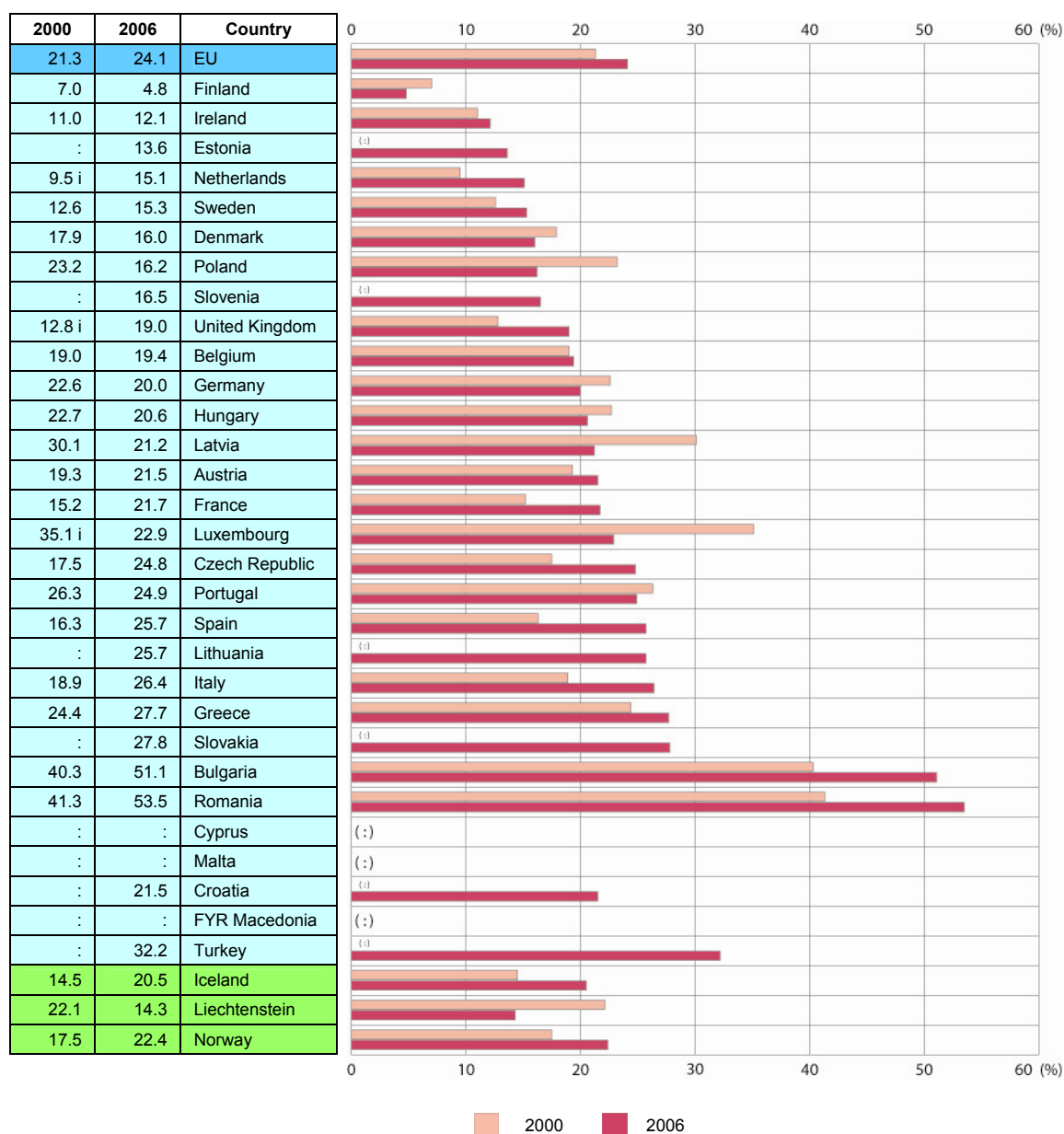
Reading literacy in the participating EU countries

In 2006 all EU countries except Malta and Cyprus participated in the PISA survey. The average share of low performers in these 25 countries was 23.1%. There are large differences in performance between the Member States. In 2006 only 4.8% of pupils in Finland were low performers in reading, followed by Ireland (12.1%), Estonia (13.6%), the Netherlands (15.1%) and Sweden (15.3%). The best performing countries in the EU are also among the best performers in the world. In

Bulgaria and Romania more than 50% of the pupils were low performers.

While performance deteriorated in many Member States from 2000 to 2006, some countries have been successful in reducing the share of low achievers, notably Poland (30.2% decrease), Latvia (29.6%), and Germany (11.5%). Finland, the top performer in 2000, managed to reduce its already low share of low achievers even further and reported the highest relative reduction in low performers with 31.4%.

Chart 5.2 Percentage of pupils with reading literacy proficiency level 1 and lower on the PISA reading literacy scale, (2000 and 2006)



Source: OECD PISA database 2000 and 2006.

i: Netherlands, Luxembourg and the UK not representative in 2000:

Additional note: EU figure: weighted average based on number of pupils enrolled and data for 18 countries

Many other EU countries, including Spain (57.7%), France (42.8%), the Czech Republic (41.7%) and Italy (39.7%) show a large increase in the share of low achievers. Chart 5.2 spells out the development from 2000 for individual countries. 14 countries increased the share of low performers, while in 8 countries the share decreased.

Distribution and mean performance of pupils in reading

The average score for all participating countries in reading in PISA is 492 points. In

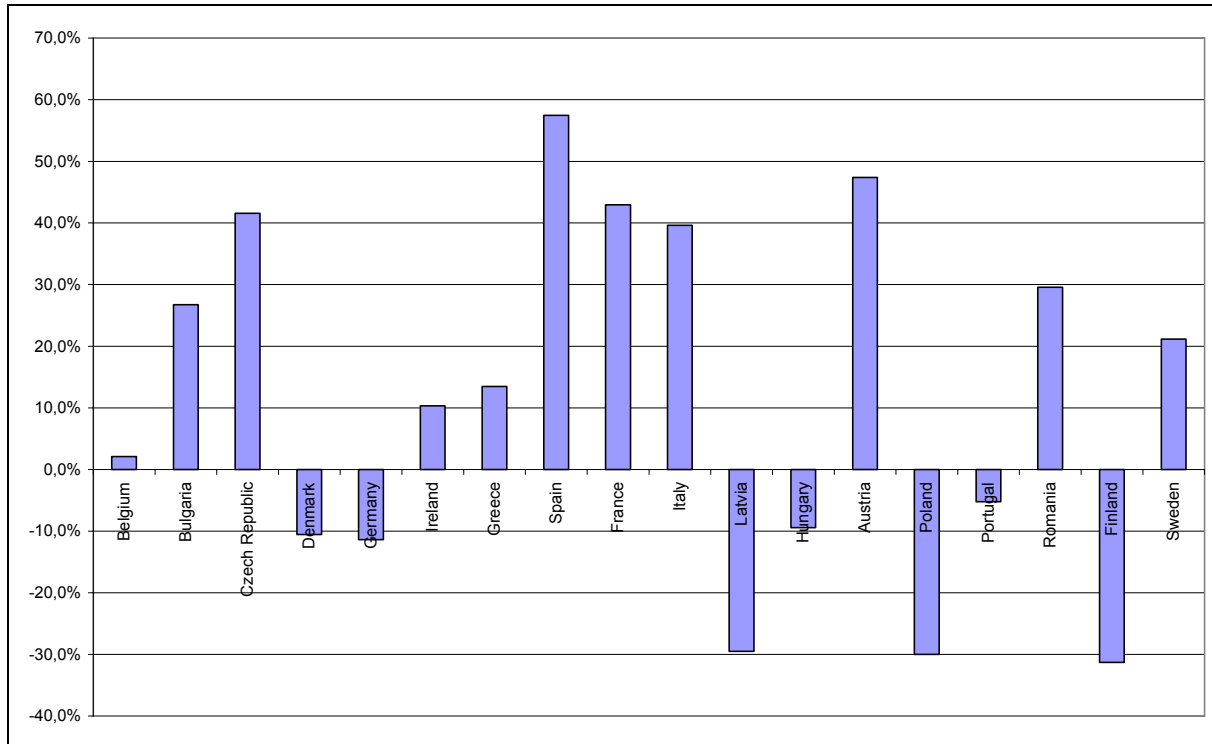
the EU countries for which data are available the average reading score fell from 491 points in 2000 and 2003 to 487 points in 2006. Performance deteriorated in a large number of Member States. The only EU country where average performance improved significantly was Poland and Latvia.

Japan scored 498 points, slightly above the EU, while there were problems with the US survey, meaning that no comparison can be made for this country for 2006. Between 2000 and 2006 Korea increased its average reading

performance by 31 points, reaching the highest performance of all participating countries with 556 points.

Finland has the highest score among the Member States, at second place with 547 points. Finland is the only European country among the top five performers.

Chart 5.3 Progress in the field of low achievers in reading (%). 2000-2006.



Source: OECD PISA database

The second best performing EU country was Ireland with 517 at rank 6. Among the 10 highest scores in 2006, five were European, including Liechtenstein.

The benchmark illustrates the share of low performers. The distribution between the low performers and the top performers makes it possible to show the performance gap between the best and the least performing pupils. Finland is the leading country in Europe (and the world) in terms of mean performance, but has also the smallest performance gap between the pupils. The gap between the 10th and the 90th percentile is 208 points among the Finnish pupils. Estonia, Spain, Denmark and Slovenia too have less than 230 points difference between the two categories of pupils. Bulgaria (303 points), Czech Republic (286 points) and Belgium (283 points) are the Member States with the largest performance gap. Chart 5.4 illustrates the distribution for each of the five proficiency levels of the PISA survey. In

Finland only 20% of students are at level 2 or below, while in Turkey more than three quarters of the pupils are in this category. At the upper end of the scale Finland (16.7%), Poland (11.6%) Ireland (11.3%), and Belgium (11.3%) have the highest share of pupils who reached level 5.

The next PISA survey will be carried out in 2009. The focus will be on reading. As the 2000 survey also focused on reading, the 2009 survey will yield a better comparison. Since the EU benchmark for 2010 concerns low performers in reading literacy the results of the PISA 2009 survey (to be published in 2011) will provide important information on developments in the EU over almost the full period of the Lisbon process.

Gender differences in reading skills

In 2006 almost twice as many boys as girls had low reading skills: 17.6% of 15 year old girls and 30.4% of boys in the same age group. In

all Member States females perform better on average than males. In Greece and Finland, girls were 57 and 51 points ahead. The smallest gender gaps were in the Netherlands and the United Kingdom with 24 and 29 points respectively. These differences between genders are very significant, bearing in mind that 40 points on the PISA scale can be considered equivalent to one year of instruction.

The wide performance gap between boys and girls implies a need to specifically address the low reading skills of boys in order to improve overall performance. The gender gap is significantly less when it comes to mathematics and science skills, as will be shown in the following analysis.

No impact on reading literacy — US experience (2004-2006) with the No Child Left Behind Act

Created under the No Child Left Behind Act of 2001, the Reading First program provides assistance to states and districts in the US in using research-based reading programs and instructional materials for students in kindergarten through third grade and in introducing related professional development and assessments. The program's purpose is to ensure that increased proportions of students read at or above grade level, have mastery of the essential components of early reading, and that all students can read at or above grade level by the end of grade 3.

This interim report presents the impacts of Reading First on classroom reading instruction and student reading comprehension during the 2004-05 and 2005-06 school years. The evaluation found that Reading First did have positive, statistically significant impacts on the total class time spent on the five essential components of reading instruction promoted by the program. The study also found that, on average across the 18 study sites, Reading First did not have statistically significant impacts on student reading comprehension test scores in grades 1-3.

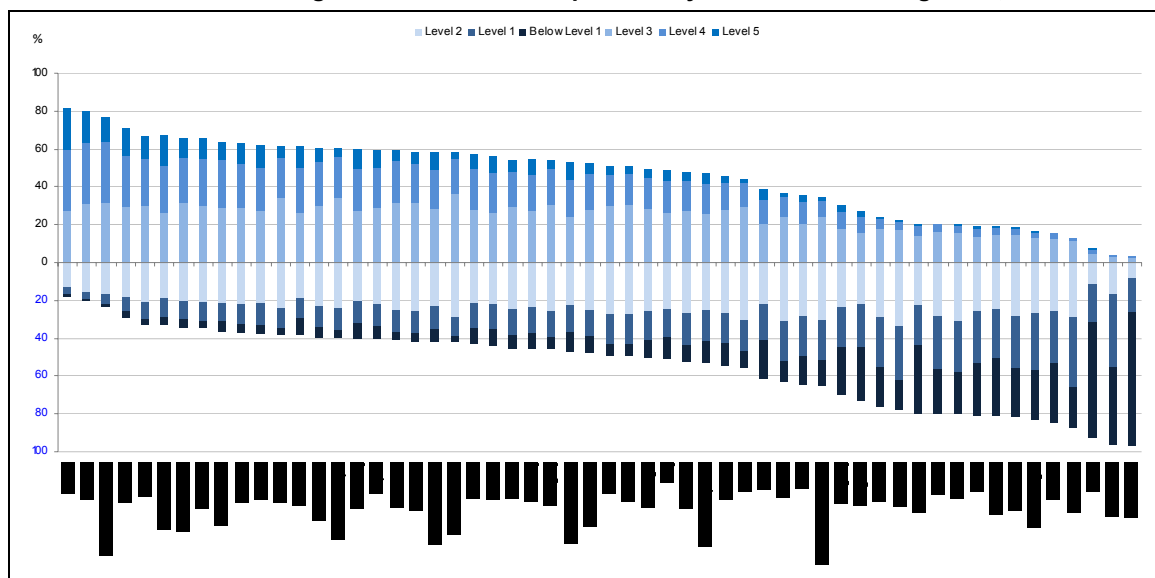
Institute of Education Science, National Centre for Educational Evaluation and Regional Assistance "Reading First Impact Study: Interim Report", Washington, May 2008.

Low performers in mathematics literacy proficiency

The average share of low performers in mathematics in the EU is lower than for reading, at 21.2%⁴⁸. Finland has easily the

smallest number of low performers in mathematics in the EU with only 6%, followed by the Netherlands (11.5%), Estonia (12.1%) and Denmark (13.6%) among the Member States.

Chart 5.4 Percentage of students at each proficiency level on the reading scale, 2006.



Source: OECD PISA database

In Romania and Bulgaria, more than half of the pupils are in this category. As a result of a change in the survey scope, only two of the four mathematics scales are comparable between 2000 and 2003. The two tests in 2003 and 2006 are however comparable and the majority of countries (13) reduced the share of low performing students in mathematics between 2003 and 2006. France reported a 34% higher share of low performers in mathematics; the Czech Republic and Iceland also recorded a more than 10% increase. Greece, Finland and Denmark all reduced the share of low performers by more than 10% from 2003 to 2006.

Less gender difference in mathematics

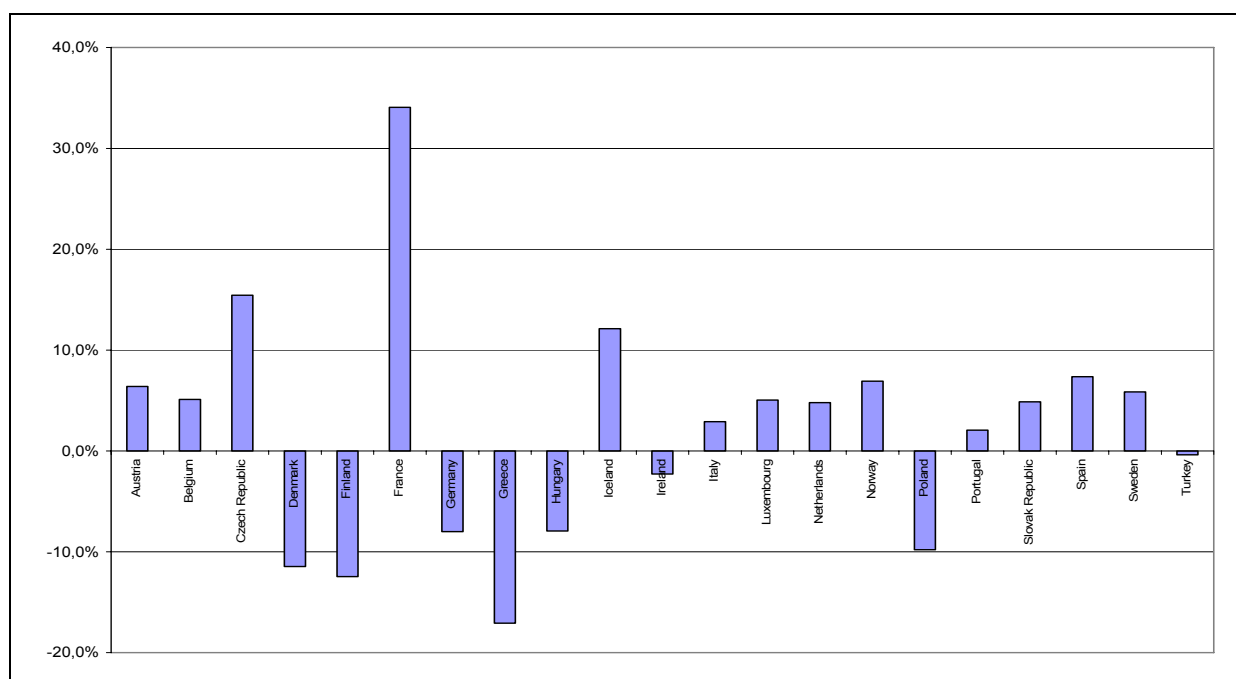
The overall gender difference in mathematics was less than a third as large as for reading,

and in all the Member States boys outperformed girls or there was no significant difference. The largest gender difference is found in Austria with an average of 23 points in favour of boys.

Comparing EU mathematics skills worldwide

Among the seven countries with the lowest proportion of low performers there are only two European countries. Finland is the best performing country in the OECD with only 6% low achievers followed by: Korea (8.9%), Hong Kong (9.5%), Azerbaijan (10.5), Canada (10.8%), Netherlands (11.5%), Macao-China (10.9%), Australia (13.0%) and Japan (13.0%)

Chart 5.5 Progress in the field of low achievers in mathematics (2003-2006) (%)



Source: OECD PISA database

Low performers in Science literacy

The PISA 2006 study includes a detailed profile of student performance in science, and in addition to reporting the score on tests in science it also covers students' attitudes to learning science, the extent to which they are aware of the life opportunities that science competences may open, and the science learning opportunities and environments which their schools offer (see OECD PISA 2006).

The average proportion of low performers in science for all the Member States (25) that participated in PISA in 2006 is 20.2%. In science too Finland has the smallest share of low performing pupils: only 4.1% received a score of 1 or less. Estonia (7.7%), Liechtenstein (12.9%), the Netherlands (13.0%) and Slovenia (13.9%) are the countries closest to Finland. More than 40% of pupils in Bulgaria and Romania are low performers in science.

Due to the change in the science test in PISA over the years, the 2006 results are not directly comparable with earlier years.

No gender differences in science skills

Unlike the tests in reading and mathematics, girls and boys showed no significant differences in average science performance in the majority of countries. This gender balance is also reflected in the attitudes to science in some countries. However in Germany, Iceland, Japan, Korea, the Netherlands and the UK, males reported more positive attitudes towards science. The largest gender difference was observed in students' self esteem regarding science, males rated their own science abilities significantly more highly than did females.

Comparing EU science skills worldwide

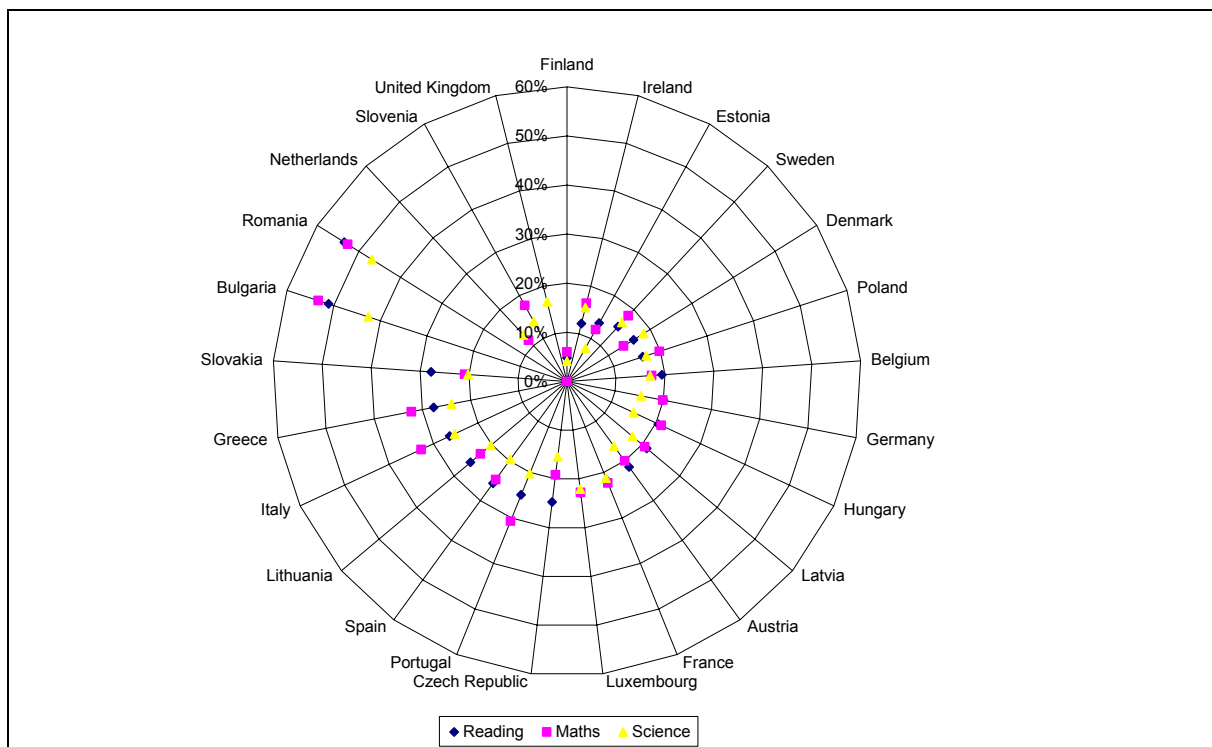
The average OECD figure for low performers in science is 19.2%. Of the 20 countries with less than 20% low performers, 10 are EU countries and 8 are from outside Europe. These countries are Hong Kong (8.7%), Canada

(10.0%), Macao-China (10.3%), Korea (11.2%), Chinese Taipei (11.6%), Japan (12.0%), Australia (12.9%) and New Zealand (13.7%),

The US performs below the OECD average with 24.4% low performers; Russia has a score of 22.2% low performers.

The proportion of low performers in reading, mathematics and science for all the participating countries is illustrated in Chart 5.6. There is a pattern in the countries for the three literacy skills — most countries have the smallest share of low performers in science. Denmark and the Netherlands are the only countries where the share of low performers in mathematics is higher than in science. Only four countries (Ireland, Denmark, Sweden and Poland) have a higher share of low performers in science than in reading, while there is an even spread of countries with more low performers in maths compared with reading.

Chart 5.6 Low achievers in mathematics, science and reading, 2006



Source: OECD, PISA database 2006

Progress in reading literacy: results from the PIRLS survey

The “Progress in International Reading Literacy Study” (PIRLS) was carried out in 2001 and 2006. 39 countries participated in 2006, including 19 Member States. While both the PIRLS and the PISA surveys aim to measure reading literacy, the PIRLS surveys use an alternative approach to the PISA surveys. PIRLS assesses reading at the fourth grade (approx. 10 year olds) whereas PISA is concerned with 15 year olds. The PIRLS surveys concentrate on how the curricula are run by targeting pupils in primary education who are just learning how to read and hence focus on the acquisition of reading literacy whereas the PISA survey mainly focuses on literacy levels and the ability to use knowledge and competences. PIRLS focuses on three aspects of reading literacy: for reading purposes, comprehension, and reading behaviours and attitudes.

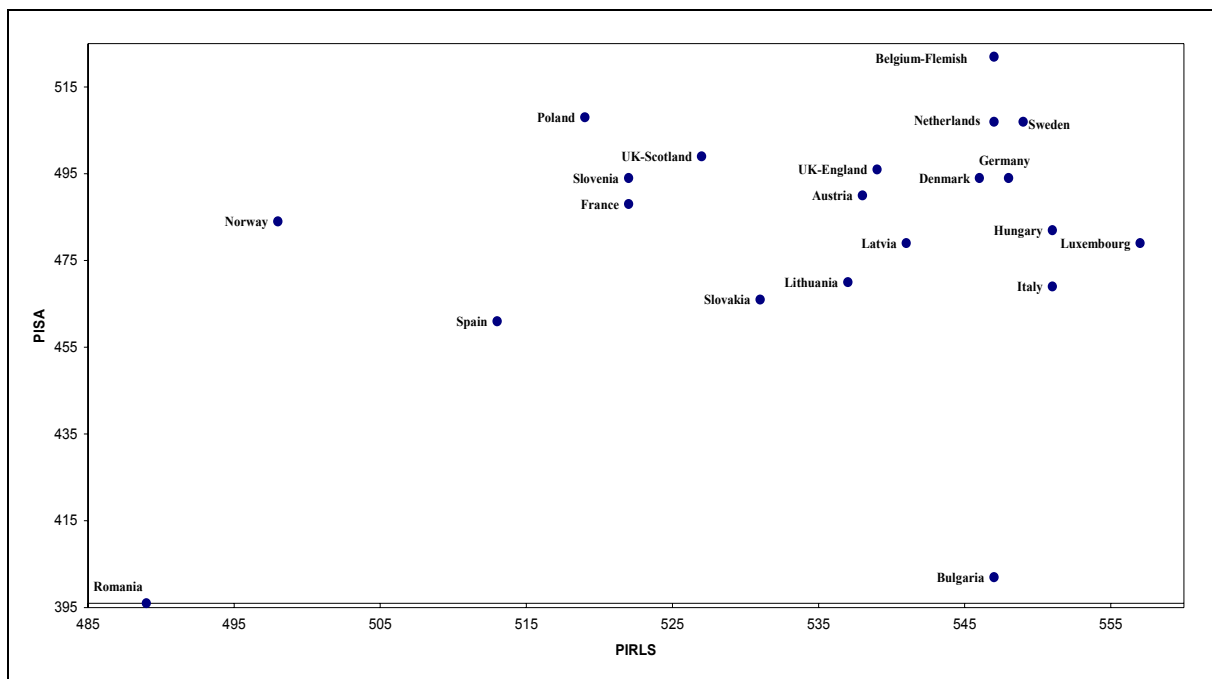
The first two form the basis of the written test in reading comprehension. The student background questionnaire addresses the third aspect. While all large EU countries are

covered by PIRLS 2006, two high performers in PISA (Finland and Ireland) are not participating in PIRLS.

PIRLS defines low performers as pupils who do not reach 400 points and the advanced international benchmark 625 points. 15% of EU education systems only reach this benchmark for low reading performance, and not the intermediate benchmark of 475 points. The Netherlands (8%) and Belgium FL (9%) have the lowest share of low performers, while Romania (23%) and Belgium WL (26%) have the highest share.

Among the Member States, Luxembourg was the top performer with the highest average score of 557 points, followed by Italy (551) and Hungary (551). The EU countries that show the most progress since 2001 are Slovenia (+20 points, from 502 to 522), Slovakia (+13 from 518 to 531) and Italy (+11 from 541 to 551). The countries where performance has declined most were Romania (-22, from 512 to 489), UK - England (-13, from 553 to 539) and Sweden (-12 from 561 to 549).

Chart 5.7 Country performances in PIRLS and PISA (2006)



Data source: OECD PISA database 2006, IEA, PIRLS 2006

5% of pupils in the participating EU education systems failed to reach the PIRLS benchmark for low reading performance. In Luxembourg and Lithuania only 1% are below this level, while in Romania the share is 16%.

Russia (565 points) performed best of the 45 participating educational systems, followed by: Hong Kong (564), the Canadian province Alberta (560) and Singapore (558). Luxembourg, the best performing EU country, scored 557 points at 6th place.

Also in the PIRLS, as in PISA, survey results show that girls had higher average achievement than boys in all participating countries. Internationally the average score for girls was 509 and 492 for boys. Boys in Germany and Italy are the only ones that showed an improvement over the 2001 survey.

Chart 5.7 illustrates the average scores for the participating countries in the PISA reading literacy (the Y-axis) and the results from the reading test in PIRLS (the X-axis). Reading the graph along the vertical axis provides information on where the country is in PISA scores, while reading it horizontally gives an indication of country positions in PIRLS.

These two score scales are not directly comparable since they refer to different tests and different age groups. A score of 400 in PISA is not equivalent to a score of 400 in PIRLS. It is important to note that they measure slightly different reading capacities: PISA measures literacy and application in a real-world context, while PIRLS is focused on curriculum knowledge.

The figure is constructed in such a way that each of the axes goes from the lowest and highest country average in the respective surveys. In this way, the position of the countries is relative to the minimum and the maximum in each survey. The diagonal line illustrates the points where the countries perform equally in both surveys in relation to the highest and lowest performers.

Most countries perform comparatively better in PISA than in PIRLS, especially Poland and Norway. Pupils from Belgium (Fl), the Netherlands and Sweden have high scores in both tests, while Bulgaria stands out with a relatively high score in PIRLS and low scores

in PISA. Romania has the lowest scores in both PISA and PIRLS among the participating countries.

Comparison between national scores in the two surveys is informative because of the different approaches to measuring skills. Why is it that countries such as Bulgaria, Italy or Luxembourg perform relatively better in PIRLS than in PISA? Are they more focused on curriculum knowledge than on real-world competences? Could it be that younger cohorts (4th graders) are better prepared in literacy terms? More research is needed to clarify and highlight the complementarities of the two surveys.

5.2 Language Skills: Learning and Teaching

The 2002 Barcelona European Council highlighted the importance of language learning in European integration and within the Lisbon process when it called for “the mastery of basic skills, in particular by teaching at least two foreign languages from a very early age.” (Council, 2002c, paragraph 44) As a consequence, knowledge of foreign languages is now recognised as one of the key competences that should be intensively cultivated within lifelong learning (Council, 2006a). The recommendation defined communication in foreign languages as the “ability to understand, express and interpret concepts, thoughts, feelings, facts and opinions in both oral and written form (listening, speaking, reading and writing) in an appropriate range of societal contexts — work, home, leisure, education and training — according to one’s wants or needs. Communication in foreign languages also calls for skills such as mediation and intercultural understanding.” (Council, 2006a)

Indicators for monitoring performance and progress

It is obligatory to learn at least one foreign language in compulsory education in all Member States (except Ireland and Scotland), and a second foreign language is often optional. (Eurydice, 2005b)

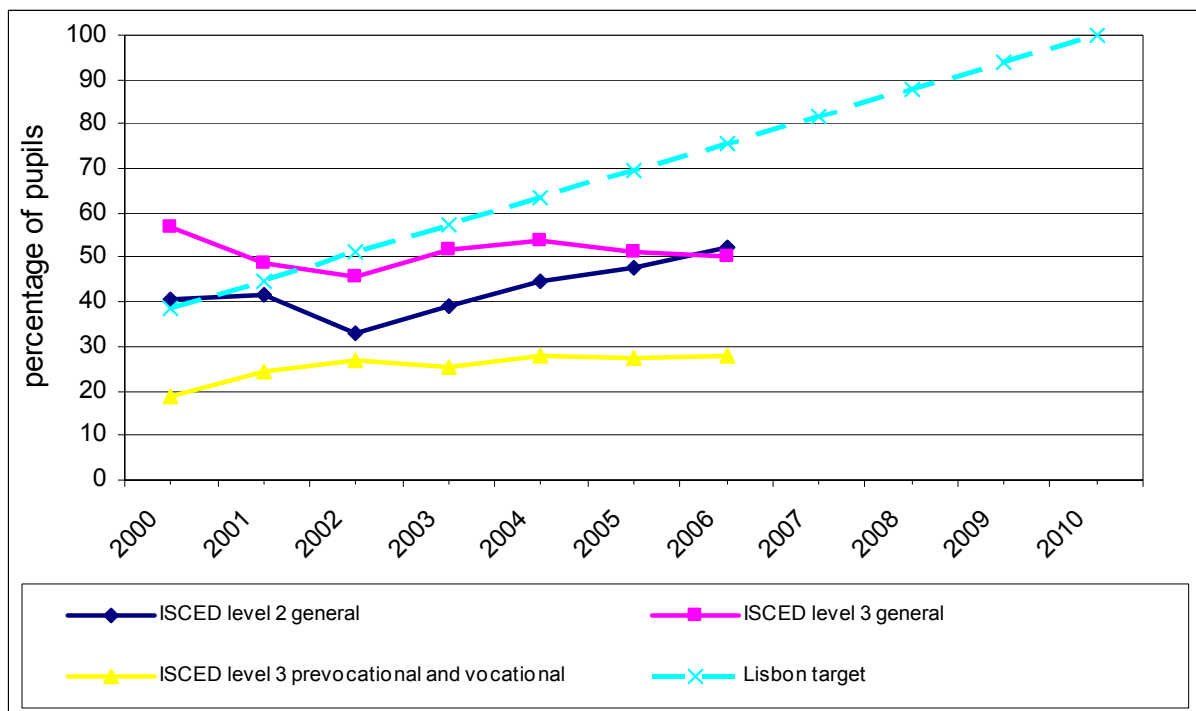
In 2006, more than half of the pupils in the EU were learning at least two foreign languages in secondary general education; 52.3% in lower

and 50.1% in upper secondary education. (See Chart 5.8)

In Denmark, Greece, Romania and Portugal more than 90% of pupils learn two foreign languages in lower secondary education, and in upper secondary general education this is true of the Czech Republic, Slovenia and Slovakia.

The number of students learning two foreign languages increased from 2005 to 2006 by 4.5 percentage points in lower secondary education and decreased by 1.0 percentage points in upper secondary education. The positive trend does not concern pre-vocational and vocational education, which decreased by 1.3 percentage points from 2005 for the average of the EU.

Chart 5.8 Percentage of pupils learning two foreign languages in EU. 2000-2006.



Source: Eurostat Data source: OECD PISA database 2006, IEA, PIRLS 2006

Foreign language teaching is arranged in the following ways (EURYDICE, 2005b):

Pupils in lower secondary education in all Member States have the possibility of learning a minimum of two foreign languages.

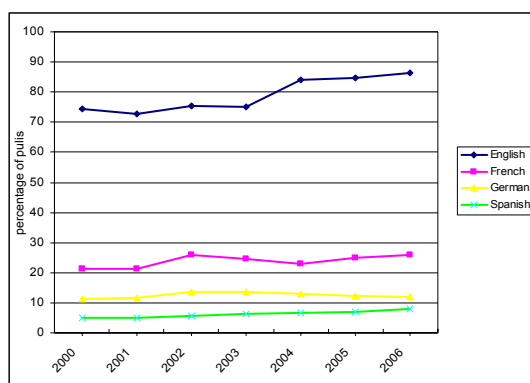
- In primary and lower and upper secondary pupils *must* learn at least two foreign languages for at least a year of full-time compulsory education (FI, SE, EE, LV, LT, DK, NL, BE NL, LU, FR, PT, IS, HU, SK, BG, RO, EL, CY, LI).
- The first foreign language is compulsory and pupils can learn the second for a year at least during full time compulsory education: NO, BE FR, BE DE, ES, SI
- Pupils *can* (DE, MT) and *must* (CZ, AT, PL) learn a minimum of two foreign languages from the beginning of upper secondary education.
- Two foreign languages are not available to all pupils but may be offered within the flexible curriculum. (IT, UK, IE)

Table 5.1: Average number of foreign languages learned in general lower and upper secondary education, and in pre-/vocational programmes in upper secondary education. 2006

| | ISCED level 2 General | ISCED level 3 General | ISCED level 3, prevocational and vocational |
|------------------|--------------------------|--------------------------|---|
| EU 27 | 1.4 | 1.6 | 1.1 |
| Belgium | 1.3 | 2.2 | 1.3 |
| Belgium Wallonia | 1.0 | 1.8 | 0.8 |
| Belgium Flanders | 1.4 | 2.5 | 1.7 |
| Bulgaria | 1.3 | 1.8 | 1.2 |
| Czech Republic | 1.1 | 2.1 | 1.3 |
| Denmark | 2 | 2.2 | 0.9 |
| Germany | 1.3 | 1.4 | 0.5 |
| Estonia | 2 | 2.3 | 1.8 |
| Ireland | 1 | 0.9 | 0.9 |
| Greece | 1.9 | 1.1 | 0.8 |
| Spain | 1.4 | 1.2 | 1 |
| France | 1.5 | 2 | 1.1 |
| Italy | 1.7 | 1.3 | 1.4 |
| Cyprus | 1.9 | 1.7 | 1.2 |
| Latvia | 1.6 | 1.8 | : |
| Lithuania | 1.8 | 1.6 | 0.9 |
| Luxembourg | 2.5 | 3 | 1.9 |
| Hungary | 1 | 1.4 | 0.7 |
| Malta | 2.2 | 1.0 | : |
| Netherlands | 2.7 | 2.6 | : |
| Austria | 1.1 | 1.9 | 1.3 |
| Poland | 1.1 | 1.8 | 1.5 |
| Portugal | 1.9 | 0.7 | 0.9 |
| Romania | 2 | 1.9 | 1.4 |
| Slovenia | 1.3 | 2 | 1.4 |
| Slovakia | 1.2 | 2 | 1.3 |
| Finland | 2.2 | 2.7 | : |
| Sweden | 1.7 | 2.1 | 1.1 |
| United Kingdom | 0.6 | 0.1 | : |
| Croatia | 1.3 | 2 | 1.2 |
| FYR Macedonia | 1.7 | : | : |
| Turkey | : | 0.7 | 0.8 |
| Iceland | 2.1 | 1.9 | 0.7 |
| Norway | 1.6 | : | : |

Source: Eurostat, UOE.

For notes see: http://epp.eurostat.ec.europa.eu/portal/page?_pageid=0,1136184,0_45572595&_dad=portal&_schema=PORTAL

Chart 5.9 Proportion of pupils learning English, French, German, Spanish at ISCED level 2 in EU. 2000-2006

Source: Eurostat

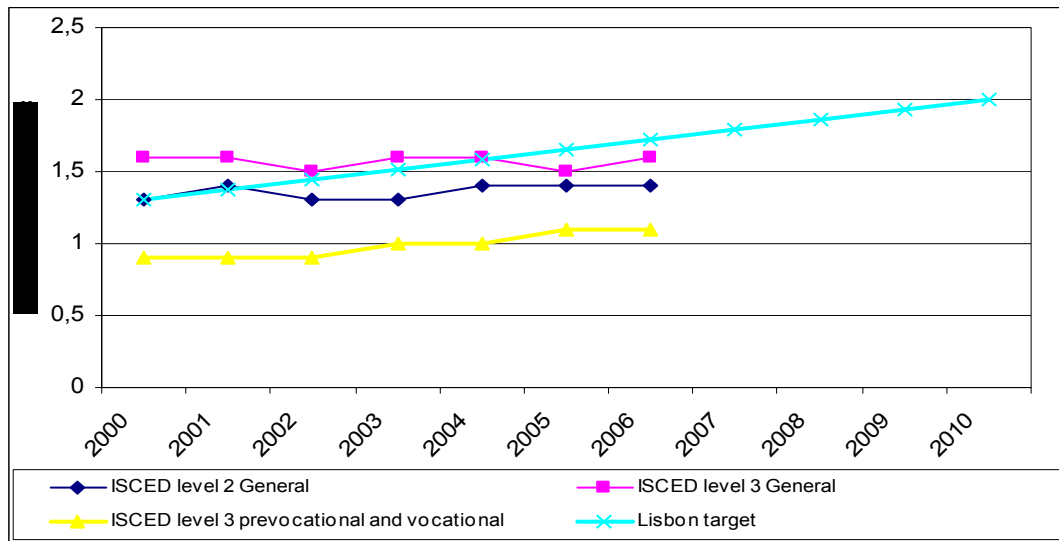
In some countries, the proportion of pupils learning two foreign languages has increased substantially. For example in lower secondary education in Italy it increased from 44% to 72% between 2005 and 2006.

The average number of foreign languages learned per pupil is higher in upper than in lower secondary general education (See Table 5.1). In upper secondary education, pupils learn two or more foreign languages in 12 countries. Luxembourg has the highest average number of foreign languages learned, with three, whereas in the United Kingdom it is only 0.1. In lower secondary education pupils

in eight countries learn at least two foreign languages. However it should be mentioned that in 11 Member States pupils continue to learn more languages in lower than in upper

secondary education, while in upper secondary general education this average increased by 0.1 percentage points from 2005 to 2006.

Chart 5.10 Average number of foreign languages learned per pupil in EU. 2000-2006.



Source: Eurostat UOE

For notes see:

http://epp.eurostat.ec.europa.eu/portal/page?_pageid=0,1136184,0_45572595&_dad=portal&_schema=PORTAL

Comparing the last two years, the European average number of foreign languages learned per pupil in lower secondary general education has remained unchanged.

In prevocational and vocational upper secondary education, the average number of foreign languages learned per pupil is lower than in general upper secondary education. In most countries at least one foreign language is learned, but in nine countries the average is lower than 1. The number of foreign languages learned ranged from 0.5 in Germany to 1.8 in Estonia and 1.9 in Luxembourg.

The proportion of pupils learning English in lower secondary education increased from 74.3% in 2000 to 86.4% in 2006. The highest relative increase is for the teaching of Spanish. Even if only 7.9% of pupils were learning Spanish in 2006, the increase is still more than 50% from 2000. The number of pupils learning French and German has also increased, at 22%

and 5% respectively. (See Chart 5.9)

In the great majority of Member States, English is the most widely taught language in general secondary education. Just two countries are exceptions: Belgium and Luxembourg in lower secondary education. In Denmark, Malta, Sweden for lower education and in the Czech Republic and the Netherlands for upper secondary education, English is learned by 100% of pupils. In Luxembourg, French and German are learned by all pupils in lower secondary education. In the Nordic countries and in Central and Eastern Europe, German is the second most widely taught language. In Southern Europe and especially the Latin countries (Spain, Italy and Portugal) as well as the German-speaking countries, French is the second most widely taught language. It is important to emphasise that for Estonia, Latvia, Lithuania and Bulgaria, Russian is the second most taught language. (See Table 5.2)

Table 5.2 Proportion of pupils learning English, French, German and Spanish in lower and upper secondary education. 2006

| Country | Pupils learning English at ISCED level 2 (GEN) — as % of total pupils at this level | Pupils learning English at ISCED level 3 (GEN) — as % of total pupils at this level | Pupils learning French at ISCED level 2 (GEN) — as % of total pupils at this level | Pupils learning French at ISCED level 3 (GEN)- as % of total pupils at this level | Pupils learning German at ISCED level 2 (GEN) — as % of total pupils at this level | Pupils learning German at ISCED level 3 (GEN) — as % of total pupils at this level | Pupils learning Spanish at ISCED level 2 (GEN) — as % of total pupils at this level | Pupils learning Spanish at ISCED level 3 (GEN) — as % of total pupils at this level |
|------------------|---|---|--|---|--|--|---|---|
| EU 27 | 86.4 | 89.4 | 25.9 | 20.6 | 11.9 | 24.7 | 7.9 | 15.7 |
| Belgium | 44.2 | 94.4 | 56.2 | 48.1 | 0.7 | 28.4 | - | 4.7 |
| Belgium Wallonia | 38.9 | 90.0 | - | - | 1.7 | 5.8 | - | 6.9 |
| Belgium Flanders | 47.9 | 99.1 | 94.8 | 99.1 | - | 52.3 | - | 2.4 |
| Bulgaria | 69.1 | 86.1 | 10.4 | 15.3 | 17.4 | 40.3 | 1.4 | 7.6 |
| Czech Republic | 77.6 | 100 | 2.3 | 25.0 | 26.7 | 72.2 | 0.6 | 8.8 |
| Denmark | 100 | 99.9 | 12.1 | 22.6 | 89.4 | 71.9 | - | 27.9 |
| Germany | 96.4 | 94.3 | 24.3 | 28.7 | - | - | 2.1 | 15.1 |
| Estonia | 93.2 | 92.6 | 2.0 | 6.1 | 19.9 | 44.1 | 0.1 | 0.3 |
| Ireland | - | - | 67.9 | 60.5 | 22.4 | 18.2 | 8.0 | 8.8 |
| Greece | 98.9 | 94.0 | 57.9 | 8.6 | 37.8 | 2.9 | - | - |
| Spain | 98.5 | 94.6 | 38.4 | 27.1 | 2.4 | 1.1 | - | - |
| France | 96.7 | 99.4 | - | - | 14.4 | 22.8 | 34.7 | 62.4 |
| Italy | 96.0 | 96.9 | 61.3 | 21.4 | 6.8 | 7.7 | 8.0 | 5.0 |
| Cyprus | 99.1 | 88.1 | 93.6 | 38.3 | 0.9 | 2.4 | 0.2 | 7.7 |
| Latvia | 97.2 | 94.9 | 0.8 | 4.1 | 16.4 | 35.1 | 0 | 0.5 |
| Lithuania | 92.3 | 82.3 | 4.0 | 5.4 | 23.4 | 27.2 | 0 | 0.3 |
| Luxembourg | 52.8 | 97.0 | 100 | 97.0 | 100 | 97 | - | 7.6 |
| Hungary | 56.2 | 73.3 | 0.6 | 6.2 | 39.6 | 49.9 | 0.1 | 1.3 |
| Malta | 100 | 63.5 | 43.0 | 7.9 | 9.5 | 1.7 | 3.0 | 1.3 |
| Netherlands | - | 100 | - | 70.1 | - | 86.2 | - | - |
| Austria | 99.1 | 96.9 | 5.2 | 54.1 | - | - | 0.4 | 12.0 |
| Poland | 73.5 | 90 | 1.5 | 10.0 | 27.9 | 64.0 | 0.2 | 1.0 |
| Portugal | 98.8 | 50.7 | 93.3 | 15.1 | 0.5 | 1.6 | 2.0 | 0.9 |
| Romania | 95.1 | 94.8 | 87.6 | 83.6 | 10.6 | 11.6 | 0.5 | 2.2 |
| Slovenia | 95.1 | 98.9 | 2.6 | 10.2 | 33.0 | 77.0 | 0.8 | 5.7 |
| Slovakia | 68.6 | 97.7 | 1.7 | 16.0 | 35.4 | 72.6 | 0.2 | 4.7 |
| Finland | 99.2 | 99.5 | 6.8 | 19.7 | 14.1 | 35.4 | - | 10.3 |
| Sweden | 100 | 99.9 | 17.1 | 22.4 | 24.9 | 32.4 | 31.6 | 40.6 |
| United Kingdom | - | - | 34.8 | 6.0 | 13.1 | 2.6 | 7.8 | 2.5 |
| Croatia | 88.4 | 98.3 | 1.2 | 3.4 | 34.5 | 65.6 | 0.1 | 1.6 |
| FYR Macedonia | 98.3 | - | 45.5 | - | 20.9 | - | - | - |
| Turkey | - | 67.3 | - | 0.7 | - | 6.5 | - | - |
| Iceland | 99.3 | 76.1 | 1.9 | 17.1 | 4.2 | 30.7 | 3.4 | 17.2 |
| Norway | - | - | 17.6 | - | 28.1 | - | 7.8 | - |

Source: Eurostat, UOE

For notes see: http://epp.eurostat.ec.europa.eu/portal/page?_pageid=0,1136184,0_45572595&_dad=portal&_schema=PORTAL

5.3 ICT skills for young and adults

Use of ICT in education and training has been a priority in most European countries over the past decade, but progress has been patchy. There are considerable differences in “e-maturity”, both within and between countries and between schools in the same country (ICT report, 2006). Digital competence is defined in the European Parliament and Council Recommendation as a sound understanding and knowledge of the nature, role and opportunities of ICT in an everyday context: in personal and social life as well as at work.⁴⁹

Considerable evidence of the impact of ICT use on learning and learners is building up, providing a basis for a number of preliminary

conclusions. The PISA survey shows that, on average, pupils with access to a computer at school perform better than pupils without.

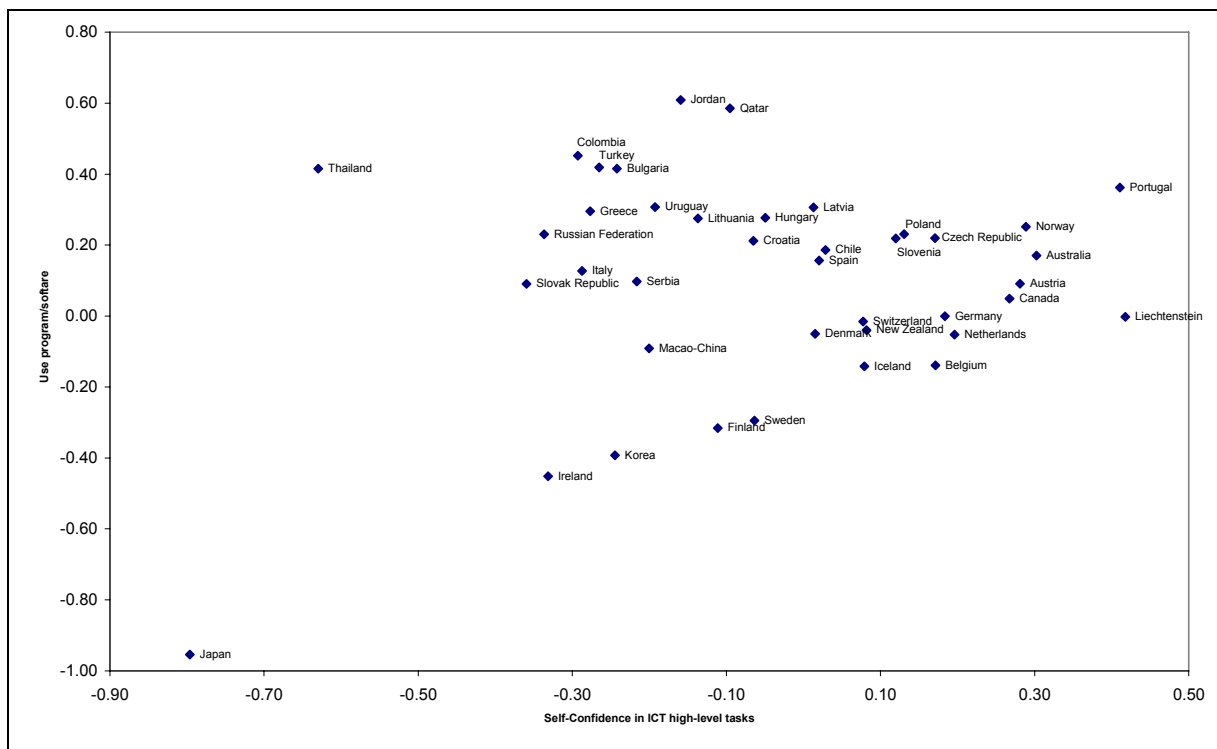
The IEA SITES study (Law et al., 2008) investigates to what extent and how ICT is used in education and how it supports and enhances teaching practice. Nine Member States participated in the study along with 13 other educational systems around the world. What it shows is that there have been great improvements in access to computers and internet since 1998 and participating EU countries have spent more on ICT during the last five years than the other participating educational systems. The study found that the impact of ICT on students’ performance, as perceived by teachers, was highly dependent

on teaching approaches. Students did better in acquiring skills when teachers provided more student-centred guidance and feedback and when they engaged more frequently in advising students on group work and inquiry projects. It was also found that higher levels of reported ICT use did not necessarily go hand in hand with higher levels of perceived learning gains from ICT use. However, the “Benchmarking Access and Use of ICT in European Schools 2006” report testifies to an increase in motivation and attention by students when ICT is used in classroom. Other studies, as reviewed by the European Schoolnet in the 2006 “ICT impact report” indicate further positive effects on attitudes and communication and more reflective skills on the learning process and its outcomes. Furthermore, a series of studies report that ICT does promote independent learning and teamwork with a variety of positive consequences on teaching and learning activities (greater responsibility, better organisation of learning etc.).

According to the Global Information Technology Report 2007-2008, Denmark is the most networked economy in the world, followed by Sweden. Korea and the US show the most notable improvements. The report stresses the importance of a coherent government vision on the importance of ICT, coupled with an early focus on education and innovation to lay the foundations for network readiness and sustainable growth.

PISA has a module on the “ICT familiarity component” in the student questionnaire. It does not directly assess ICT skills, but it asks students how well they do specific computer tasks: “I can do this very well by myself”, “I can do this with help from someone”, “I know what this means but I cannot do it” or “I don’t know what this means”. With these items, PISA has created two self-confidence scales on the use of ICT: in internet tasks and in “high level tasks” (see Chart 5.11).

Chart 5.11 Self-confidence in ICT high level tasks and use of ICT program/software 2006



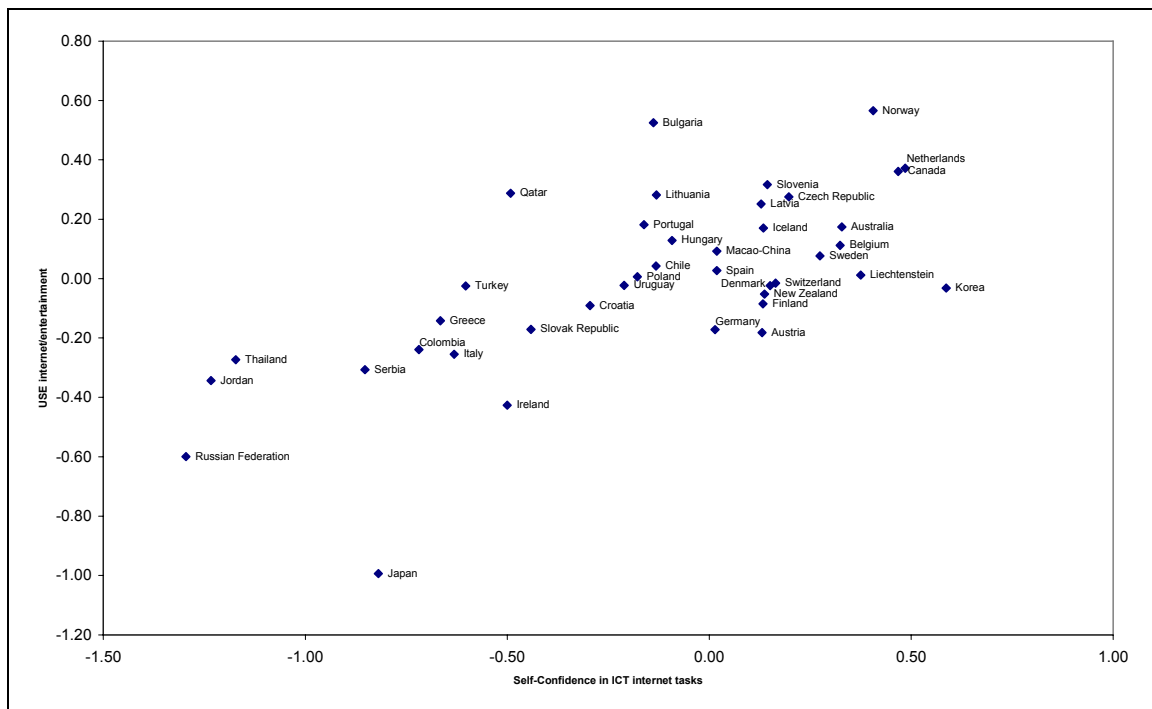
Source: OECD, PISA database 2006

The scales were created by PISA using IRT scaling techniques, higher levels of use or confidence in computers and internet. In addition, PISA has information on the frequency of computer use, where students are asked how often they use computers for the 16 tasks evaluated in their self-perception performance. Information on the place where students usually use computers is also available in PISA 2006 (see App 2 in the Appendix and the chapter on school development).

Compared to countries outside Europe, the European countries have a relatively high degree of self-confidence in the use of ICT, whereas Japan is singled out as the country with by far the lowest self-confidence levels in the field, and also the relatively lowest use of ICT. Korea is also performing below most European countries in these two domains. It is interesting to see Finland and Sweden among the lowest users of ICT in Europe. Jordan and Qatar are best performers, with Bulgaria and Portugal as the European countries with highest levels of use of ICT.

Chart 5.12 illustrates the same as Chart 5.11 but in relation to the internet. For internet confidence, Korea is out in front, with the Netherlands as the first European country. Bulgaria is the highest among the Member States on the use of internet scale, while Norway is the best performing among all countries. Ireland, Italy and Greece perform relatively low on these measures. While there is a positive and relatively clear relationship between self-confidence in internet tasks and use of internet, more use of computer programs does not seem to be related to higher confidence. In other words, countries where the 15 year olds report high confidence in internet use do not necessarily translate into high levels of computer use in general. This begs the question of how far self-confidence is interacting with actual ICT use. Cultural aspects might be driving the way people perceive their self-confidence, and the general level of computer awareness in a country might influence the perceived confidence in ICT use. Availabilities of computers might also play a role, since people can feel confident of doing something, but they might not have the opportunity to actually do it.

Chart 5.12 Self-confidence in internet tasks and use of internet/entertainment. 2006.



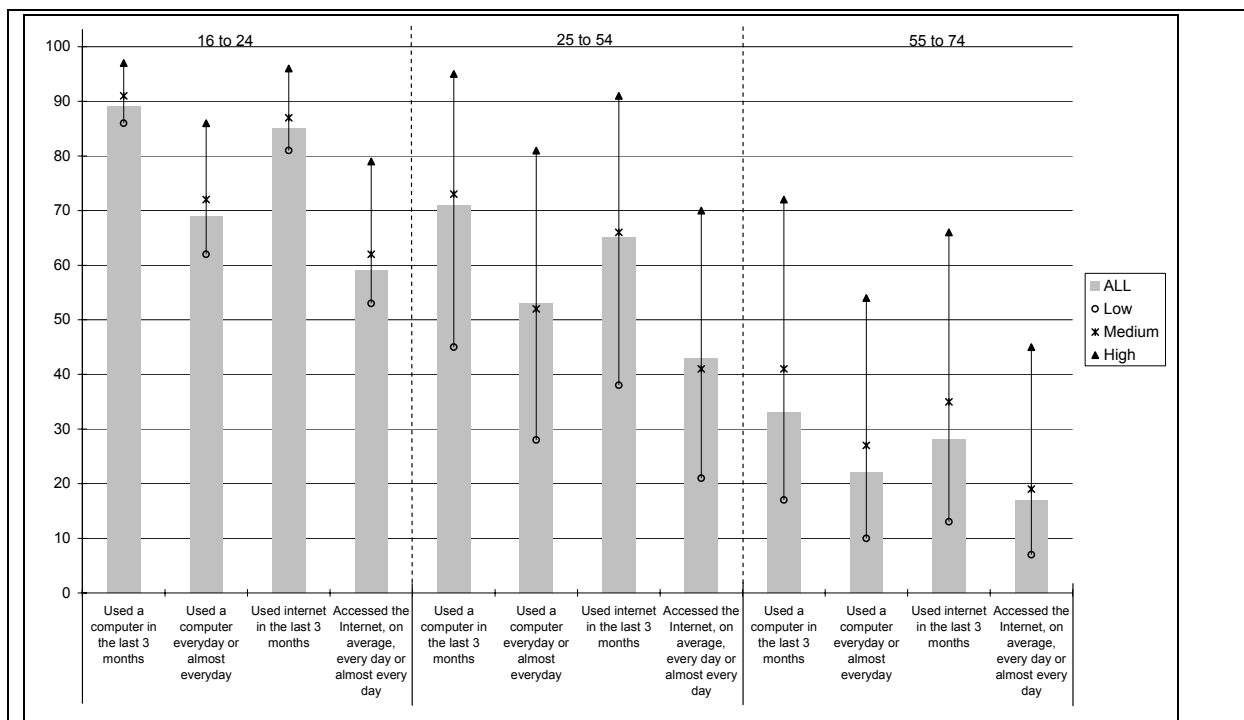
Source: OECD, PISA database 2006

At present only limited data are available on ICT competences amongst adults at European level. In terms of monitoring tools, an important source of comparative cross-national data on ICT skills and computer use can be found in EUROSTAT's Information Society Statistics (ISS). ISS uses two main surveys on "ICT usage in enterprises" and "ICT usage in households and individuals". The aggregate numbers can be obtained by breakdowns of

age group, sex, educational level, employment situation and region.

Chart 5.13 shows the percentage of individuals who have used a computer or the internet and the frequency of use by age and level of education. The chart illustrates the average situation for all Member States, but it gives a good picture of the general situation at country level.

Chart 5.13 Use and frequency of use of computers and internet by age and educational attainment. EU average. 2006



Source: Eurostat

There is a big difference between use and frequency of computer and internet use by age. While almost 90% of all individuals aged 16 to 24 years old have used a computer in the last three months, and around 70% use it almost everyday, the same figures for the age group 55 to 74 years old are 30% and 20% respectively. A similar pattern appears in internet use.

The chart also shows that higher levels of educational attainment are related to higher computer and internet use. For example, 65% of individuals with higher education use the internet every day or almost every day, while this is true of only around 20% of the population with a low level of education. Young cohorts present less differences

between well and low educated. But this is partially due to the fact that many in the young cohorts are still in education. Country differences are considerable in terms of the level of internet and computer use.

They range from almost 90% of all individuals in Sweden using a computer to less than 35% in Romania. In general terms, Scandinavian countries have less difference between young and old, and between well and low educated, while Eastern and Southern European countries have higher differences. In Portugal, for example, the differences are 60% between young and old cohorts in their use of computers. There are also considerable gender differences. Men use computers and the internet more often than women. Luxembourg

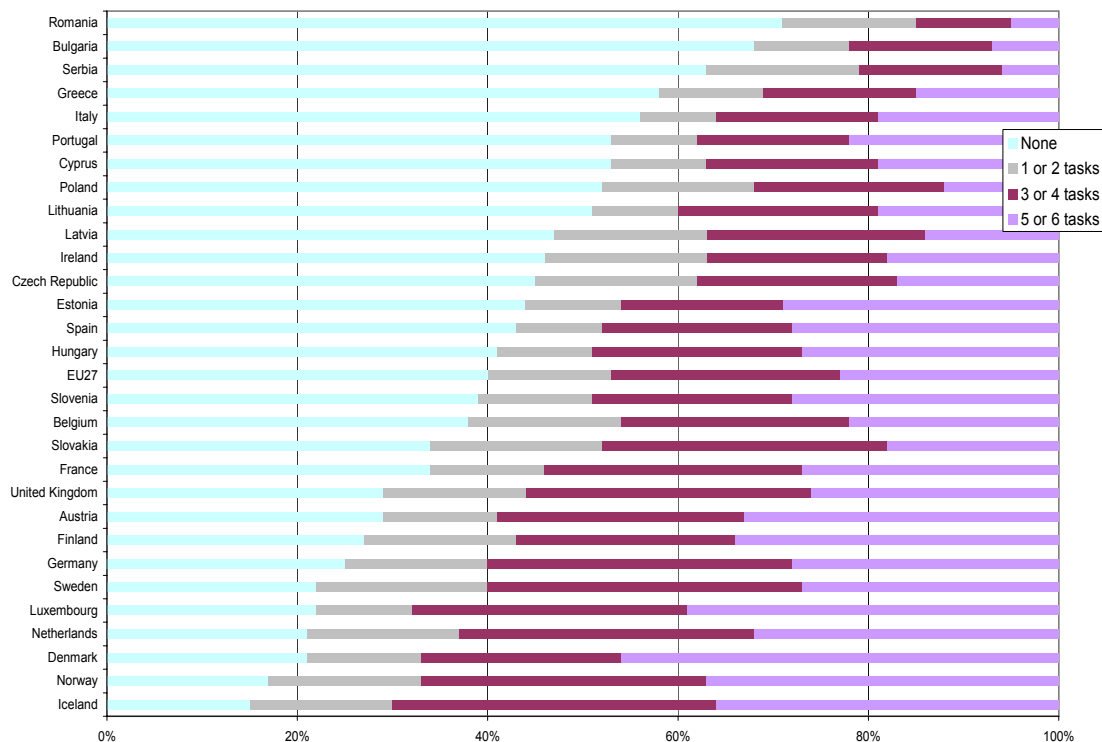
has the highest gender differences here: 68% of men but only 44% of women report using the internet every day or almost every day. Italy, Austria and Greece also have high gender inequalities. The Eastern European countries have smaller differences; in Bulgaria and Estonia, women use computers more than men.

In terms of trends, the percentage of people using the internet and computers has increased in the last three years in the EU27. However, the gap between low and high educated individuals has not narrowed EU. 19% more of the high educated individuals used the internet every day or almost every day in the EU as against 11% more of the low educated between 2004 and 2007.

In almost all EU countries the gap has remain stable or has increased. This is especially true of the frequency of internet use. Only the Netherlands, Luxembourg and the Scandinavian countries show higher growth among low educated individuals in the frequency of use of the internet. For frequency of computer use, low educated individuals are catching up in more EU countries, especially the Scandinavian countries. Gender differences are being reduced almost in all Member States, but the gap in terms of age group is growing.

Computer and internet use will necessarily affect the level of ICT skills, as we shall see later. The general pattern for internet and computer use holds true for ICT skills too.

Chart 5.14 Computer skills by number of tasks or actions. 2006.



Source: Eurostat

The information on skills *per se* available from EUROSTAT — ISS is limited. In terms of e-skills we can get the percentage of people who say they have done some of the following tasks in the last 3 months, in the last year:

- Moved files
- Copy and paste
- Basic arithmetic in a spreadsheet
- Compressed files
- Installed new devices
- Written a computer program

The six tasks could be considered within a gradient of difficulty, since some tasks are easier than others. However, the fast changing pace of ICT makes it hard to assess ICT-skills. Some of the tasks that at one point in time might have required quite sophisticated knowledge of computer use turn out to be easy a few years later.

For example, installing a new device was much more complicated before the widespread

introduction of “plug and play” functionality. Also important to note is that some of these tasks might simply be of no interest for some individuals. Most computer users will have no need to write a computer program or compress a file. Thus, the current way of measuring adults' ICT skills refer more to actual use than to competences.

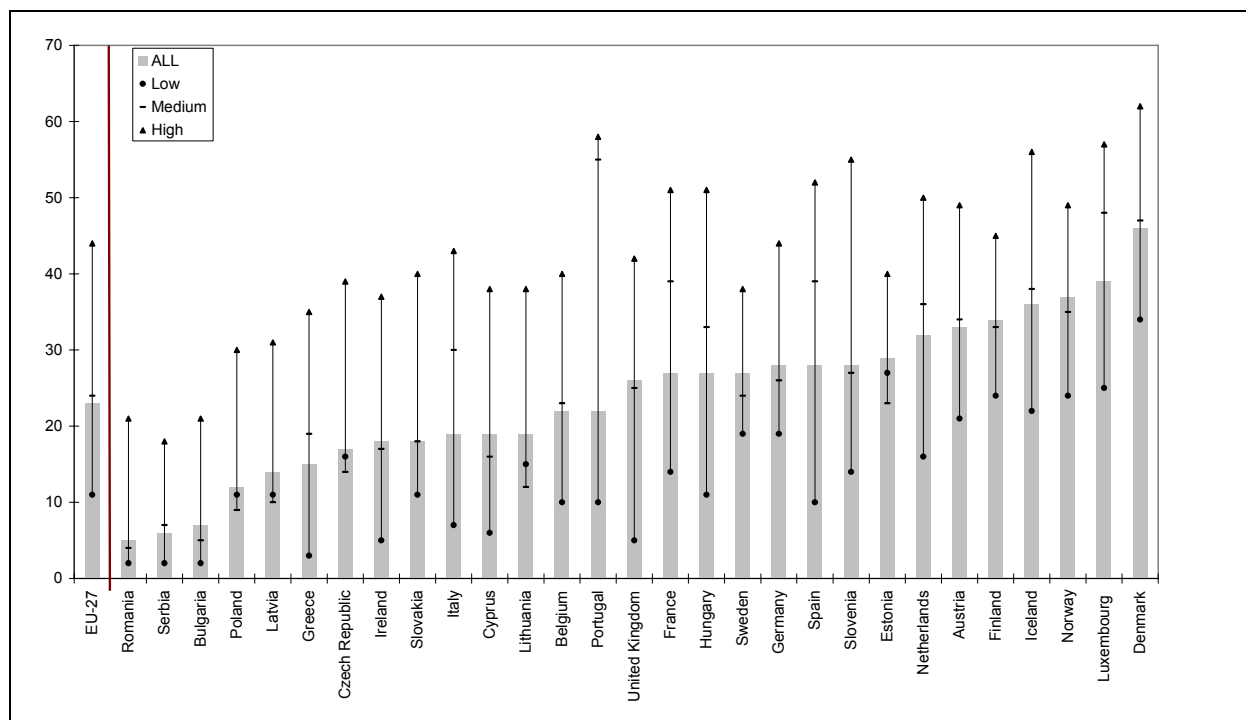
The current measures of ICT skills and use do not explain how ICT are used for complex problem solving, creativity and innovation. Further improvements to ICT measurement should be encouraged.

Looking at the percentage of individuals carrying out each of these tasks per country, we see that Scandinavian countries together

with the Netherlands are among the countries with the lowest proportion of people who have not carried out at least two of the tasks. The range of people who have done none of the six tasks is from 71% in Romania to 15% in Iceland. The Netherlands is the Member State with the lowest percentage (21%).

The percentage with high computer skills (carried out 5 or 6 of the tasks) ranges from less than 5% in Romania to around 45% in Denmark. As in the case of computer and internet use, ICT skills differ by age, gender and educational level. Individuals with higher education report a high level of computer ICT skills compared with individuals with a low level of education.

Chart 5.15 Percentage of individuals that report having carried out 5 or 6 computer tasks by level of education. 2006.



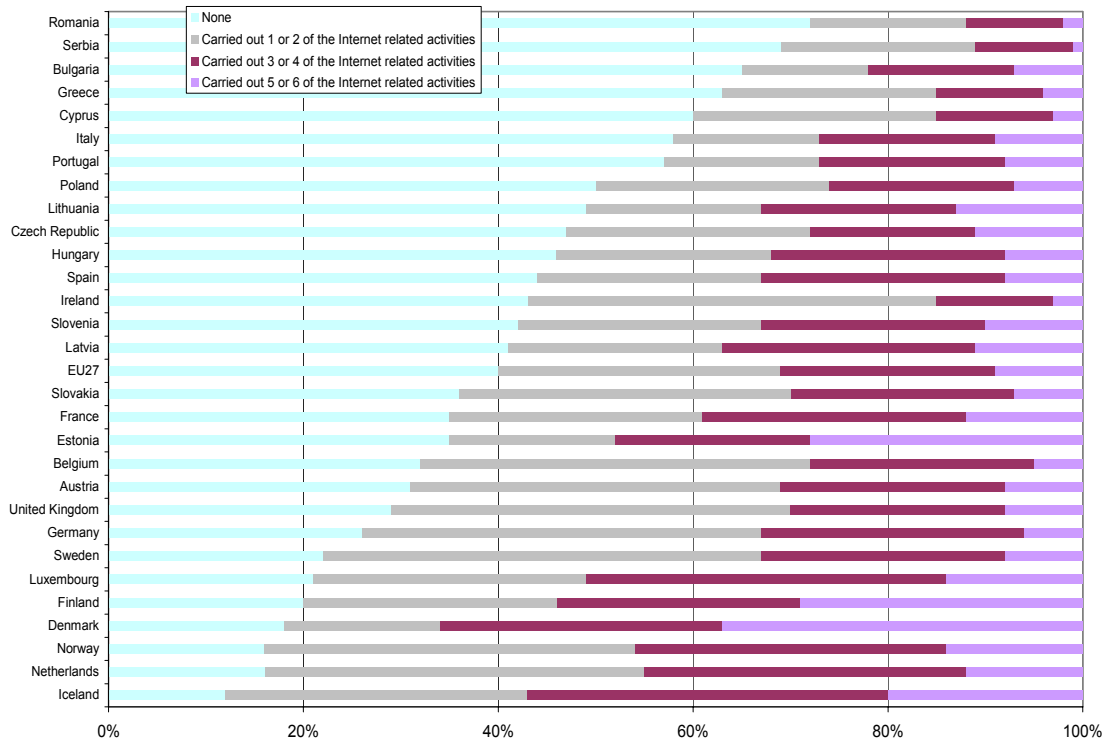
Source: Eurostat

For the EU, there is a difference of 33 percentage points between the low and high educated. Young cohorts tend to carry out more tasks than the older ones. It is interesting to note that the pattern of computer use is similar for young and older individuals. Elderly people report similar ICT skills to youngsters, albeit at a lower level. In both age groups, moving a file and copy and pasting show the highest proportion of individuals,

while writing a computer program or compressing a file has the lowest return.

A similar pattern applies by level of education, but the percentage of people doing each of the tasks is always greater for the better educated individuals. It happens in all countries where data exists. Differences between levels of education are especially marked in Portugal, Hungary, Spain and Slovenia, with a more than 40% gap between low and high educated.

Chart 5.16 Use of Internet, 2006.



Source: Eurostat

Chart 5.16 shows the percentage of individuals carrying out none, one or two, three or four, and five or six internet-related tasks. As in the case of computer use, the differences are quite marked from country to country. Scandinavian countries, together with the Netherlands, are among the ones with the lowest proportion of people who have not carried out at least two of the tasks.

The range of people who have done none is from 71% in Romania to 15% in Iceland. The Netherlands is the Member State with the lowest percentage (21%). EUROSTAT provides information on the use of internet by asking individuals if they have carried out one of the following tasks:

- used a search engine;
- sent an email with attached files;
- posted messages to chat rooms, etc.;
- used the Internet to make phone calls;
- used peer-to-peer file sharing;
- created a Web page

Measuring internet skills is as tricky as measuring computer ICT skills. In this case, the tasks are less clear on the gradient of difficulty. The data are therefore more clearly

an indication of the level of internet use, rather than the level of skill.

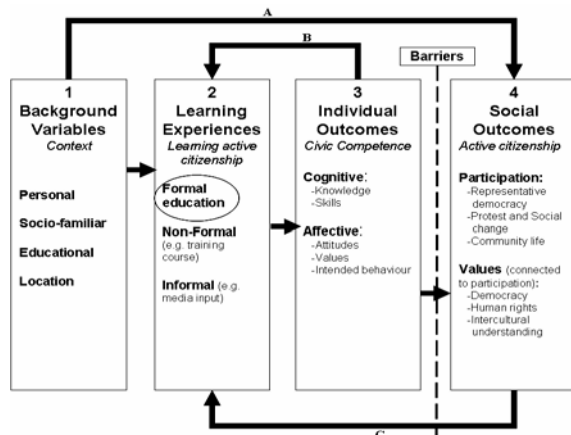
A similar pattern as for computer use appears for the percentage of individuals who report having carried out each of the activities in the last three months by country. Nordic countries and the Netherlands are at the top, while Southern European together with Romania and Bulgaria return lower percentages. Differences are quite big among countries. Romania has the highest percentage of people who have never carried out any of the internet tasks, while the Netherlands is the EU country with the lowest proportion. There is a clear difference in the pattern of internet use by the young and the older cohort. While no more than 10% of older individuals report using chat rooms, 60% of young Europeans do so. The level of education and age differences are thus similar in all countries.

EUROSTAT has been collecting ISS statistics for the last three years in all the Member States. In the five years for which we have data, changes have been slow in general terms. The difference between low and well educated has not been reduced, and this is true for both young and old.

5.4 Civic skills and active citizenship

Exploratory research has taken place on indicator development for active citizenship and civic skills (Hoskins et al 2006a, Hoskins 2008a, and Kerr and Losito 2008). The working definition of Active citizenship which has been used is 'Participation in civil society, community and/or political life, characterised by mutual respect and non-violence and in accordance with human rights and democracy' (Hoskins, 2006b). Two composite indicators have been developed – one on active citizenship (actions), see column 4 chart 5.17, and one on civic competence (knowledge, skills, attitudes and values), see column 3 of the same chart.⁵⁰

Chart 5.17 Measuring Active Citizenship working model



Research in this field has been limited due to the lack of breadth and timeliness of data; nevertheless some interesting findings can be derived from existing data. In order to improve this situation the IEA is carrying out a new study (see part C) which will support the measuring of civic competences. However, how to measure the full breadth of active citizenship activities and values remains unresolved; one possibility would be for Eurostat to collect this data in their future surveys.

Civic competence

In the field of civics a number of exploratory studies on indicators from existing data have been carried out, including the development of a composite indicator on civic competence from IEA CIVED data 1999 by CRELL (Hoskins, 2008). This was based on the notion of competence measurement as described in

the introduction to Chapter 9 and has been further developed by exploring the nature of civic competence, in particular by reflecting on the attributes described in the European Commission Reference Framework on Key Competences and the further developments taken place by the Council of Europe, the research network Active Citizenship for Democracy and the research of Veldhuis and Abs (2006). This list below can be considered a useful basis for discussion on possible curriculum development. The data and scales used to measure the knowledge, skills, attitudes and values from the list below are from the IEA 1999 international Civic Education study of 14-year-olds in school. Not all dimensions however, were available from this data⁵¹.

Based on an empirical⁵² analysis of the IEA CIVED data a framework of four domains of civic competence was established: **Citizenship values**, **Social justice** (both values and attitudes), **Participatory attitudes** and **Cognition about democratic institutions**.⁵³ The results reflect only the situation for 14 year old pupils and not for the general population. Equal weights were given for each dimension and sub-dimension, and the composite indicator proved to be very robust (see Hoskins et al 2008a for further details).

In contrast to what is often observed in rankings such as the Active Citizenship Composite Indicator, the Civic Competence Composite Indicator ranking does not in general show clear geographical patterns.

There is some tendency for Southern European countries to be in the upper part of the ranking, with Cyprus and Greece doing particularly well in the overall Civic Competence Composite Indicator and in the domains of **Citizenship values**, **Participatory attitudes** and **Cognition about democratic institutions**. A common cultural heritage of the foundations of democracy could be a factor in this. However, a Northern European country like Norway can also be found in the top part of the overall Civic Competence Composite Indicator ranking, along with some new Member States such as Poland, Slovakia and Romania. Other Northern European countries such as Denmark and Finland are found in the lower-middle part of the Civic Competence Composite Indicator

rankings, together with some other new Member States such as Lithuania, Slovenia and Hungary.

Two Baltic States close the Civic Competence Composite Indicator rankings together with Belgium (FR). Certain regional results deserve further exploration.

Chart 5.18 The ideal list of knowledge, skills, attitudes, values and intended behaviour.

| | |
|---|---|
| <p>Knowledge:</p> <ul style="list-style-type: none"> ➤ Key elements of the political and legal system (human rights, social rights and duties, Parliamentary government, the importance of voting) (local, national, European level) ➤ Basic institutions of democracy, political parties, election programmes and the proceedings of elections ➤ The role of the media in personal and social life ➤ Social relations in society ➤ The history and cultural heritage of own country; of predominance of certain norms and values ➤ Different cultures in the school and in the country ➤ Main events, trends and change agents of national, European and world history ➤ The function and work of voluntary groups ➤ Knowledge of current political issues | <p>Skills:</p> <ul style="list-style-type: none"> ➤ To be able to evaluate a position or decision, take a position and defend a position ➤ To distinguish a statement of fact from an opinion ➤ To resolve conflicts in a peaceful way ➤ To interpret media messages (interests and value systems that are involved etc.) (critical analysis of the media) ➤ To be capable of examining information critically ➤ To possess communication skills (to be able to present one's ideas in verbal and/or written form) ➤ To be able to monitor and influence policies and decisions including through voting ➤ To use the media in an active way (not as consumer but as producer of media content) ➤ To build coalitions; to co-operate; to interact ➤ To be able to live and work in a multicultural environment |
| <p>Attitudes</p> <ul style="list-style-type: none"> ➤ To feel responsible for your decisions and actions in particular in relationship to other citizens ➤ To feel confident to engage politically ➤ To trust in and have loyalty towards democratic principles and institutions ➤ To be open to difference, change of own opinion and compromise | <p>Values:</p> <ul style="list-style-type: none"> ➤ Acceptance of the rule of law ➤ A belief in social justice and the equality and equal treatment of citizens ➤ Respect for differences including gender and religious differences ➤ Negative towards prejudice, racism and discrimination ➤ Respect for human rights (freedom, diversity and equality) ➤ Respect for the dignity and freedom of every individual ➤ Tolerance of difference ➤ A belief in the importance of democracy ➤ A belief in the need to preserve the environment |
| <p>Intended behaviour:</p> <ul style="list-style-type: none"> ➤ To be active in the political community ➤ To be active in the community ➤ To be active in civil society | |

See App1 in the Appendix

Citizenship values

Romania and Lithuania are high performing countries, with Southern European countries again giving the best results, Greece and Cyprus being the highest performers. In contrast, Northern and Western Europe tends to perform less well, with Denmark, England, Belgium (French speaking) and Finland closing the ranking for this dimension, together with Estonia, an outlier, which joins this group at the end of the table.

Participatory attitudes

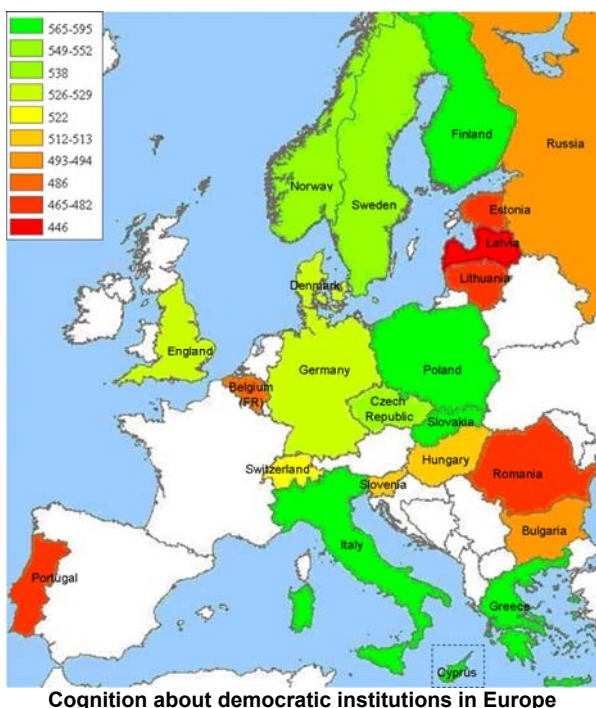
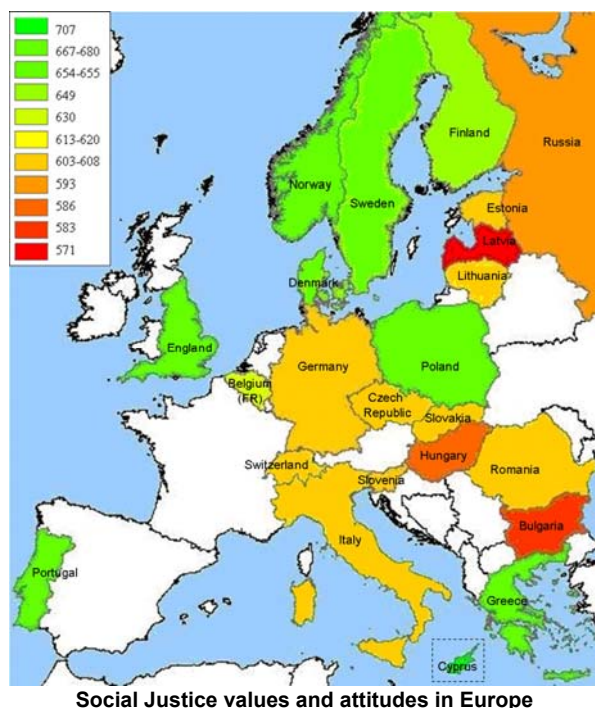
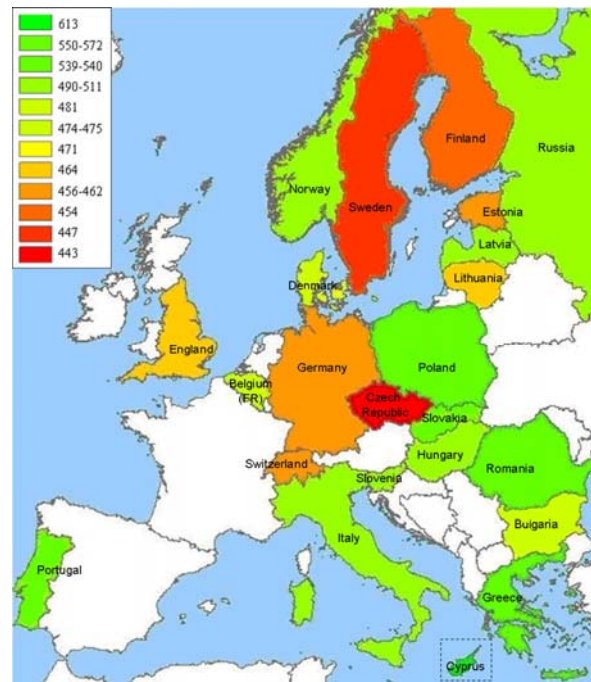
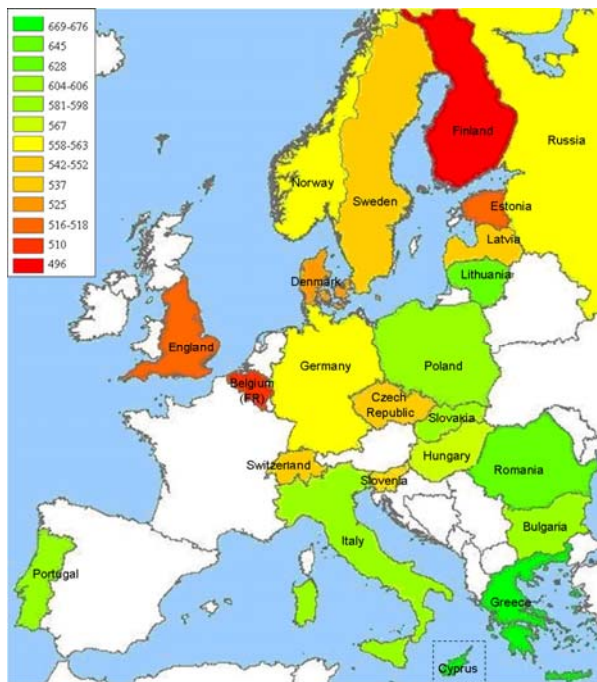
The results for participatory attitudes are similar. Overall, Southern and Eastern European countries tend to perform better in this domain; in particular Cyprus, Portugal, Romania, Poland, and Slovakia are high

performing countries for this dimension. Most of the Northern European countries taking part in the survey (Denmark, Sweden and Finland), and most of the Western European countries that participated (Germany, England and Switzerland) are at the foot of the rankings.⁵⁴

Social justice values and attitudes

For the dimension of Social justice values and attitudes, the results are different, Cyprus, Portugal, Norway and England performing well, in contrast to the Russian Federation, Hungary, Bulgaria and Latvia, all former Communist countries, which are the lower performers in this domain. Poland is the outlier by being both a former Communist country and a high performer.

Map 5.1-4: Civic Competences of young people in Europe (14 year olds)⁵⁵
(Composite Indicator)



Source: IEA, Data 1999

Cognition about democratic institutions

The regional results are less strong for Cognition about democratic institutions, but still follow a similar pattern to that of social justice values and attitudes, with Northern, Southern and Western European countries being found in the top half of the table, with the exception of Slovakia and Poland, which

are high performing countries for this dimension. In contrast, Eastern European countries tend to be located in the bottom half of the table, with Romania, and the Baltic states of Estonia, Lithuania and Latvia giving low performances. The outlier in this case is Portugal, which likewise does not perform well (Hoskins et al., 2006b and Buk-Berge, 2006).

The country trends for **Social justice values and attitudes** and **cognition** and the trends for **Participatory attitudes** and **Citizenship values** can also be found when the data are looked at on the individual level. Here, the closest correlations were found between **Participatory attitudes** and **Citizenship values**, supporting the theory that there is a connection between these two phenomena. Importantly for education purposes there was a higher correlation also between **Social justice values and attitudes** and **Cognition**.

Citizenship values, however, seemed relatively independent of cognition. In addition to the country level trends, there was also a link on the individual level between Social justice values and attitudes and Participatory attitudes. As Social justice correlates with all the dimensions it therefore seems to some extent an underlying principle of civic competence

Active citizenship.

Framework of indicators

CRELL, in cooperation with the Council of Europe, recently developed the Active Citizenship Composite Indicator (Hoskins et al. 2006, and revised in Hoskins and Mascerni (forthcoming)). The measurement model comprises four dimensions: *Protest and social change* (civil society action that hold governments to account), *Representative democracy*, *Community life*, and *Democratic values*. Northern European countries generally deliver the highest performances, with Sweden gaining the highest results across the different domains. Western Europe and Finland turned in mid-table performances. Southern and Eastern European countries achieved the lowest scores (more details on the results can be found in the report (Hoskins 2006)).

While the Active Citizenship Composite Indicator, which uses ESS 2002 data, encompasses a broad range of participatory activities, this breadth is not available in the 2004 or 2006 edition. Thus we have chosen a smaller number of indicators with which it is possible to measure trends. We have two indicators for representative democracy (voting and membership of a political party) and a mini composite of five indicators for the domain of Protest and social change (i) worked in an organisation or association, (ii) worn or displayed a campaign badge/sticker, (iii) signed a petition, (iv) taken part in a lawful public demonstration, or (v) boycotted certain products).

The “Protest mini composite” is strongly correlated with the whole Active Citizenship Composite Indicator and thus constitutes a good proxy for it.

A picture of Europe: Active Citizenship 2002-2004-2006

In order to develop an understanding of whether active citizenship in Europe is changing from the original results of the 2002 Active Citizenship Composite Indicator we have created a time series on these selected indicators for 2002, 2004 and 2006. However, it should be noted that a time series of four years is not a particularly long period from which to draw strong conclusions. For these indicators we have established above we have 13 countries which took part in each round. What can be immediately seen from table 5.3 is that over the four year period the indicators for Protest and social change, and Representative democracy (voting and membership of political parties) remain fairly constant, with continued marked differences in regional levels of participation across Europe.

Table 5.3 Development of Voting, Membership in political parties and Protest and Social change in 13 European countries. 2002, 2004 and 2006.

| | Voting | | | Membership of political parties | | | Protest and social change | | |
|-------------|--------|------|------|---------------------------------|------|------|---------------------------|------|------|
| | 2002 | 2004 | 2006 | 2002 | 2004 | 2006 | 2002 | 2004 | 2006 |
| Belgium | 87.6 | 93.5 | 95.6 | 7.5 | 7.1 | 7.2 | 55.4 | 37.1 | 49.8 |
| Germany | 85.1 | 80.9 | 79.7 | 3.5 | 3.1 | 3.9 | 52.8 | 51.5 | 48.8 |
| Denmark | 94.2 | 92.1 | 93.6 | 5.8 | 6.4 | 7.0 | 50.3 | 56.1 | 60.7 |
| Spain | 80.2 | 83.3 | 81.0 | 3.1 | 4.2 | 2.5 | 32.4 | 51.4 | 37.1 |
| Finland | 82.2 | 79.4 | 84.1 | 7.4 | 7.3 | 7.7 | 57.5 | 58.9 | 62.1 |
| France | 75.6 | 77.2 | 78.6 | 2.4 | 1.8 | 2.2 | 53.0 | 52.2 | 52.2 |
| Hungary | 80.9 | 77.5 | 76.9 | 1.6 | 0.8 | 1.5 | 10.4 | 10.2 | 9.9 |
| Poland | 66.3 | 64.6 | 65.9 | 1.7 | 1.0 | 1.0 | 15.5 | 9.1 | 12.0 |
| Portugal | 73.4 | 72.1 | 77.0 | 4.0 | 3.2 | 3.5 | 14.3 | 12.2 | 12.1 |
| Sweden | 87.8 | 89.6 | 89.9 | 8.5 | 6.7 | 6.4 | 62.9 | 69.6 | 66.9 |
| UK | 72.9 | 69.9 | 72.9 | 3.0 | 2.6 | 2.9 | 53.7 | 46.4 | 53.0 |
| Norway | 85.3 | 86.3 | 86.8 | 9.2 | 8.8 | 9.3 | 61.7 | 62.1 | 63.9 |
| Switzerland | 70.2 | 67.2 | 66.9 | 9.3 | 8.1 | 8.2 | 60.6 | 54.3 | 54.7 |

Voting

Self reported voting (which is certainly higher than actual voting measures) stays very much the same across the four years. As would be expected Belgium tops the voter turnout, thanks presumably to the compulsory voting laws. Belgium also has the largest increase in reporting voters, showing an 8 percentage point increase over the four years to 96% in 2006. Denmark is also high, even without compulsory voting, remaining in the low nineties throughout. Sweden remains constant at just below 90% over the four year period. Switzerland shows the greatest decline in voting over this period, with a 4 percentage point change from 70% to 66%, most probably as a result of the high number of national referendums in the country during this period. Poland reports the lowest voter turnouts across Europe, scoring roughly 65% across the four years.

Membership of political parties

Membership of political parties is quite low across Europe and the scores remain fairly static. Norway has the highest results with about 9% of the population claiming to be a member of a political party. Denmark is the country with the highest increase, going up by 1.1% to almost 7%. Sweden is the country with the largest decrease, of 2.1 percentage points to 6.4%. What should be noted are the very low and declining scores for Poland, which dropped from 1.7% in 2002 to 0.9% in 2006, and Hungary, which in 2004 had 0.9% declaring membership of a political party, with a slight recovery to 1.5% in 2006.

Protest and Social Change

For the indicator of Protest and Social change the general patterns for country groupings remain the same, with high participation in Northern Europe and very low participation in Eastern Europe. Sweden recorded the highest rate in 2004 with almost 70% participation. Denmark increased its participation most, rising by 10 percentage points to 60%. France, UK and Germany remain fairly constant at around the 50% mark. Hungary, Poland and

Portugal consistently record 12% or less participation levels.

The trends show that the gap between the regional results seem to be increasing rather than narrowing and the younger democracies are not looking positive in the development of their civil society. If we then take the domain of Protest and social change as a proxy for the total of active citizenship activities, the marked differences between regions within Europe highlight a need for further work towards on democracy and social cohesion for Eastern European countries.

5.4.1 Impact of formal education on active citizenship

Using the same indicator from ESS 2006 to measure active citizenship (voting, membership of a political party and five indicators compressed into a mini composite on Protest and social change) CRELL research centre has measured the impact of years of formal education on active citizenship (Hoskins, D'Hombres and Campbell, 2008). Their results uniformly suggest that there is a significant democratic return associated with formal education. They found that education is positively and significantly correlated with Active Citizenship behaviour. Tertiary education has by far the biggest affect, with a 27.3% impact on participation in the domain of Protest and Social change. Since this domain can be used as a proxy for the whole active citizenship composite indicator, this would be another strong argument for the democratisation of tertiary education. However, it is difficult to say for sure that this correlation is causal: many variables have been controlled for, but there could be other factors involved. The study by Elchardus and Spruyt (2007) in Belgium (Fl) highlighted that it may not actually be the learning experience of tertiary education but the access to it that creates the positive identity of active citizen and that the lack of access to higher education can introduce negative attitudes, identity and behaviour.

Appendix

App 1

The knowledge, skills, attitudes, values required to be an active citizen, based on the attributes described in the European Commission Reference Framework on Key Competences, and further development by the Council of Europe and under the research of Veldhuis and Abs (2006).

The above list can be used to aid curriculum development on civic competence. It should, however, be recognised that school is only one of the learning opportunities for civic competence, and that the full spectrum of learning opportunities, e.g. community, family, media and youth NGOs, can be brought in.

App 2

ICT Internet/entertainment use

The **index of ICT Internet/entertainment use** was derived from students' responses about the frequency with which they use computers for the following reasons: *i*) browse the Internet for information about people, things, or ideas; *ii*) play games; *iii*) use the Internet to collaborate with a group or team; *iv*) download software from the Internet (including games); and *v*) download music from the Internet and *vi*) for communication (e.g. e-mail or "chat rooms"). A five-point scale with the response categories "almost every day", "once or twice a week", "a few times a month", "once a month or less" and "never" was used. All items were inverted and positive values on this index indicate high frequencies of ICT use.

ICT program/software use

The **index of ICT program/software use** was derived from students' responses about how much they use computers for the following reasons: *i*) write documents (e.g. with <Word® or WordPerfect®>); *ii*) use spreadsheets (e.g. <Lotus 1 2 3® or Microsoft Excel®>); *iii*) drawing, painting or using graphics programs; *iv*) use educational software such as mathematics programs; and *v*) writing computer programs. A five-point scale with the response categories "almost every day", "once or twice a week", "a few times a month", "once a month or less" and "never" was used. All items were inverted, and positive values on this index indicate high frequencies of ICT use.

Self-confidence in ICT Internet tasks

The **index of self-confidence in ICT Internet tasks** was derived from students' beliefs about their ability to perform the following tasks on a computer: *i*) chat online; *ii*) search the Internet for information; *iii*) download files or programs from the Internet; *iv*) attach a file to an e-mail message; *v*) download music from the Internet; and *vi*) write and send e-mails. A four-point scale with the response categories "I can do this very well by myself", "I can do this with help from someone", "I know what this means but I cannot do it" and "I don't know what this means" was used. All items were inverted for IRT scaling, and positive scores on this index indicate high self-confidence.

Self-confidence in ICT high-level tasks

The index of self-confidence in ICT high-level tasks was derived from students' beliefs about their ability to perform the following tasks on a computer: *i*) use software to find and get rid of computer viruses; *ii*) edit digital photographs or other graphic images; *iii*) create a database (e.g. using <Microsoft Access®>); *iv*) use a word processor (e.g. to write an essay for school); *v*) use a spreadsheet to plot a graph; *vi*) create a presentation (e.g. using <Microsoft PowerPoint®>); *vii*) create a multi-media presentation (with sound, pictures, video); and *viii*) construct a web page. A four-point scale with the response categories "I can do this very well by myself", "I can do this with help from someone", "I know what this means but I cannot do it" and "I don't know what this means" was used. All items were inverted for IRT scaling, and positive values on this index indicate high self-confidence.

Source: OECD PISA

6. IMPROVING EQUITY IN EDUCATION AND TRAINING

6.1 Early school leavers

- 6.1.1 Pathways out of early school leaving
- 6.1.2 Young people not in education, employment or training
- 6.1.3 Early school leavers in the USA

6.2. Special needs education

- 6.2.1 Education of pupils with special educational needs in inclusive or segregated settings
- 6.2.2 Education of pupils with special education needs depending on the type of difficulty

6.3 Gender inequalities in education and training

6.4 Children at risk and intergenerational transmission of disadvantages

MAIN MESSAGES

Improving Equity in Education and Training

- **Equity continues to be a challenge to most education and training systems in the EU.** Less favoured family backgrounds, migrant origins and gender differences continue to affect educational achievement.
- **1 in 7 18-24 year olds (about 6 million young people) finish schooling with less than upper secondary education.**
- **1 in 7 4-year-olds are still not enrolled in pre-primary education, despite its importance for success in later schooling and for developing social and emotional skills.** Many of children not enrolled are those in greatest need, including children with a migrant background or from families with a low socio-economic status.
- **1 in 50 pupils in compulsory education are - because they are identified as having special educational needs - educated largely out of contact with their mainstream peers.** The percentage varies widely between countries, ranging from below 1% to over 5% of the total compulsory school age population.
- **Gender inequalities remain.** Boys perform less well in reading (performance difference 38 points in PISA) and are more often identified as having special education needs (60% of boys and 40% of girls). Girls perform less well in mathematics (performance difference 11 points in PISA) and are underrepresented among higher education students and graduates in mathematics, science and technology.

Launching the Lisbon strategy in 2000, the European Council agreed that the economic targets for 2010 should be accompanied by greater social cohesion (European Commission, 2000a, paragraph 37).

The European Council of March 2008 confirmed the need to combat poverty and social exclusion within the Lisbon agenda and highlighted the challenges of low performance in reading, early school leaving, and learners with a migrant background or from disadvantaged groups (Council, 2008a, paragraphs 14 and 15).

Recent Commission papers on education and training confirm that poverty and social exclusion continue to be a serious challenge for all Member States.

The **Communication on efficiency and equity** in European education and training systems of 2006 defined equity in education and training as the extent to which “individuals can take full advantage of education and training in terms of opportunities, access, treatment and outcomes” (European Commission, 2006a). The Communication brought the central message that it is possible and necessary to develop education and training systems which are both efficient and equitable. The **two recent communications on adult learning** (European Commission, 2006g and 2007h) stressed the key role adult learning has to play in responding to social exclusion.

Different circumstances or conditions, such as low levels of initial education, unemployment, rural isolation and reduced life chances on a wide range of grounds have the effect of marginalising large numbers of people and excluding them from the benefits of society and from being an active citizen. New forms of illiteracy in the shape of exclusion from access to and use of ICT in professional and daily life exacerbate this exclusion: adults who are not digitally literate are deprived of essential information and facilities which are increasingly only available in digital form.

The **Communication "Improving competences for the 21st century: An agenda for European cooperation on schools"** (European Commission, 2008a) which represents a part of the and the Commission's package on the Social Agenda of measures, adopted on 2 July 2008 underscores the need of giving all pupils the competences they need for life in our rapidly changing knowledge

society. This includes: increasing levels of reading literacy and numeracy; reinforcing learning-to-learn skills; and modernising curricula, learning materials, teacher training, and assessment accordingly.

Moreover, there is a need to provide high quality learning for every student. This involves generalising pre-school education; improving equity in school systems; reducing early school leaving; and improving support within mainstream schooling for students with special needs.

These goals cannot be achieved without improvements of the quality of teachers and school staff. This will require more and higher quality teacher education; more effective teacher recruitment; and help for school leaders to focus on improving learning.

The Commission's **Green paper on education and migration** (European Commission, 2008d) adopted on 2 July 2008 opened the debate on how education policies may better address the challenges posed by immigration and internal EU mobility flows. The presence of significant numbers of migrant children has substantial implications for European education systems. Key issues are how to prevent the creation of segregated school settings, so as to improve equity in education; how to accommodate the increased diversity of mother tongues and cultural perspectives and build intercultural skills as well as how to adapt teaching skills and build bridges with migrant families and communities.

Educational inequalities persist in Europe and have devastating effects, especially on the lives of the most disadvantaged. Research shows that all European education and training systems are still marked, to a greater or lesser extent, by widespread inequalities. These most often reflect and compound wider socio-economic inequalities; they are detrimental to democracy and social cohesion and have a huge societal and financial cost which is very rarely shown in public accounting systems (European Commission, 2006a).

In this chapter we will analyse the issues of equity and social inclusion in the field of education and training in following four areas:

- early school leavers
- special needs education

- gender issues
- children at risk and intergenerational transmission of disadvantages.

The analysis in the first two areas is linked to core indicators approved by the Council in 2007 as part of a general framework of indicators and benchmarks for monitoring progress in education and training (Council, 2007a).

6.1 Early school leavers

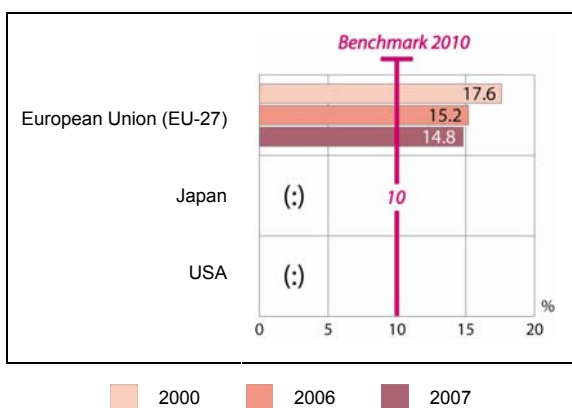
Young people who leave school with only lower secondary education are at a disadvantage on the labour market in today's knowledge-based society.

European benchmark
By 2010 an EU average of no more than 10% early school leavers should be achieved.

Their personal and social development is in danger of being curtailed and they are at risk of a life of poverty and social exclusion. They are also less likely to get involved in lifelong learning.

Chart 6.1: Early school leavers - benchmark for 2010

Percentage of the population aged 18-24 with less than upper secondary education and not in education or training



Data source: Eurostat (EU-Labour Force Survey), 2000 – 2007

The issue of early school leaving is becoming more complex as the labour market marginalisation of people leaving school with no qualifications grows.

Taking this into account, the same target for cutting early school leaving is included in the Employment Guidelines (2005/2008) for the revised Lisbon process (Council, 2005d).

The EU benchmark to achieve an EU average of no more than 10% early school leavers by 2010 is based on indicator which refers to persons aged 18 to 24 with highest level of education or training no more than upper secondary education (ISCED 0, 1, 2 or 3c short) declaring not having received any education or training in the four weeks preceding the survey.⁵⁶

In 2007 the average early school leavers rate was 14.8% for EU-27, 2.8 percentage points lower than in 2000. Progress is slow, and at the current rate of improvement, the benchmark of no more than 10% early school leavers will not be attained by 2010. Additional efforts need to be made to meet this target.

Data show a geographical divide between the higher performers in northern and central Europe and the lower performers in the south of the European Union.

The best performers — the Czech Republic, Lithuania, Poland, Slovakia and Finland, along with Norway — all have early school leaving rates below the European reference level (benchmark) for 2010 (not more than 10%).⁵⁷ Slovenia and Croatia also belong to the best performers in this area, though recent data are unreliable for these countries because of the small sample size in the Labour Force Survey.

By contrast, in 2007 Malta and Portugal still had the highest proportions of early school leavers in the EU (37.6% and 36.3% respectively), but they are improving steadily. The new Member States which joined in 2007 – Romania and Bulgaria – also have relatively high proportions of early school leavers (19.2% and 16.6% respectively).

In the majority of countries the percentage of early school leavers decreased between 2000 and 2007, especially in Malta (down from 54.2% in 2000 to 37.6% in 2007). Only in Denmark, Estonia, Austria, Slovakia, France and Spain did the percentage of early school leavers stagnate or increase slightly. While the first four of these countries belong to the best performing countries within the EU, the situation in Spain, with one of the highest percentages of early school leavers, is alarming from this point of view.

However, in almost every country the quality and comparability of the data on early school leaving over this period are affected by breaks in time

series, small sample sizes or methodological changes in the surveys.

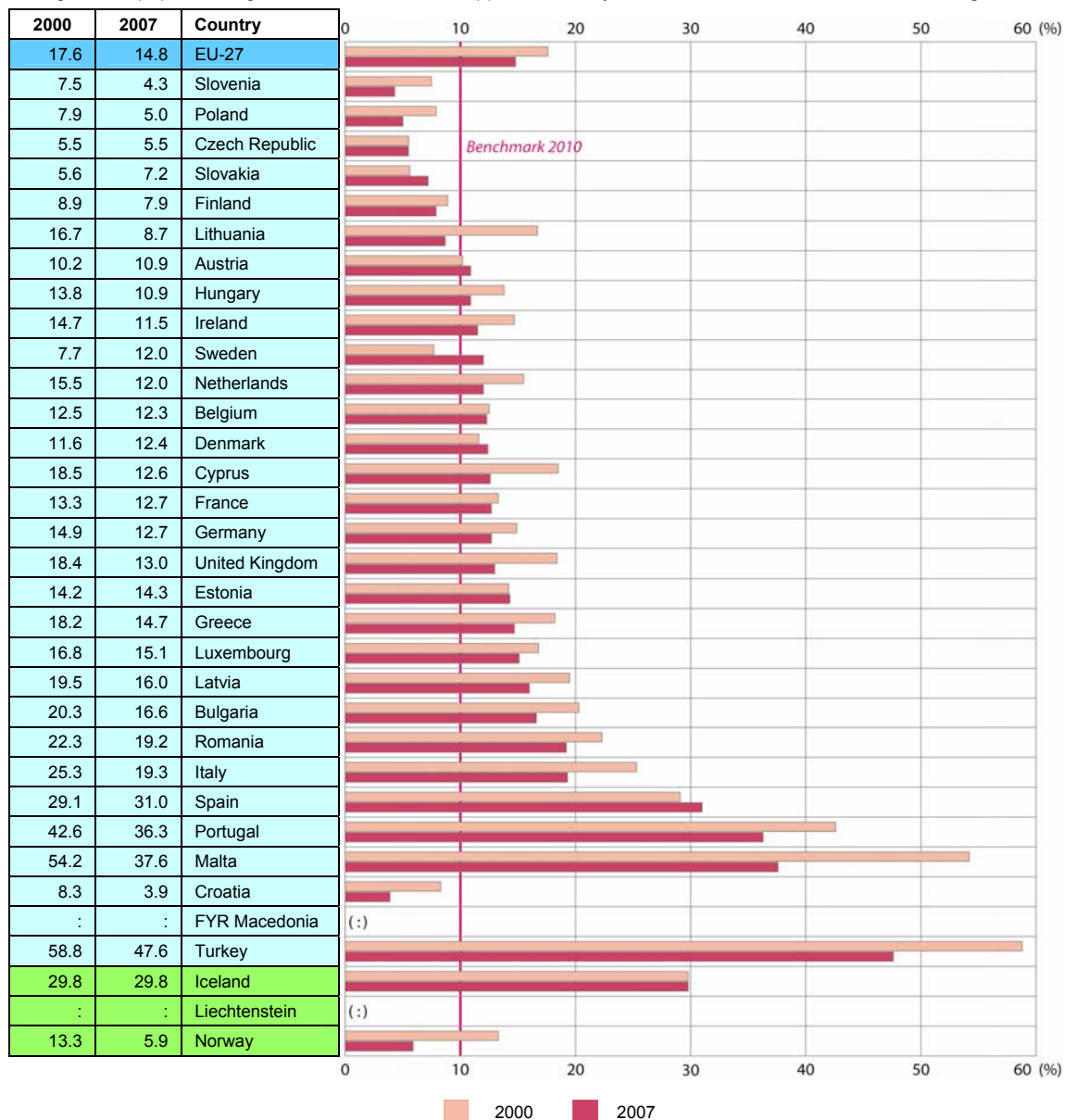
Despite all the progress, the latest (2007) figure for early school leavers in the EU (14.8%) is still far in excess of the European benchmark of 10% in 2010.

The national targets, combined with lessons learned from the peer learning activities on this

subject (the cluster on “access and social inclusion in lifelong learning”)⁵⁸ by the European Commission, have shown that equity in education, and especially the problems linked to early school leaving, are high on the policy agenda, not only in countries with a high proportion of early school leavers but also in the countries which have been quite successful in the past.

Chart 6.2: Early school leavers, 2000 and 2007

Percentage of the population aged 18-24 with less than upper secondary education and not in education or training, 2000 and 2007



Data source: Eurostat (Labour Force Survey), 2007

Additional notes:

Provisional 2007 data for Latvia, Portugal and Finland

Unreliable data for Slovenia and Croatia because of the small sample size.

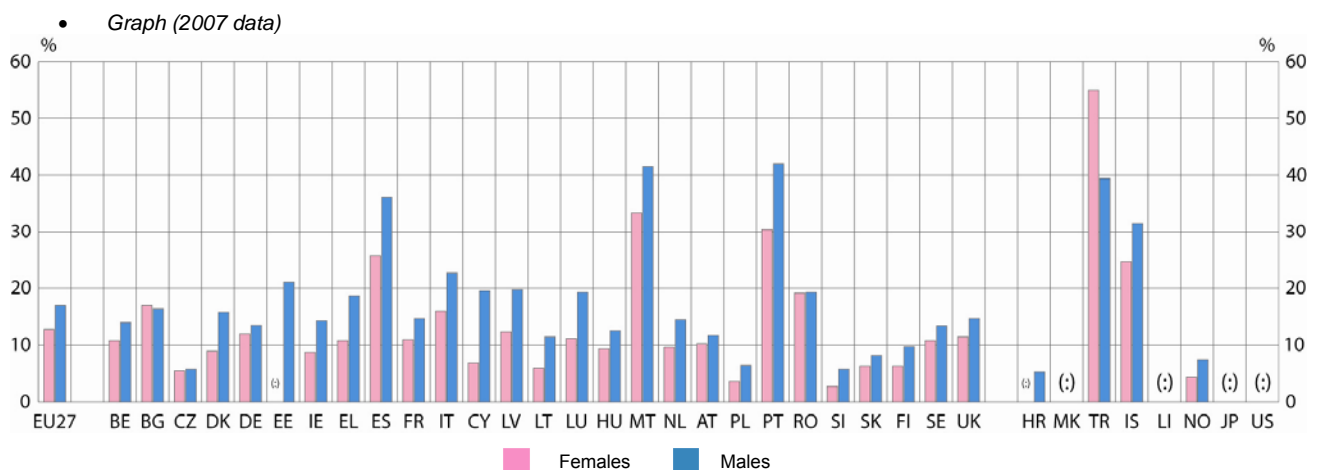
Break in series for Finland (2000) and Denmark (2007)

Cyprus: Students studying abroad are not covered by the survey; this indicator is therefore overestimated.

Czech Republic and Croatia: 2000 data refer to 2002

Chart 6.3: Early school leavers by gender, 2000 and 2007

Percentage of the population aged 18-24 with less than upper secondary education and not in education or training, 2000 and 2007



• Table (2000 and 2007 data)

| | EU27 | BE | BG | CZ | DK | DE | EE | IE | EL | ES | FR | IT | CY | LV | LT | LU | HU | MT |
|-------------|------|------|------|-----|------|------|------|------|------|------|------|------|------|------|------|------|------|------|
| 2000 | 17.6 | 12.5 | 20.3 | 5.5 | 11.6 | 14.9 | 14.2 | 14.7 | 18.2 | 29.1 | 13.3 | 25.3 | 18.5 | 19.5 | 16.7 | 16.8 | 13.8 | 54.2 |
| Females | 15.6 | 10.2 | 19.5 | 5.7 | 9.9 | 15.2 | 12.1 | 10.9 | 13.6 | 23.4 | 11.9 | 21.9 | 13.9 | 12.2 | 14.9 | 17.6 | 13.2 | 56.1 |
| Males | 19.7 | 14.8 | 21.1 | 5.3 | 13.4 | 14.6 | 16.3 | 18.4 | 22.9 | 34.7 | 14.8 | 28.8 | 25.0 | 26.7 | 18.5 | 15.9 | 14.3 | 52.5 |
| 2007 | 14.8 | 12.3 | 16.6 | 5.5 | 12.4 | 12.7 | 14.3 | 11.5 | 14.7 | 31.0 | 12.7 | 19.3 | 12.6 | 16.0 | 8.7 | 15.1 | 10.9 | 37.6 |
| Females | 12.7 | 10.7 | 16.9 | 5.4 | 8.9 | 11.9 | : | 8.7 | 10.7 | 25.6 | 10.9 | 15.9 | 6.8 | 12.3 | 5.9 | 11.1 | 9.3 | 33.3 |
| Males | 16.9 | 13.9 | 16.3 | 5.7 | 15.7 | 13.4 | 21.0 | 14.2 | 18.6 | 36.1 | 14.6 | 22.6 | 19.5 | 19.7 | 11.4 | 19.2 | 12.5 | 41.5 |

| | NL | AT | PL | PT | RO | SI | SK | FI | SE | UK | HR | MK | TR | IS | LI | NO | JP | US |
|-------------|------|------|-----|------|------|-----|-----|------|------|------|-----|----|------|------|----|------|----|----|
| 2000 | 15.5 | 10.2 | 7.9 | 42.6 | 22.3 | 7.5 | 5.6 | 8.9 | 7.7 | 18.4 | 8.3 | : | 58.8 | 29.8 | : | 13.3 | : | : |
| Females | 14.8 | 10.7 | 6.0 | 35.1 | 21.3 | 5.6 | 4.6 | 6.5 | 6.2 | 17.9 | 7.4 | : | 65.8 | 29.6 | : | 13.5 | : | : |
| Males | 16.2 | 9.6 | 9.7 | 50.1 | 23.3 | 9.3 | 6.7 | 11.3 | 9.2 | 19.0 | 9.1 | : | 51.2 | 29.9 | : | 13.2 | : | : |
| 2007 | 12.0 | 10.9 | 5.0 | 36.3 | 19.2 | 4.3 | 7.2 | 7.9 | 12.0 | 13.0 | 3.9 | : | 47.6 | 28.1 | : | 5.9 | : | : |
| Females | 9.6 | 10.2 | 3.6 | 30.4 | 19.1 | 2.7 | 6.3 | 6.3 | 10.7 | 11.4 | : | : | 55.0 | 24.6 | : | 4.3 | : | : |
| Males | 14.4 | 11.6 | 6.4 | 42.0 | 19.2 | 5.7 | 8.1 | 9.7 | 13.3 | 14.6 | 5.2 | : | 39.4 | 31.5 | : | 7.4 | : | : |

Data source: Eurostat (EU-Labour Force Survey)

Additional notes:

2007: provisional data for DK; LV, PT, FI and IS

SI and HR (all indicators, except total for 2001) and EE and LT (indicators by gender): unreliable because of the small sample size.

In DK, LU, IS, NO, EE, LV, LT, CY, MT and SI the high degree of variation of results over time is partly influenced by the low sample size.

Due to the implementation of harmonised concepts and definitions in the survey, the breaks of series were noted in the majority of countries, especially in 2003 and 2004.

CY: Students studying abroad are not covered by the survey; this indicator is therefore overestimated.

The EU aggregates are calculated using the closest available year result in case of missing country data.

UK, CZ, SE and IS: 2007: data for 2006

IE, LV, SK, CZ and HR: 2000: data for 2002

BG, PL and SI: 2000: data for 2001

Moving on to gender, there were more male than female early school leavers in the EU. Slightly more female than male young people leave school before completing at least upper secondary education only in Bulgaria, as well as in Turkey with a significantly higher gender gap.

Factors with a significant impact on early school leaving

Considerable research has been carried out over the past few years at national and international level on early school leavers, and young people 'at risk' of leaving school after the age of compulsory schooling is reached, but before

completing upper secondary education. There is evidence that early school leaving is a complex and multidimensional process influenced by a variety of school and out-of-school experiences, with broad social and cultural implications, rather than a single decision made at a specific moment in time (Ferguson, B et al., 2005).

Research has confirmed that pupils choose to leave school even though they know that education and training can increase their chances of getting better jobs and higher earnings in the future.

The literature describes many factors which influence early school leaving. In this section, we will concentrate on some of them, distinguishing seven wider groups.

► *Individual characteristics*

Pupils might have learning difficulties, health problems, poor knowledge of the teaching language, low self-esteem, or be young parents which often hamper them to continue in schooling. Early school leavers usually perform worse on scholastic tests than students who complete their education successfully, as confirmed for example in longitudinal research done in Canada (Audas, R. and J. D. Willms, 2001).

► *Education related reasons*

Usually young people who left school before completing upper secondary education have found the upper secondary school environment unsatisfactory for a variety of reasons. They usually had low achievements in the school and negative interaction with their teachers, and many of them were discouraged and disconnected from school.

The decision to leave school before completion of studies was usually a result of a longer period of experiencing failure in the school.

There is also evidence that the rate of early school leavers depends on individual characteristics of schools, such as school size, resources available, and degree of support for students with academic or behavioural problems. Small schools tend to have lower rates of early school leavers (United States General Accounting Office (GAO), 2002).

► *Job related reasons*

One emerging problem is the availability of **part time work** for young people enrolled in formal education at the upper secondary level. In some countries there has been a greater pull of young people from the formal education system to paid work, supported by a marked increase in part-time job opportunities. A study done by Morgan in Ireland in 2000 has shown that 51% of the sample of students enrolled in upper secondary education was in employment and 58% of those were doing Leaving Certificate. In this connection, increasing concern was expressed that part-time work could lead to an early exit from the formal schooling process, particularly by those already at risk of early leaving (Morgan M., 2000).

Experience from Australia

In Australia the following reasons for leaving school early were identified by students, starting with the reasons most frequently reported:

1. Subjects
2. Teachers/classroom
3. South Australian Certificate of Education
4. Employment
5. School
6. Workload
7. Personal
8. Disabilities
9. Discipline
10. Finance
11. Assessment
12. Timetable
13. Other

(Leaving School early without credentials. As many reasons as students. SSABSA, 1999)

On the other side, there is also evidence that moderate levels of employment (between 10 and 15 hours of work per week) might have a protective effect and help reduce early school leaving (Fergusson, B., 2005)

► *Family related reasons*

Families can have financial difficulties or negative attitudes to their children's education, not recognising the value of education as such, and often it can be with a family history of early school leaving. The family can also belong to ethnic or cultural minority groups, and access to cultural and intellectual material (books, internet) and the availability of social capital in some families might be limited (Traag, T. and R.K.W. Van der Velden, 2006).

However, in some cultures, families with low socio-economic status are even more ambitious as regards the educational level of their children than higher-status families, believing that investment in their children's higher education will later bring higher economic and social returns.

Also the link between families and school might be poor, and it happens quite often that the school does not know about the socio-economic status of its pupils and students.

► *Peer effects*

The friends, and rejection by friends, of young people at risk of early school leaving are further factors which have an impact on the decision to drop out from the school. Current and future early school leavers usually have friends who already

left the school prematurely and more friends already working; they may have been rejected by their school peers, and perhaps they were not integrated into their school's social networks (Ellenbogen, S. and C. Chamberland, 1997).

► *Early experiences and events*

There is evidence from longitudinal studies that early experiences and events have an ongoing and cumulative effect on outcomes (Rumberger R.W., 1995). Researchers examined in this connection performance in the first grade of compulsory schooling, and the behaviour (for example aggressiveness), expectations of parents as regards the education of their children or commitment of pupils in the school, as well as the availability of social capital.

► *Discrimination in schools*

The discrimination which still occurs in some schools, most often on the grounds of religion,

sexual orientation and disability, frequently in the form of harassment and bullying, often leads also to early dropping out of school.

► *Community effects*

Crane described the community effects by using the “epidemic model”, defining ghettos as “neighbourhoods that have experienced epidemics of social problems” (Crane, 1991). There might also be a problem with mobility and school accessibility (poor transportation conditions).

Highest educational level achieved before leaving school

As shown in the table 6.2 below, the majority of European early school leavers — 84% of them — leave formal education after completing lower secondary education, i.e. after completing compulsory education in the majority of European countries.

Table 6.1: Percentage of early school leavers by highest educational level achieved, 2006

| | No formal education | ISCED 1 | ISCED 2 | ISCED 3C short |
|----------------|---------------------|----------|-----------|----------------|
| EU 27 | 1 | 9 | 84 | 6 |
| Belgium | 9 | 14 | 77 | 0 |
| Bulgaria | 7 | 12 | 81 | 0 |
| Czech Republic | 1 | 0 | 99 | 0 |
| Denmark | 2 | 0 | 98 | 0 |
| Germany | 0 | 10 | 90 | 0 |
| Estonia | 1 | 9 | 91 | 0 |
| Ireland | 2 | 13 | 84 | 1 |
| Greece | 2 | 23 | 60 | 15 |
| Spain | 1 | 14 | 83 | 2 |
| France | 0 | 9 | 91 | 0 |
| Italy | 1 | 4 | 94 | 1 |
| Cyprus | 4 | 28 | 60 | 8 |
| Latvia | 0 | 3 | 97 | 0 |
| Lithuania | 2 | 7 | 92 | 0 |
| Luxembourg | 1 | 6 | 37 | 55 |
| Hungary | 0 | 5 | 95 | 0 |
| Malta | 0 | 2 | 98 | 0 |
| Netherlands | 1 | 10 | 89 | 0 |
| Austria | 0 | 0 | 98 | 0 |
| Poland | 1 | 12 | 87 | 0 |
| Portugal | 1 | 32 | 67 | 0 |
| Romania | 4 | 9 | 87 | 0 |
| Slovenia | 2 | 2 | 96 | 0 |
| Slovakia | 1 | 3 | 96 | 0 |
| Finland | 0 | 1 | 99 | 0 |
| Sweden | 0 | 2 | 98 | 0 |
| United Kingdom | 2 | 0 | 37 | 61 |

Source: EU- LFS, 2006

6% of them achieved even some kind of upper secondary education (ISCED 3C short courses) incorporating some vocational or pre-vocational training. However, this concerns only three countries. More than 50% of early school leavers did ISCED 3C short courses in Luxembourg and the UK, and the ratio for Greece is 15%.

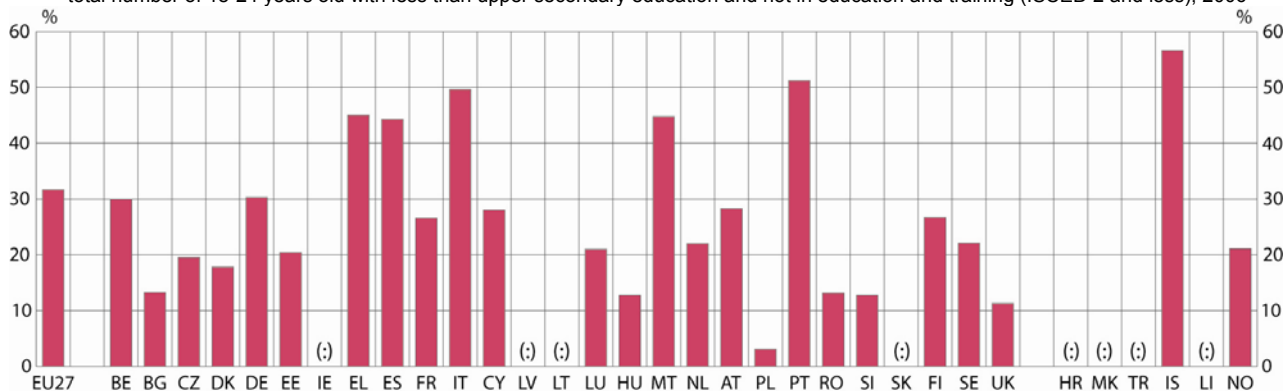
What is alarming is that 1% of early school leavers do not have any formal education and 9%

of them completed only primary education. The proportion of early school leavers with only primary education is still extremely high in Portugal (32%), Cyprus (28%) and Greece (23%), but also exceeds 10% in Belgium, Bulgaria, Ireland, Spain and Poland.

In Turkey, this group accounts for nearly half of the total number of 18 to 24 years old (46%).

Chart 6.4: Percentage of early school leavers with migrant backgrounds, 2006

Percentage of 18-24 years old non-nationals with less than upper secondary education and not in education and training (ISCED 2 and less) of the total number of 18-24 years old with less than upper secondary education and not in education and training (ISCED 2 and less), 2006



| | EU27 | BE | BG | CZ | DK | DE | EE | IE | EL | ES | FR | IT | CY | LV | LT | LU | HU |
|---------------|------|------|------|-------|-------|------|-------|----|------|------|------|------|------|----|----|------|-------|
| Non-nationals | 31.7 | 30.0 | 13.2 | 19.5b | 17.8a | 30.3 | 20.4a | : | 45.0 | 44.3 | 26.6 | 49.6 | 28.0 | : | : | 21.0 | 12.8a |

| | MT | NL | AT | PL | PT | RO | SI | SK | FI | SE | UK | HR | MK | TR | IS | LI | NO |
|---------------|-------|------|------|------|------|-------|------|----|-------|------|------|----|----|----|-------|----|-------|
| Non-nationals | 44.8a | 22.0 | 28.3 | 3.1a | 51.2 | 13.1a | 12.8 | : | 26.7b | 22.1 | 11.3 | : | : | : | 56.6a | : | 21.1a |

Data source: Eurostat (Labour Force Survey), 2006

Note: a, b – limited reliability because of low number of non-nationals

Early school leavers with migrant backgrounds

There is evidence that migrant pupils perform better where socio-economic status and educational achievement are less correlated, that means, those systems which strongly prioritise equity in education are likely to be most effective in responding to their particular needs. Comprehensive strategies across all levels and strands of the system work best; partial measures may simply transfer problems of inequality or poor attainment from one segment of the system to another. Furthermore, policies to build equity in education work best within a broader framework to build an inclusive society, as recently stated in the Commission's Green Paper on education and migration (European Commission, 2008d).

When we look at the share of early school leavers from the aspect of nationality as defined in the Labour Force Survey⁵⁹, early school leaving is still a more common phenomenon among non-nationals (30.1% of non-nationals in contrast to 13% of nationals in 2005). From 2005 to 2006 the percentage of early school leavers with migrant backgrounds even slightly increased (by 1.5 percentage points to 31.7% in 2006).

In some countries, the percentage of early school leavers among non-nationals is the double of the percentage observed among nationals (see data in 2007 Progress report).

As shown in the Chart 6.4, from 40% to nearly 50% of the total number of early school leavers have a migrant background in Italy, Greece, Spain and Malta, as well as in Island with a percentage more than 50%. On contrary, the immigration in the new Member States seems to be higher qualified – there were only 10% to 15% early school leavers with migrant background of the total number of early school leavers in the Czech Republic, Bulgaria, Hungary, Romania and Slovenia, a share comparable to the UK with 11.3% of early school leavers with migrant background of the total number of early school leavers in the UK in 2006.

Employment status of early school leavers

As shown in the table 6.2, more than half of early school leavers aged 18 to 24 (56%) in the EU are employed. The rest — nearly half of them — are outside the labour market. About 25% of early school leavers are inactive persons and nearly 20% of them are unemployed (actively looking for employment).

The situation in individual countries varies. In some countries, in particular in Denmark, Estonia, Greece, Malta, Spain, Cyprus, the Netherlands, Portugal, Island and Norway, there are favourable conditions for employment of early school leavers, ranging from about 70% to more than 80% in work (Malta and Island).

Table 6.2 Early school leavers by employment status, 2006 (%)

| | Employed | Unemployed | Inactive |
|----------------|-----------|------------|-----------|
| EU-27 | 56 | 19 | 25 |
| Belgium | 52 | 20 | 27 |
| Bulgaria | 27 | 15 | 58 |
| Czech Republic | 32 | 28 | 40 |
| Denmark | 73 | 5 | 22 |
| Germany | 47 | 28 | 26 |
| Estonia | 68 | 12 | 20 |
| Ireland | 61 | 14 | 25 |
| Greece | 66 | 16 | 18 |
| Spain | 73 | 13 | 13 |
| France | 46 | 30 | 24 |
| Italy | 53 | 15 | 32 |
| Cyprus | 74 | 7 | 19 |
| Latvia | 47 | 21 | 33 |
| Lithuania | 37 | 7 | 56 |
| Luxembourg | 52 | 17 | 30 |
| Hungary | 39 | 17 | 44 |
| Malta | 83 | 9 | 8 |
| Netherlands | 75 | 7 | 18 |
| Austria | 59 | 16 | 25 |
| Poland | 29 | 35 | 36 |
| Portugal | 77 | 11 | 11 |
| Romania | 58 | 11 | 32 |
| Slovenia | 57 | 13 | 30 |
| Slovakia | 19 | 48 | 32 |
| Finland | 54 | 20 | 26 |
| Sweden | 52 | 24 | 24 |
| United Kingdom | 55 | 18 | 27 |
| Croatia | : | : | : |
| FYR Macedonia | 34 | 26 | 40 |
| Turkey | 42 | 6 | 52 |
| Iceland | 86 | 7 | 7 |
| Liechtenstein | 73 | 8 | 20 |

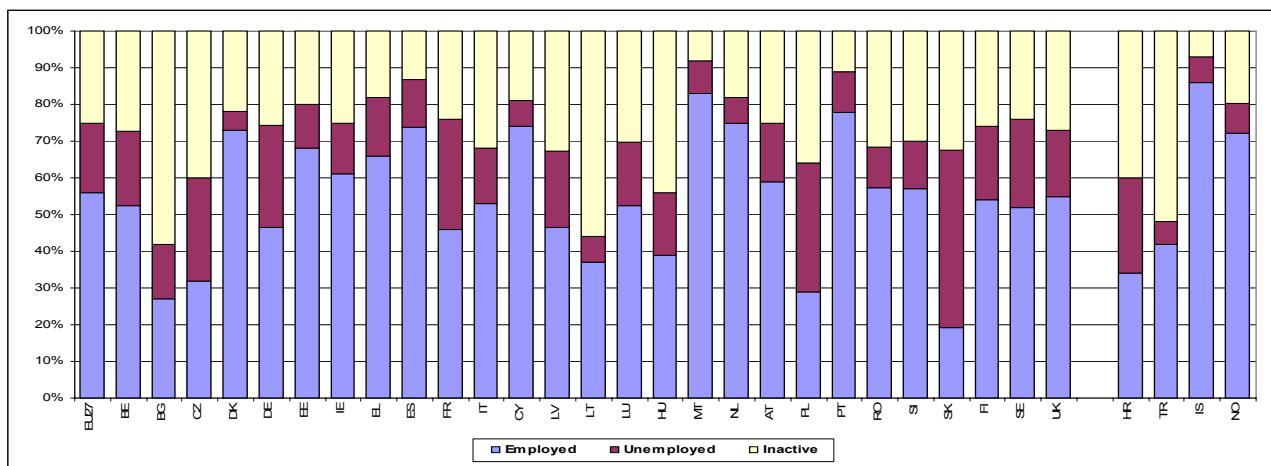
Data source: Eurostat (Labour Force Survey), 2006

In contrast, the situation in some new Member States with very low percentages of early school leavers (Bulgaria, Czech Republic, Poland and Slovakia) is really marginalised — the employment of these young people is extremely low, ranging from only 19% in Slovakia to 32% in the Czech Republic.

However, the general unemployment rate in Slovakia is very high.

Participation of population with low educational attainment in lifelong learning

The phenomenon of early school leaving needs to be seen in a broader context of lifelong learning. There is evidence that the participation of adults in education and training tends to be proportional to the level of prior education. In 2006 only 3.7% of the population aged 25-64 with less than upper secondary education participated in education and training in the four weeks prior to the survey, which is less than one third of the average over all levels of education and less than one seventh of the figure for those with high educational attainment.

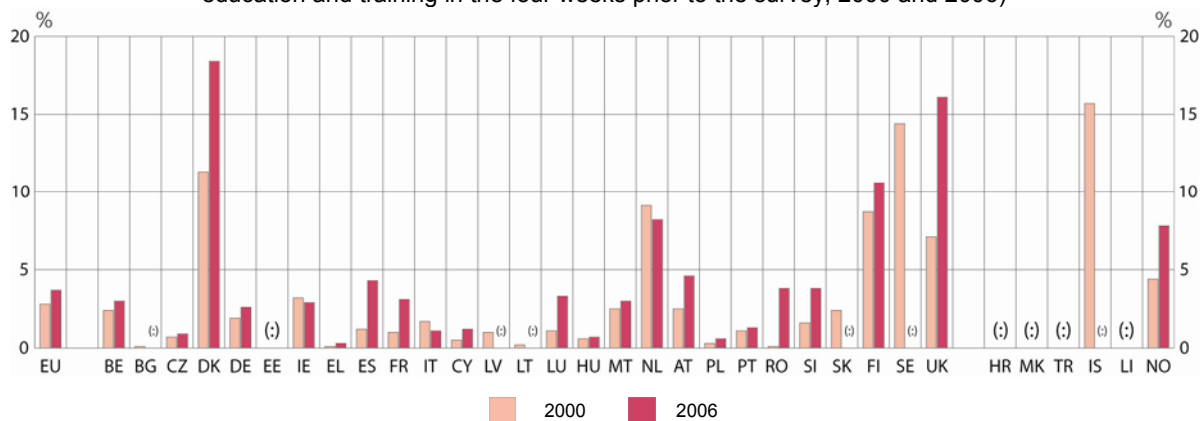
Chart 6.5 Early school leavers by employment status, 2006

Data source: Eurostat (Labour Force Survey)

Countries with a high general participation rate in lifelong learning (Denmark, Finland and the UK) also record relatively high participation rates by people with low educational attainment. The results for these countries ranged from 10.6% in Finland to 18.4% in Denmark in 2006. Of the remaining countries, only the Netherlands, Austria and Spain, along with Norway, had a participation rate exceeding 4% in 2006.

Countries with a high general participation rate in lifelong learning have relatively narrow gaps in participation between those with high and with low prior educational attainment levels, while countries with low overall participation rates have wider gaps.

Chart 6.6: Participation in lifelong learning by adults with less than upper secondary education
(Percentage of population aged 25-64 with less than upper secondary education (ISCED levels 0-2) participating in education and training in the four weeks prior to the survey, 2000 and 2006)



| | EU27 | BE | BG | CZ | DK | DE | EE | IE | EL | ES | FR | IT | CY | LV | LT | LU | HU |
|-------------|------|-----|-----|-----|------|-----|----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|
| 2000 | 2.8 | 2.4 | 0.1 | 0.7 | 11.3 | 1.9 | : | 3.2 | 0.1 | 1.2 | 1.0 | 1.7 | 0.5 | 1.0 | 0.2 | 1.1 | 0.6 |
| 2006 | 3.7 | 3.0 | : | 0.9 | 18.4 | 2.6 | : | 2.9 | 0.3 | 4.3 | 3.1 | 1.1 | 1.2 | : | : | 3.3 | 0.7 |

| | MT | NL | AT | PL | PT | RO | SI | SK | FI | SE | UK | HR | MK | TR | IS | LI | NO |
|-------------|-----|-----|-----|-------|-----|-------|-------|-----|------|------|------|----|----|----|------|----|-----|
| 2000 | 2.5 | 9.1 | 2.5 | 0.3 | 1.1 | 0.1 | 1.6 | 2.4 | 8.7 | 14.4 | 7.1 | : | : | : | 15.7 | : | 4.4 |
| 2006 | 3.0 | 8.2 | 4.6 | (0.6) | 1.3 | (3.8) | (3.8) | : | 10.6 | : | 16.1 | : | : | : | : | : | 7.8 |

Data source: Eurostat (EU-Labour Force Survey)

Additional notes:

- Due to introduction of harmonised concepts and definitions in the survey, the information on education and training is not comparable with previous years:
- from 2003 in the cases of CZ, DK, EL, IE, CY, HU, NL, AT, SI, FI, SE and NO, from 2004 in the cases of BE, LT, IT, IS, MT, PL, PT, UK and RO and from 2005 in the case of ES due to wider coverage of the activities taught;
 - from 2003 in SK due to restrictions for self-learning;
 - 2000 in PT due to changes in the reference period (formerly one week preceding the survey);
 - DE: 2004 data used for 2005.

Due to changes in the survey, data are not comparable with previous years in the cases of FI (from 2000), SE and BG (from 2001), IE, LV and LT (from 2002), HU (from 2003), LU (2003: annual average), DK, EL, FI and SE (first quarter from 2003), AT (second quarter from 2003; from 2004 continuous survey covering every week of the reference quarter).

The EU aggregates are provided from 1999, using the figures for the closest available year in cases where data for a given country are missing.

6.1.1 Pathways out of early school leaving

Consequently there has been a considerable effort on the part of governments to encourage young people to return to, or to remain in, formal education. However, a holistic and integrated approach by all stakeholders is necessary; the school (formal education) alone cannot solve this problem.

From the educational point of view, there is evidence that **flexible scheduling, smaller classes and individualised educational plans** as well as supportive teachers and guidance personnel might be helpful in this connection.

Another reaction of governments which was successful in many countries was the introduction of various academically less demanding **vocationally oriented training schemes** at upper secondary education level, in some countries covered by partial compulsory schooling organised in firms.

The concept of **Second Chance Education** has been developed to combat the social exclusion of – especially – young people who have left school without sufficient skills to get fully integrated in society and on the labour market. The aim is to reintegrate these people socially and professionally by offering them a wide range of education and training opportunities that are tailor-made to their individual needs.

These initiatives were especially successful in certain countries and in particular in relation to certain adult groups.⁶⁰

The teaching methods, attitudes and other examples of good practice developed within second chance education might be useful and could be widely practised in formal education too as a preventive measure to avoid or reduce early school leaving, especially for pupils who feel ill at ease in school and are at risk of leaving prematurely.

In the USA similar approaches to low achieving and educationally demotivated young people have been applied in the so-called “Accelerated schools”⁶¹ and Charter Schools⁶²; but also the opportunity to obtain GED (General Education Diplomas) without regular and full attendance at school is well used by young people who left high school without completing their courses.

Alternative pathways

There are also many initiatives focused on alternative educational environments for students who do not feel well in regular classroom. They operate within existing schools or outside schools.

The alternative schools are usually smaller with a higher number of teachers per pupil and providing more personalised teaching, sometimes offering also some kind of vocational training.

Transfer to non-formal education

This alternative is relevant in particular in countries with a long tradition in providing this type of education not only to adults but also to youngsters. For example in Nordic countries, the percentage of young people who left formal education and are in some kind of non-formal education is much higher than in other European countries.

Prolongation of compulsory schooling or universal right to upper secondary education

Many governments tried to combat early school leaving by extending compulsory education to cover, in some cases, 1, 2 or even more years of upper secondary education. In some countries, so called partial compulsory education was introduced, which covers certain kinds of job related training (EURYDICE, 2005a). Recent initiatives of **the UK government** focusing on extending compulsory schooling, including penalties for not attending the courses, fall under this category of governmental initiatives.

In **Norway**, young people who have completed primary and lower secondary education, or the equivalent, have a right to three years’ upper secondary education and training leading either to admission to higher education, to vocational qualifications or to basic skills (Norwegian Ministry of Education and Research, 2007).

However, the most important factor positively influencing early school leaving, in particular at a local level, is how various sectors (for example employment, social affairs, formal and non-formal education), institutions, agencies and families

work together and are able to reach all students at risk of early school leaving.

Plan to improve the situation of Roma in Slovakia

The Slovak government adopted on 26 March 2008 a strategy for improving the situation of the Roma community, subject to subsequent approval by Parliament. The objective is to create more favourable conditions for this marginalised community. The strategy in particular proposes compulsory pre-primary schooling for 5-year-olds, preparation of text-books in the Roma language, and very rigid conditions for sending Roma pupils to special schools.

(Strategy of the Ministry of Education, 2008)

Vocational education and training and early school leaving

VET is expected to provide a vital link between initial education and training. There is evidence that countries with high levels of participation in VET at upper secondary level usually have the lowest rates of early school leavers.

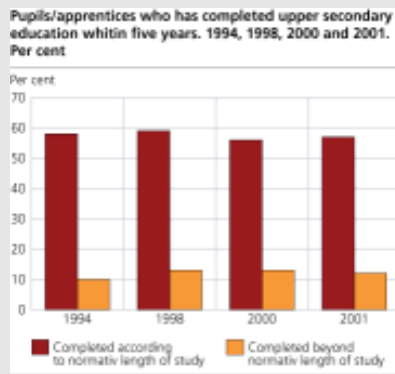
However, there are also many students, more than in the general stream of upper secondary education, who leave the vocational education and training system without completing the course, as shown by an example from Norway described in the box below.

School tracking and equity

There is evidence from large scale surveys (confirmed also by PISA 2006) that in countries with a larger number of distinct programme types, the socio-economic background of pupils tends to have a significantly greater impact on pupils’ performance, suggesting stratification or tracking at the system level associated with segregation of pupils in various tracks based on their socio-economic background. Although there was no correlation between the age of selection and country mean performance, the share of variation in pupils’ performance between schools was much higher in countries where the pupils are streamed at an earlier age (OECD, 2007b).

However, the age when the tracking or streaming occurs is important. Data show that this impact is greater for younger pupils than for upper secondary students.

Brunello and Chechi investigated school tracking at the level of (upper) secondary education, looking at such outcomes as literacy, drop out rates, college enrolment, employability and

Drop outs in Norway — a special situation in VET

In Norway, nearly 70% of students who were enrolled in upper secondary education for the first time in autumn 2001 completed general or vocational education within five years.⁶³

18% of the students dropped out before or within the final year. 6% enrolled in final year but failed in examinations, and therefore did not complete upper secondary education. By 1 October 2006, 7% of the 2001 cohort were still in upper secondary education and had not completed general or vocational education.

Most drop-outs in vocational education and training

Table: Drop outs in general upper secondary education and in VET, in %

| | General upper secondary education | Vocational upper secondary education |
|--------|-----------------------------------|--------------------------------------|
| total | 15 | 38 |
| female | 12 | 33 |
| male | 19 | 43 |

There are significant differences in the drop out rates of students in general and vocational upper secondary education. Nearly three out of ten students in VET who started upper secondary education for the first time in 2001 dropped out before or within the final year. In contrast only 6% of the students in general areas of study dropped out.

(Statistics Norway, 2006)

earnings. They found that in the countries investigated, the curricula offered in vocational schools seem to be more effective in promoting further training and adult competencies (the specialisation effect), thereby reducing the impact of parental background on these two outcomes (Brunello, G. and D. Chechi, 2007).

Therefore, reducing the extent of student tracking, either by raising the age of first selection or by reducing the number of educational programmes available, may be appropriate for reducing intergenerational effects in educational attainment

between parents and their children, but may increase social exclusion for students with disadvantaged backgrounds.

However, there are no longitudinal studies at the international level to confirm the above findings.

Drop-outs in the USA

Respondents in the USA too reported various reasons why they left school before completing their courses:

- ▶ Nearly half (47%) said a major reason for dropping out was that classes were not interesting.
- ▶ Nearly 7 in 10 respondents (69%) said they were not motivated or inspired to work hard, 80% did one hour or less of homework each day in high school, two-thirds would have worked harder if more was demanded of them (higher academic standards and more studying and homework), and 70% were confident they could have graduated if they had tried.
- ▶ Many students gave personal reasons for leaving school. A third (32%) said they had to get a job and make money; 26% said they became a parent; and 22% said they had to care for a family member.
- ▶ It is clear that some dropouts, but not the majority, leave school because of significant academic challenges.
- ▶ 35% said that “failing in school” was a major factor for dropping out.
- ▶ 45% said they started high school poorly prepared by their earlier schooling.
- ▶ 32% were required to repeat a grade before dropping out and 29% expressed significant doubts that they could have met their high school’s requirements for graduation even if they had put in the necessary effort.

(Bridgeland, J. M., Dilulio, J. J. and Morison, K.B. (2006) *The Silent Epidemic Performance of High School Dropouts*)

6.1.2 Young people not in education, employment or training

At present, in many countries there are growing concerns about the group of young people aged 16 to 18 years who are neither in education or training nor in employment — the “Neet” group.

According to recent data there were 206 000 Neets, aged 16 to 18, in England (2006). Other sources estimate that 10% of all 16 to 18 year olds in England are Neets (Statistical First Release (SFR), 2007).

However, data also show that the Neet group in England is not static but rather a rapidly changing group — most young people do not spend long periods as Neets. It was estimated that only

around 1% of 16-18 year olds are ‘long term Neet’ — that is, not doing anything at each of the three survey points at the ages of 16, 17 and 18 years old.

Internationally, there is little evidence about this population group. Some research has been done and governmental strategies focused on “Neets” have been developed in particular in the UK and Japan. Government sources in Japan have estimated that there are some 640 000 Neets in Japan (Ken, Y-N., 2006) but also the 2.5 million so-called FREETERS, covering young people not permanently on the labour market, are viewed as a risk group.

Among other characteristics of this diverse group of Neets, persistent absentees are seven times more likely to be doing nothing at age 16 than

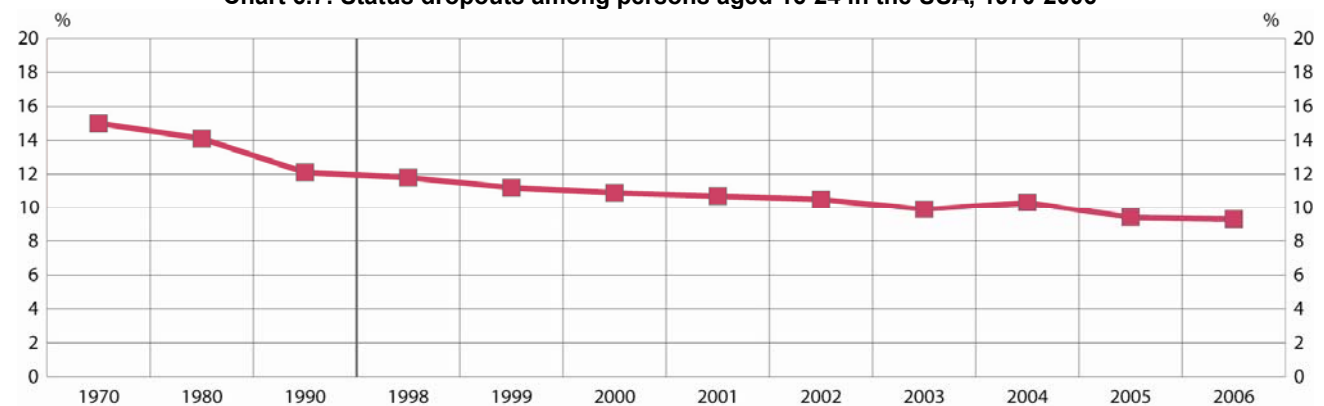
those who have had regular school attendance. Also those with learning difficulties are twice as likely to be Neets.

The Welsh government set up in 2006 a new strategy and a quantitative target for reducing the number of Neets and increasing the percentage of 16 to 18 year olds in education, employment or training to 93% by 2010.⁶⁴

6.1.3 Early school leavers in the USA

Early school leaving is also on the policy agenda outside Europe.

Chart 6.7: Status dropouts among persons aged 16-24 in the USA, 1970-2006



| Year | 1970 | 1980 | 1990 | 1998 | 1999 | 2000 | 2001 | 2002 | 2003 | 2004 | 2005 | 2006 |
|------|------|------|------|------|------|------|------|------|------|------|------|------|
| % | 15.0 | 14.1 | 12.1 | 11.8 | 11.2 | 10.9 | 10.7 | 10.5 | 9.9 | 10.3 | 9.4 | 9.3 |

Data source: Digest of Education Statistics for data from 1970 to 2001, Youth Indicators for data from 2002 and 2006, both published by the US Department of Education

It is not possible to compare directly the data on early school leavers between the EU and the USA since different definitions are used, but national data on the situation in these countries can be useful.

In the USA the concept of early school leaving, more popularly known as “dropping out”, is based on several definitions of dropout rates and indicators used by official authorities, among which the “status dropout” rate seems to be most comparable with the EU benchmark.⁶⁵

According to official US data, 10.3% of 16- to 24-year-olds in the USA had no upper secondary education and were not enrolled in a high school programme (“status dropouts”) in 2004.⁶⁶

Also in the USA, dropping out is more of a problem among boys than girls (10.3% and 8.3%

respectively) and of persons from certain ethnic backgrounds (22.1% for persons of Hispanic origin and 10.7% for black persons of non-Hispanic origin, in comparison with 5.8% for white persons of non-Hispanic origin) (National Center for Education Statistics, 2007).

Drop-outs in England

In England, youngsters who were likely to drop out were pupils with the following characteristics:

- **Angry young rebels.** Against the system. Moderate to low ability. Very hostile to authority and hence teachers. Disruptive in class. Although hostile to school, they yearn for respect. They can be attracted to college courses that offer opportunities to succeed.
- **Quitters.** Believe they have tried and failed. Moderate to low ability. Any reaction from hostility to

passivity.

► **Rebels without a cause.** Impatient to make their own way in the world of work. Believe their personality will be their key to success. High to moderate ability. School is boring, but this group is not hostile to teachers.

► **Cool Dudes.** Life is predicated on having fun, and school gets in the way of this. High or moderate ability, but underachieving. Disengaged, but not hostile. Seen as lazy by teachers.

► **Hedgers.** Disaffected but in touch. Waiting to commit until they get their GCSE results. Moderate to low ability. Generally positive.

► **Settlers.** Disaffected but in touch. Have chosen an undemanding life. Sit between “Cool Dudes” and “Quitters”. Moderate to low ability. Passive.

► **Escapists.** Dream of being “discovered”. Low ability. Disengaged and disconnected.

► **Strugglers.** Want to do well, have unrealistic aspirations, but have not given up. Low ability. Positive and eager to get on.

(BBC news, 5 November 2007)

It took the USA more than 30 years to reduce the dropout rate by about 6 percentage points (from 15% in 1970 to 9.3% in 2006). This could be compared with the EU objective of reducing the share of early school leavers by about 7 percentage points over a period of 10 years (from 2000 to 2010).

6.2 Special needs education

In recent decades, the European Union has made some notable developments in the areas of mainstreaming and inclusion of students with special educational needs into regular classroom settings. The Helios programme in 1988 and the Resolution on the integration of children and young people with disabilities into ordinary systems of education in 1990 represent positive moves in this vein. The goal of inclusive education forms part both of the Charter of Luxembourg (EC, 1996) and the Amsterdam Treaty (EU, 1997).

Indeed, these programmes laid the foundation for the European Year of People with Disabilities in 2003 and the adoption of subsequent Council Resolutions: the Resolution on improving access for people with disabilities to the knowledge-based society, the Council Resolution on equal opportunities for pupils and students with

disabilities in education and training; and the Resolution on accessibility of cultural infrastructure and cultural activities for people with disabilities.

With the signing of the United Nations **Convention on Rights of People with Disabilities** (2006) EU Member States recognise the right of persons with disabilities to education.⁶⁷

Most importantly, all European countries have ratified the UNESCO **Salamanca Statement and Framework for Action in Special Needs Education** (1994). This collective statement is a major focal point for special needs education work in Europe — it is still a keystone in the conceptual framework of many countries’ policies. The extract from the statement in the box below is used repeatedly as a guiding principle in policy level debates:

UNESCO Salamanca Statement and Framework for Action in Special Needs Education (1994)

"Regular schools with an inclusive orientation are the most effective means of combating discriminatory attitudes, creating welcoming communities, building an inclusive society and achieving education for all; moreover, they provide an effective education to the majority of children and improve the efficiency and ultimately the cost-effectiveness of the entire education system."

All European countries agree that the key principles in the Salamanca Statement of equal opportunities in terms of genuine access to learning experiences that heed individual differences and quality education for all focused on personal strengths rather than weaknesses, are the same principles that should underpin all education policies — not just those dealing specifically with special needs education.

These principles are echoed in the 2007 **Lisbon Declaration — Young People’s Views on Inclusive Education** (European Agency for Development in Special Needs Education, 2007), which outlines a number of proposals agreed upon by young people with special educational needs from 29 countries attending secondary, vocational and higher education. The declaration sets out the young people’s views on their rights, needs, the challenges they face and recommendations for inclusive education.

The domain of Special Needs Education was stressed within the Framework on Indicators and Benchmarks and the Council Conclusions of May 2007, that calls for an indicator on Special education needs as one of sixteen core indicators and benchmarks which should be used for monitoring of progress in the field of education and training (Council, 25 May 2007).

Data on education of pupils with special education needs — problems of definition

Policy makers, practitioners, researchers and the wider community do not always agree on who does and does not have a disability, impairment or special need. The reason for this is that a person's special need arises essentially from two possible sources — factors within persons themselves (some form of impairment) and factors

International Standard Classification of Education — ISCED. UNESCO, Paris(1997)

“... the concept of ‘children with special educational needs’ extends beyond those who may be included in handicapped categories to cover those who are failing in school for a wide variety of other reasons that are known to be likely to impede a child's optimal progress. Whether or not this more broadly defined group of children are in need of additional support depends on the extent to which schools need to adapt their curriculum, teaching and organisation and/or to provide additional human or material resources so as to stimulate efficient and effective learning for these pupils.”

within the environment (the role of the environment in either minimising the impact or exacerbating it). The International Classification of Functioning develops this concept at the international level (World Health Organisation, 2001). It provides a standard framework for considering disability and how environmental factors interact with different functional capabilities of people with special needs.

The ISCED (UNESCO, 1997) discussion of special educational needs expands on this by highlighting the fact that "special educational needs" is a broader term than disability; it covers more 'types' of educational need — for example social, emotional and behavioural difficulties — and is clearly a context-bound definition.

Special Educational Needs is a 'construct' that countries define within their legislation and then go on to identify, assess and make provision for in

different ways. There are no accepted definitions of disability and/or special needs available to use comparatively across European countries, and whilst some countries are considering incorporating ISCED definitions within the legislation, no countries use more specific externally generated definitions within their educational legislation or policymaking. The education systems (policies and practice) in this area have evolved over time, within very specific contexts, and are therefore highly individual (Watkins, A., 2007). For most countries, policies have a clear focus on special needs 'provision' rather than solely 'in learner' factors, and whilst there is a movement in all countries away from medically based models of definition, assessment and provision and towards educational and 'integrationist' approaches (Watkins, A., 2007), there is no agreement on who should receive what provision.

In this section of the chapter, we will analyse data on education of pupils and students with special educational needs based on two international data sources which use different concepts.

The concept used by the European Agency for Development in Special Needs Education is based on agreement of countries on a 'bottom-up' approach which uses the country's own legal definition of special educational needs as the basis for data collection.⁶⁸

The OECD concept is based on additional resources⁶⁹ of various kinds available to pupils and students who have particular difficulties, for a variety of reasons, with making progress in their schooling, whether or not they fell within the national definition of special educational needs distinguishing three categories described later in section 6.2.2.

6.2.1 Education of pupils with special education needs in inclusive or segregated settings

Data collected by the Agency enable the percentage of pupils with SEN educated in segregated settings to be analysed.⁷⁰ Data on pupils with SEN in segregated settings are comparable across countries, and these quantitative data alone can be used to analyse trends in provision and movements towards inclusion.

However, they cannot provide any indication of the quality, suitability or appropriateness of the

education provided for pupils with SEN. It should be clearly recognised that other, qualitative indicators must be considered in relation to statistical data if trends in provision and movement towards inclusion are to be fully understood (Kyriazopoulou, M., in press).

All European countries are also able to provide some data on the numbers of pupils who are placed in inclusive settings. However, these are considered by Agency member countries to be less reliable and comparable.

Pupils recognised as having special education needs

From data collected in 2008⁷¹ and 2006⁷² by the European Agency for Development in Special

Table 6.3: Percentage of pupils in compulsory education recognised as having special education needs (in all educational settings), data collections in 2006 and 2008

| | 2006 | 2008 |
|--------------------------------------|------------|------------|
| EU | 3.6 | 3.6 |
| Belgium (Flemish speaking community) | 5.6 | 5.8 |
| Belgium (French speaking community) | 4.3 | 4.4 |
| Bulgaria | 2.0 | : |
| Czech Republic | 9.3 | 8.6 |
| Denmark | 2.7 | 3.2 |
| Germany | 5.6 | 5.6 |
| Estonia | 18.4 | 19.0 |
| Ireland | 0.9 | 1.0 |
| Greece | 1.7 | 1.9 |
| Spain | 2.7 | 2.6 |
| France | 2.6 | 2.7 |
| Italy | 0.02 | 0.01 |
| Cyprus | 3.5 | 4.3 |
| Latvia | 4.3 | 4.0 |
| Lithuania | 11.1 | 11.4 |
| Luxembourg | 2.1 | 2.3 |
| Hungary | 7.0 | 6.0 |
| Malta | 3.7 | 3.8 |
| Netherlands | 3.1 | 3.7 |
| Austria | 3.6 | 4.1 |
| Poland | 3.1 | 2.9 |
| Portugal | 4.4 | 3.7 |
| Romania | : | : |
| Slovenia | : | 5.4 |
| Slovakia | : | : |
| Finland | 6.7 | 7.7 |
| Sweden | 1.5 | 1.5 |
| United Kingdom(England) | 2.9 | 2.8 |
| United Kingdom(Scotland) | : | 5.5 |
| United Kingdom(Wales) | : | 3.5 |
| Croatia | : | : |
| FYR Macedonia | : | : |
| Turkey | : | : |
| Norway | 5.6 | 5.7 |
| Iceland | 2.0 | 19.7 |
| Liechtenstein | : | : |

Notes:

DK: data refers to pupils with the most serious needs in special classes only

Iceland: break in time series because of different procedure being employed

UK (England) and UK (Wales): data refers to pupils with statements of special education needs only

EU average was calculated as a percentage of pupils with special educational needs of the whole school population in all European countries for which data are available.

Needs Education, the percentages of pupils recognised as having special educational needs ⁷³

in all educational settings as well as the percentages of pupils with special educational needs in segregated setting tell us that across all countries for which data are available, at present 3.6% of pupils are officially recognised as having some form of special educational needs that requires additional support. This percentage has not changed since the 2006 data collection. There is a considerable difference between countries in the range of percentages of pupils identified as having special educational needs — from 19% (Estonia and Iceland) to less than 2% (Italy, Ireland, Sweden and Greece).

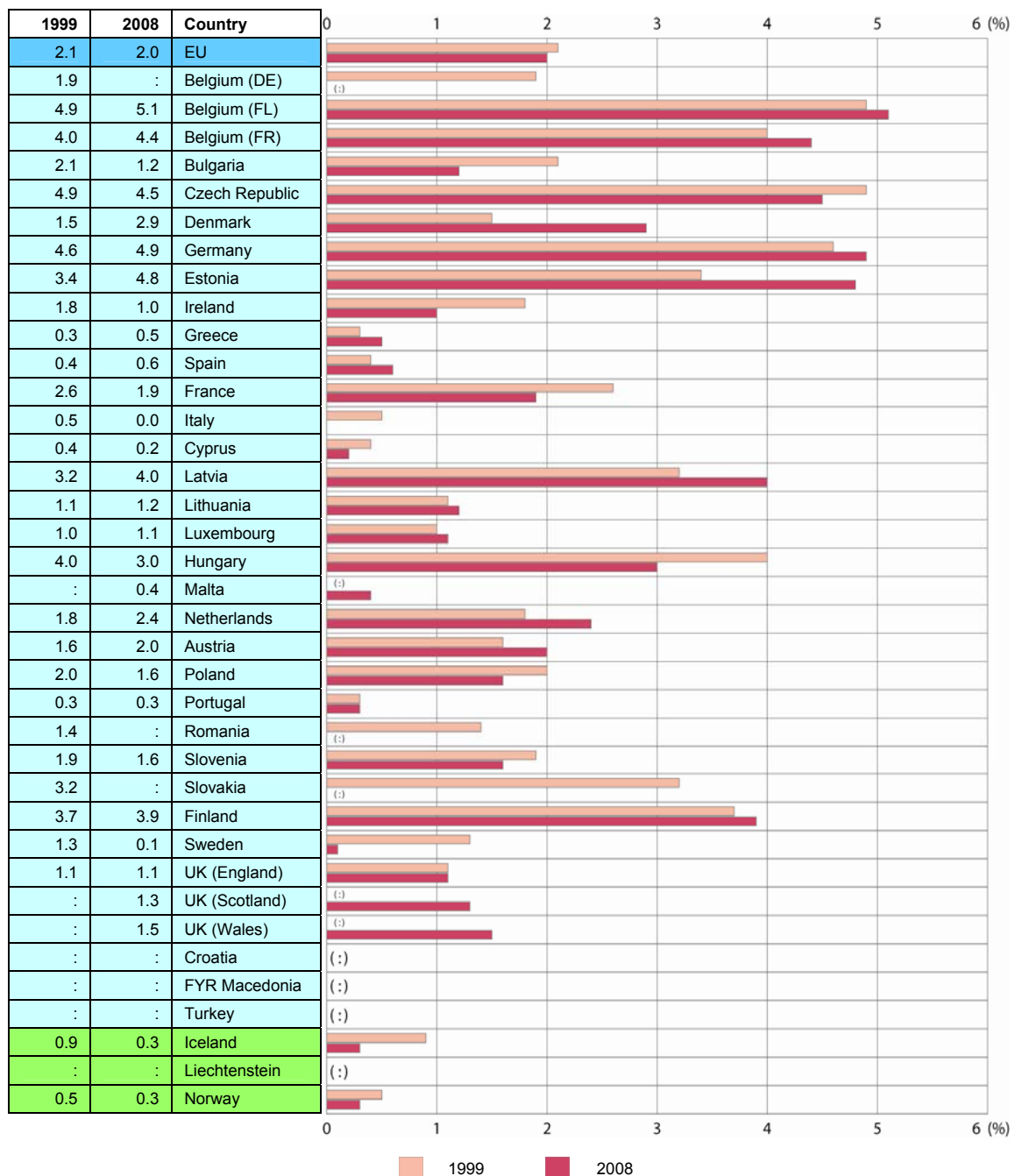
If the data collected by the Agency in 2006 and 2008 are compared, then most countries have almost no change in the overall percentage of pupils identified as having special educational needs. Generally, the percentage of pupils in compulsory education recognised as having special educational needs increased in 13 Member States and decreased in 8 (Czech Republic, Spain, Italy, Latvia, Hungary, Poland, Portugal and the UK (England)). A few countries show around a 0.5% increase or decrease — only Finland with a 1.1 percentage points increase and Hungary and Czech Republic with decrease by 1 percentage point and 0.7 percentage points respectively show greater variations.

Segregated settings

There is a growing consensus that equity considerations require that, wherever possible, pupils with special educational needs be educated in regular, mainstream classrooms rather than in separate institutions. This consensus stems from the realisation that the educational and social experiences that special schools and mainstream schools provide are often different; such differences often translate into inequities, especially in terms of pupils' access to post-compulsory education and the labour market (OECD, 2003a, Chapter 1, European Agency, 2006)⁷⁴.

As shown in Chart 6.8, at present 2% of the total population in compulsory education within the EU are taught in special settings because of their special education needs.⁷⁵ No quantifiable progress was made towards more inclusive policies for educating pupils with special needs between 1999-2001 and 2006-2008 (down only by 0.1 percentage point) although changes in national legislation and policy for SEN do highlight

Chart 6.8: Percentage of pupils in compulsory education with special needs in segregated settings, 1999 – 2008



Data source: European Agency for Development in Special Needs Education and Eurydice for 1999-2001; European Agency for Development in Special Needs Education for 2004-2006.

Additional note: EU average calculated as arithmetic average of EU Member States for which data are available. BE, IR, LU, NL, IS –data for 2006, UK only England, in Scotland 1.3%

Notes referring only to 2008 data:

1999: Refers to school years 1999/2000 and 2000/2001

2008: Refers to school years 2005/2006, 2006/2007 and 2007/2008

DK — Data refer to pupils with the most serious needs in special classes only

SE- Data refer to pupils in special schools and classes only

UK- Data refer to pupils with statements of SEN only; 2006 -2008 data refers to the UK(England), UK (Scotland) and UK Wales)

possible qualitative moves towards inclusion that may have a long term quantifiable impact. However, the situation varies between individual countries. About 4% to 5% of all pupils in compulsory education are taught in segregated settings (special schools or special classes) in

Belgium (Flemish and French speaking communities), the Czech Republic, Estonia, Germany, Finland and Latvia, whereas the figure is no more than 0.5% in Cyprus, Greece, Malta, Portugal and Sweden, along with Iceland and Norway, and in Italy it is about zero.

Given the non-comparability of data (i.e. using present data, the same country sample cannot be compared) it is not possible to identify exact trend information across countries. However, using the available data sets for individual countries, there would appear to be no real trend either upwards or downwards in the percentage of pupils in segregated provision. Very little change in the percentage of pupils placed in segregated settings is observable in individual countries.

Inclusive settings

As explained above, some countries are able to provide data on pupils educated in inclusive settings, but these depend very much on the national definition of SEN — pupils receiving support in inclusive settings may or may not be included in official figures.

Some countries — Estonia, Iceland and Lithuania — officially count all pupils who receive any form of support. This means they identify up to 19% of pupils as having some form of special education needs. Other countries only count pupils who receive the most intensive forms of support in mainstream classes at all. Denmark and Sweden are clear examples of such an approach although they estimate that well over 10% of pupils in mainstream settings do receive support; they are just not counted in figures.

Other countries have a ‘staged’ approach to provision — for example Finland and the UK (England) — where different ‘levels’ of support are considered and counted differently. If all categories of support for these countries were included then over 15% of pupils in mainstream settings would be recognised as receiving support for SEN in Finland and over 16% in UK (England).

Theoretically, as countries aim for inclusive schooling, reporting on pupils in inclusive settings will become harder and harder as their needs becoming increasingly met in ‘ordinary’ settings rather than by ‘special’ services requiring pupils to be clearly identified and/or categorised.

This change in policy emphasis away from individual needs, towards enabling the mainstream educational system to accommodate all pupils’ needs is a clear aim for most countries. Countries are however at different stages of this movement and such moves are not always clearly evidenced by ‘hard data’ on pupil placements.

Often, qualitative changes in policy and or provision are implemented long before a significant impact on pupil placements is obvious.

6.2.2 Education of pupils with special education needs depending on the type of difficulty

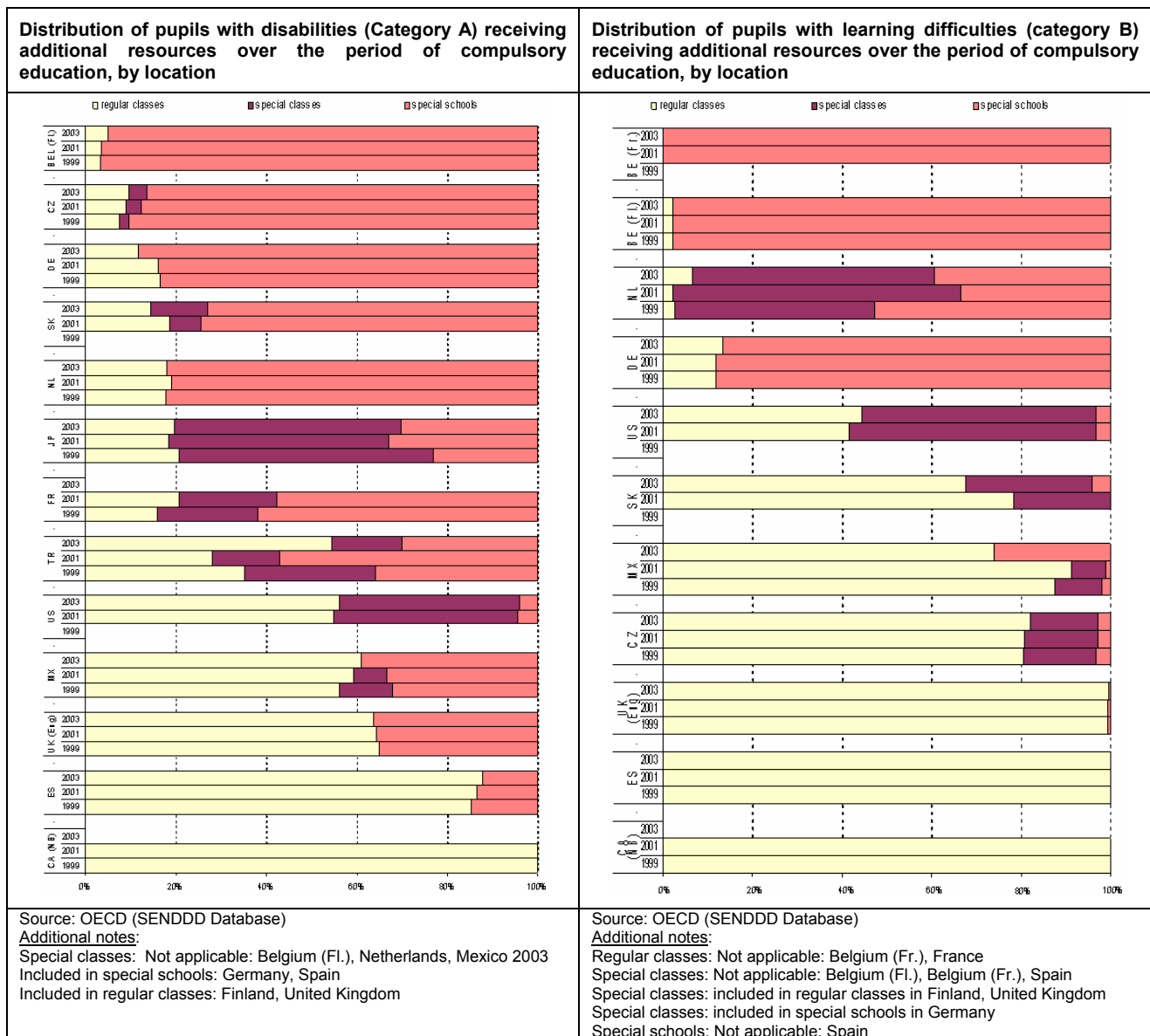
The data collected by the OECD on pupils with special education needs make it possible to analyse EU Member States’ policies from other angles. The OECD concept is based on additional resources⁷⁶ of various kinds available to pupils who have particular difficulties, for a variety of reasons, with gaining access to the standard curriculum, whether or not they fall within the national definition of special educational needs. This framework draws a distinction between three broad cross-national categories based on perceived causes of educational failure:

1. the “disabilities” category: pupils who have clear organic reasons⁷⁷ for their difficulties in education (Category A);
2. the “difficulties” category: pupils with emotional and behavioural difficulties or specific difficulties in learning (Category B), and the educational need arises from problems in interaction between the pupil or student and the educational context;
3. the “disadvantages” category: pupils in need of additional educational resources to compensate for problems due to aspects of their socio-economic, cultural and/or linguistic background (Category C) (OECD, 2005b).

Chart 6.9 documents the settings in which pupils with disabilities (Category A) and learning difficulties (Category B) are educated; the differences they reflect reveal potential inequities of provision within and among countries that could result in different and/or inequitable educational and social experiences for some pupils with disabilities and difficulties.

Chart shows the variation in the distribution of pupils in categories A and B educated in special schools, special classes, and regular classes in 1999, 2001, 2003. It is clear that there is substantial variation between countries in the extent to which pupils in these categories are in regular schools.

Chart 6.9: Distribution of pupils with special education needs according to categories of needs (1999-2003)



There are also some substantial differences within countries with regard to pupils in category A and category B.

Belgium (Fl.), the Czech Republic, Germany, the Slovak Republic and the Netherlands have high percentages of category A pupils in special schools and classes. Belgium (Fl. And Fr.) and Germany also educate high proportions of category B pupils in special schools and classes. However, policies in these countries contrast with the Czech Republic and the Slovak Republic, where most category B pupils are educated in regular schools. Similar but less extreme results are apparent in Spain and the UK.

Different national policies concerning inclusion provide an explanation for these differences;

policies may be influenced by features of regular schools and their curriculum, and training and attitudes of teachers, which may facilitate or obstruct inclusion practices.

Furthermore, there may be features of special schools that are viewed by parents and educators as desirable (OECD, 2004a and 2005b). Also, different cultural and societal views may influence the choice of parents and educators to place pupils in mainstream or special schools. Another important factor is funding mechanisms.

The trend analysis in Chart 6.9 shows that overall there have been few changes over time in the distribution of pupils with disabilities (Category A) receiving additional resources over the period of compulsory education vis-à-vis in the settings

where they are educated. The majority of countries (Belgium Fl., the Czech Republic, France, Mexico, Spain, Turkey and the United States) have shown a slight trend towards more inclusive provision, away from special schools and towards special or regular classes.

The same changes over the time hold good in the distribution of pupils with difficulties (Category B) receiving additional resources over the period of compulsory education vis-à-vis in the settings where they are educated.

Another group which is targeted by countries' provisions are pupils with social and socioeconomic disadvantages. When additional resources are provided to pupils with social disadvantages—those belonging to category C—they are usually addressed at ethnic minorities and migrants and consist of special courses for language learning and preparation for compulsory schooling (preparatory classes before primary education). In some countries these provisions fall under the definition of special education needs. In other countries, this is not the case (OECD, 2005b).

6.3 Gender issue in education and training

The Treaty of the European Union obliges Member States to promote equality between women and men. Over the years, the principle of gender equality has been reinforced by specific legislation. In the 1990s, the policy of gender mainstreaming was introduced. This new strategy strived to include gender equality issues in all activities — in the “mainstream”.

A cornerstone of the EU gender equality programme is that women and men must have the same opportunities to support themselves and

attain financial independence. However, from the initial initiatives focused on the principle of equal pay for equal work, emphasis has now shifted towards the equality of men and women outside the field of employment. More and more attention is now paid to gender issues in the field of education and training.

Gender and key competences

Because primary and lower secondary schooling is compulsory, formal equal access to school education at this level is not an issue. However, many dimensions behind this situation are of critical importance, such as access to a quality compulsory education or performance at school.

As regards academic subjects, the performance of female and male pupils in individual subjects is different.

Reading

Generally girls outperform boys in reading. PISA 2006 has shown that in all OECD countries females perform better in reading than males.

In 12 OECD countries the gap was at least 50 score points. In Greece and Finland females were 57 and 51 points ahead respectively, and the gap was between 50 and 66 points in Bulgaria, Slovenia, Lithuania and Latvia too.

The smallest gender gaps among OECD countries were found in the Netherlands (24 points) and the UK (29 points).

Mathematics

On the other hand, males still perform much better than females in Mathematics. In 35 of 57 countries participating in PISA 2006, males performed significantly ahead of females. In 21 countries there was no significant difference and only in one country — Qatar — did females outperform men.

Overall gender differences were less than a third as large as for reading – 11 points on average across OECD countries – and this has not changed since 2003. Of the EU countries, males outperformed females by more than 20 points only in Austria. Males also averaged 12 to 20 points more in Germany, the UK, Italy, Luxembourg, Portugal, the Slovak Republic and the Netherlands.

Science

Males and females in PISA 2006 showed no difference in average science performance in the majority of countries. In 12 countries, on average, females outperformed males, while males outperformed females in 8 countries. Most of these differences were small. In no OECD country was the gender difference larger than 12 points on the science scale. This is different from reading and mathematics, where significant gender differences were observed.

However, similarities in average performance mask certain gender differences: In most countries, females were stronger in *identifying scientific issues*, while males were stronger at *explaining phenomena scientifically*. Males performed substantially better than females when answering physics questions. Last but not least, in most countries more females attend higher

performing, academically oriented tracks and schools than do males.

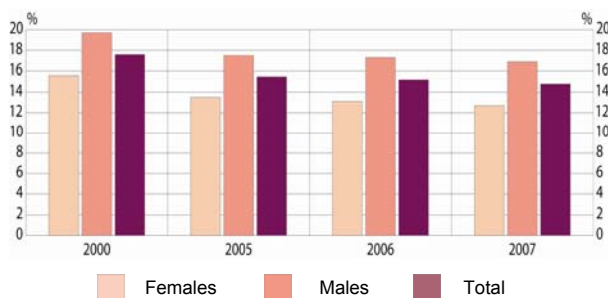
As a result of this, in many countries gender differences in science were substantial within schools or programmes, even if they appeared small overall.

PISA data show that countries were between 2000 and 2006 more successful in reducing the gap in Mathematics and increasing girls' skills in Mathematics than in Reading, where the gap between girls and boys, to the disadvantage of boys, remains very wide (38 points in PISA 2006).

More male than female early school leavers

Within the EU, early school leaving is more of a male phenomenon. In 2007, there were 12.7% female and 16.9% male early school leavers. The gap is stable, there being only a slight decrease between 2000 and 2007.

Chart 6.10: Percentage of early school leavers by gender - 2000, 2005, 2006 and 2007



| | 2000 | 2005 | 2006 | 2007 |
|---------|------|------|------|------|
| Total | 17.6 | 15.5 | 15.2 | 14.8 |
| Females | 15.6 | 13.5 | 13.1 | 12.7 |
| Males | 19.7 | 17.5 | 17.2 | 16.9 |

Data source: Eurostat (Labour Force Survey), 2000-2007

There are significant intergenerational differences in the ratio of females and males with only lower secondary education attainment (ISCED 2) and below. While in the younger generation (less than 24 years old) the males in 2004 accounted for 58% in contrast to 42% females, the opposite was true of the older generation (more than 24 years old, potential parents of present school population): females represented 57% in contrast to 43% males.

Thus in the majority of EU countries the gender gap increased in comparison with “older” (more than 24 years old) early school leavers, mostly in favour of the female population, except for Luxembourg where the majority of the “younger” (less than 24 years old) early school leavers were

and still are women. The Czech Republic shows a narrowing gender gap but has a higher number of female early school leavers among the younger generation.

A similar situation exists in the USA. In 2006, there were 10.3% dropouts among men and only 8.3% among women.⁷⁸

Boys overrepresented in special needs education

The gender data which have been collected by the OECD within the SENDDD project over the past 10 years has shown remarkable consistency as regards gender (OECD, 2007c).

In nearly all countries the ratio of boys to girls across all ISCED levels identified as pupils with special education needs is close to 60:40.

For those with learning difficulties, the difference is even greater, being closer to a two-thirds/one-third split. On the other hand, for socio-economically disadvantaged pupils this ratio is 50 to 50, apart from pupils in this category being educated in special schools. For these pupils with SEN the ratio is greater than 2:1.

Because the OECD concept of identifying pupils with SEN is based on the allocation of additional resources to these pupils, boys are in effect receiving a greater share of available resources than girls.

There are three reasons that might explain this situation:

- genetic or biological differences
- different behaviour pattern
- various biases leading to a situation where boys are more likely than girls to be identified as in need of additional support. Usually girls show behaviour patterns that are more closely matched to the expectations of teachers.

However, further investigations would be useful about gender issues in special needs education.

More women in higher education

Over the last few decades, women in the EU have closed the education gap and even surpassed men in terms of numbers of university graduates. Women are more likely than men to go on to university education and to graduate. But there are still large differences in the fields of study chosen by women and men. Men greatly outnumber women in science and engineering, while women dominate in arts and humanities. There remain

education sectors seen as “female”, which normally lead to lower paid jobs.

More male Mathematics, Science and Technology graduates and students

However, only little progress has been made on reducing the gender imbalance among MST graduates. The proportion of **female graduates** has increased slightly, from 30.7% in 2000 to 31.6% in 2006 (See also Chapter 4).

Bulgaria and Estonia, have the highest share of female graduates (>40%) while the biggest increases since 2000 have been in Estonia, Cyprus, Hungary and Slovakia. At EU level the female share of MST graduates increased slightly, from 30.7 % in 2000 to 31.6% in 2006. Since there was little change in the share of female MST students over the period 2000-2006 no significant improvements in the gender balance in MST graduates (who will be drawn from these students) are likely in the next few years. However, the share of women amongst MST students is lower than amongst MST graduates, implying a lower dropout rate for women.

Gender imbalance is especially pronounced in engineering (18% female graduates) and computing (20%) and, to a lesser extent, in architecture and building (36%), whereas in mathematics and statistics gender balance has existed since 2000. On the other hand, in the field of life sciences women clearly predominate (62%).

At EU level the female share of MST graduates increased slightly from 30.4% in 2000 to 31.1% in 2003. Since the share of female MST students remained stable in the period 2000-2003 significant improvements of the gender balance are unlikely in the coming years. However, it is notable that the share of women is lower as regards MST students than in terms of graduates, implying a lower drop out rate for women.

Further analysis and research necessary

The problem of gender differences in education and training is more complex than would seem to be the case. It is necessary to analyse more deeply what is happening in schools in relation to boys; however, it would be too simplistic to draw a conclusion from the above and to concentrate only on underachievement among boys in the future; always some girls are low achievers, just like some boys are best performers at school.

Some researchers conclude that policy makers should focus on the ‘gender jigsaw’ rather than

the ‘gender gap’, asking ‘which boys? and which girls?’ are underachieving. Males and females are not homogenous groups. Instead of stereotyped attitudes, expectations and behaviour, we need a coordinated multi-pronged approach to tackling gender differences in schools, one that addresses curricular issues, peer pressures and cultural attitudes and expectations (Tinklin, T. et al., 2003 and Collins, C et al., 2000).

We also need to pay attention to the interactions between gender, social class and ethnic background. Despite all the progress, females continue to be disadvantaged in various areas of education and training. For example, female early school leavers might have diverse difficulties and might be in a more difficult situation than male early school leavers.

6.4 Children at risk and intergenerational transmission of disadvantages

One of the major challenges facing European education and training systems is to compensate for any differences in pupils’ backgrounds which could place certain groups at a disadvantage.

In many countries at present characteristics such as social origin, poverty, ethnicity, age and gender significantly affect individuals’ opportunity of attaining higher levels of education and degrees.

There is evidence that universal access to high-quality pre-primary education can be particularly important for reducing inequalities caused by such factors as the educational attainment of parents, the difference between the language spoken at home and the language of instruction at school, and the socio-economic status of parents.

However, at present (2005) and as analysed in Chapter 1, every eighth four-year-old child is not enrolled in pre-primary education, including a majority of those in greatest need, such as children with a migrant background or from families with a low socio-economic status.

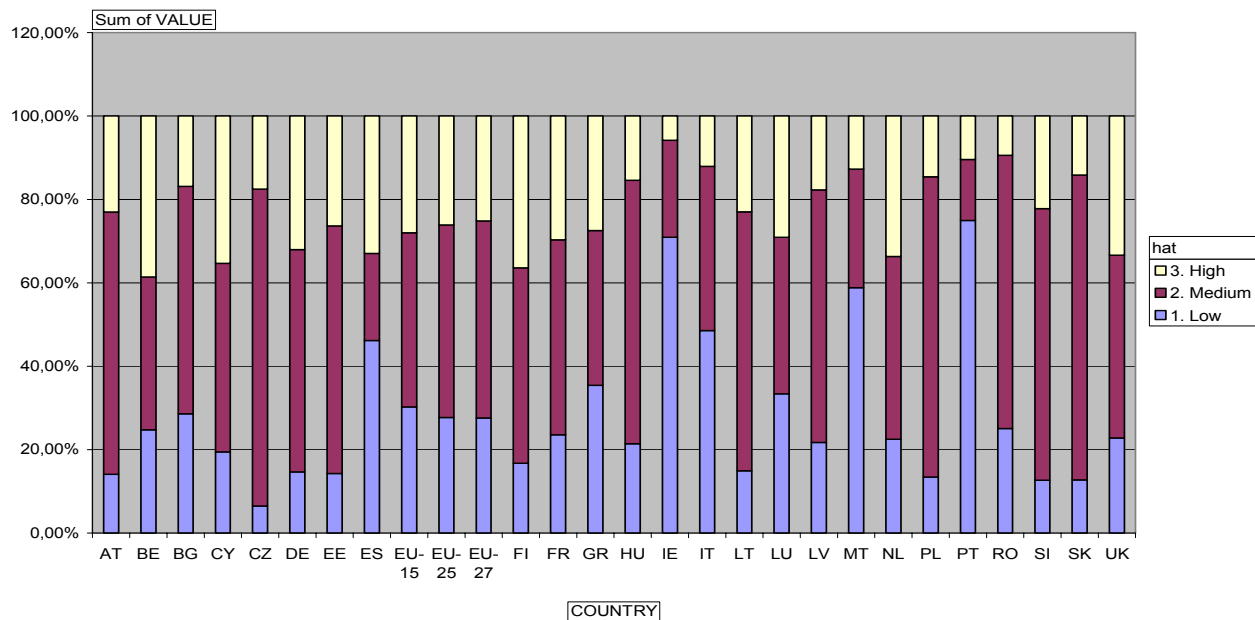
Low educational level of parents

A supportive family environment can help to improve pupils’ performance at school and their attitudes to education later in the life. Parents can read to young children and help them with homework. Parental education is therefore important for children’s educational performance. The data from large-scale international surveys show positive, statistically significant

relationships in the vast majority of countries between both mothers' and fathers' educational attainment on the one hand and pupils' performance in mathematics, reading and science on the other. Chart 6.11 shows the ratio of

children at risk of failure in education and training later in life because of low education level of parents, as illustrated by the highest education level achieved by the father.

Chart 6.11 Children aged 3 to 6 by educational level of parents, 2006



| | EU27 | BE | BG | CZ | DK | DE | EE | IE | EL | ES | FR | IT | CY | LV | LT |
|---------------|------|------|------|------|----|------|------|----|------|------|------|------|------|------|------|
| Low | 19.0 | 18.1 | 23.8 | 5.7 | : | 13.5 | 9.0 | : | 20.1 | 30.9 | 15.1 | 30.5 | 7.4 | 9.4 | 9.7 |
| Medium | 47.8 | 34.1 | 46.7 | 73.4 | : | 53.5 | 50.0 | : | 42.2 | 22.2 | 42.1 | 50.4 | 42.8 | 61.8 | 53.4 |
| High | 33.3 | 47.9 | 29.5 | 20.9 | : | 33.0 | 41.0 | : | 37.6 | 46.9 | 42.9 | 19.1 | 49.8 | 28.8 | 36.9 |

| | LU | HU | MT | NL | AT | PL | PT | RO | SI | SK | FI | SE | UK | HR | TR |
|---------------|------|------|------|------|------|------|------|------|------|------|------|----|------|------|------|
| Low | 24.0 | 16.3 | 51.0 | 12.4 | 10.6 | 5.8 | 59.5 | 21.0 | 4.9 | 9.7 | 4.3 | : | 19.3 | 9.2 | 70.3 |
| Medium | 39.6 | 61.4 | 30.3 | 45.1 | 61.4 | 70.3 | 21.3 | 67.5 | 57.0 | 71.9 | 37.9 | : | 43.2 | 69.4 | 21.2 |
| High | 36.4 | 22.3 | 18.7 | 42.5 | 28.0 | 24.0 | 19.3 | 11.5 | 38.0 | 18.3 | 57.8 | : | 37.5 | 21.4 | 8.6 |

Data source: Eurostat (Labour Force Survey), 2006

In five EU countries — Spain, Ireland, Italy, Malta and Portugal — about 40% or more of fathers of children aged 3 to 6 years obtained only lower secondary education or less. Four of these — Spain, Malta, Italy and Portugal — belong also to countries with highest level of early school leavers in the EU ranging from some 20% of early school leavers in Italy to about 40% in Malta and Portugal

Migrant background

Immigration has been and will continue to be a main feature of European societies. Today, the successful integration of migrant children in European schools and societies is both an economic necessity and a pre-condition for democratic stability and social

cohesion. Education and training play a crucial role in the integration of immigrants, but cannot on their own solve the problem — a holistic and integrated approach on the part of all stakeholders is necessary.

A study recently prepared for the Commission by Friedrich Heckman⁷⁹ has confirmed that immigrant children, in comparison to their peers, are very often unable to take full advantage of education and training in various areas and at various levels of the system.

Enrolment in pre-primary has improved in many countries, as shown in the Chapter 1 of this report, though migrant children in some countries, for example in Germany, still enrol at a later age and at

a generally lower ratio compared to their native peers⁸⁰. Migrant students' enrolment in **secondary schools** is often in schools that are academically less demanding and of shorter duration^{81,82}. The EUMC survey⁸³ also found that migrant children and young people usually stay in secondary education for a shorter period. Another important aspect of school enrolment is the overrepresentation of migrant children in **schools for special education**. This "...appears to be a common phenomenon in many countries of the European Union".

Moreover, foreign ethnic background is a factor which significantly influences pupils' achievement at school in many countries. Data from all relevant international surveys (PISA, TIMSS and PIRLS) confirm this (see for example Table Ann B.6.1

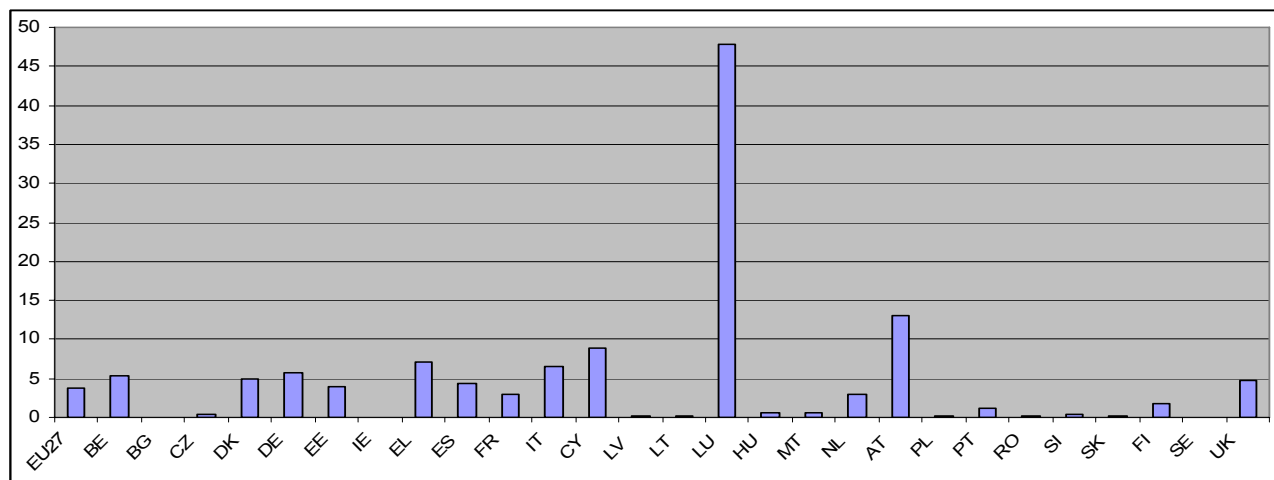
based on PIRLS data and Table Ann B.6.2 based on PISA data).⁸⁴

The performance of migrant pupils in schools is comparatively higher in countries with lower levels of economic inequality, high investment in childcare and a well-developed system of preschool education. It is also better in comprehensive systems with late selection of pupils to different ability streams and worse in systems characterised by high levels of selectivity.

The individual school matters. Research supports the hypothesis that schools of good general quality are also good for migrant children and their educational opportunities.

Chart 6.12 Children aged 3 to 6 with migrant background, 2006

(Percentage of children aged 3 to 6 with migrant background of the total number of children aged 3 to 6, 2006)



| | EU27 | BE | BG | CZ | DK | DE | EE | IE | EL | ES | FR | IT | CY | LV | LT | LU | HU | MT |
|------|------|------|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|------|-----|-----|
| 2006 | 3.8 | 5.4 | 0.0 | 0.3 | 4.9 | 5.7 | 4.0 | : | 7.2 | 4.3 | 3.0 | 6.5 | 8.8 | 0.2 | 0.1 | 47.9 | 0.5 | 0.5 |
| | NL | AT | PL | PT | RO | SI | SK | FI | SE | UK | HR | MK | TR | IS | LI | NO | JP | US |
| 2006 | 2.9 | 13.0 | 0.2 | 1.2 | 0.1 | 0.4 | 0.2 | 1.7 | : | 4.8 | : | : | : | : | : | : | : | : |

Data source: Eurostat (Labour Force Survey), 2006

Some differences in the various education systems' ability to reduce the differences between foreign and native pupils' achievement levels, as shown in PIRLS and PISA, can be explained by the different immigration policies and different composition of the foreign population in individual countries, in terms of national origin and socio-economic, educational and linguistic background. However, there are still significant differences between countries with relatively uniform foreign school populations. Chart 6.12 shows that the percentage of children aged 3 to 6 years with a foreign background due to enter

compulsory education soon varies considerably between countries.

Among the countries for which data are available, the proportion of children with a foreign background is extremely high in Luxembourg, accounting for about half of the children aged 3 to 6, followed by Austria with 13%. In six other countries (Belgium, Denmark, Germany, Greece, Italy and Cyprus) the ratio is between 5% and 10%.

Intergenerational transmission of disadvantages

There are marked differences between countries in the scale of the influence of the educational level of parents on educational level obtained by their children. This impact seems particularly large in a number of the new Member States (the Czech Republic, Hungary, Poland, Slovakia, Lithuania and Cyprus) but also relatively big in Italy, Luxembourg and Belgium. On the other hand, the influence of the parent's level of education on the education level of their children appears to be smaller in Finland, Sweden, Germany and the Netherlands.

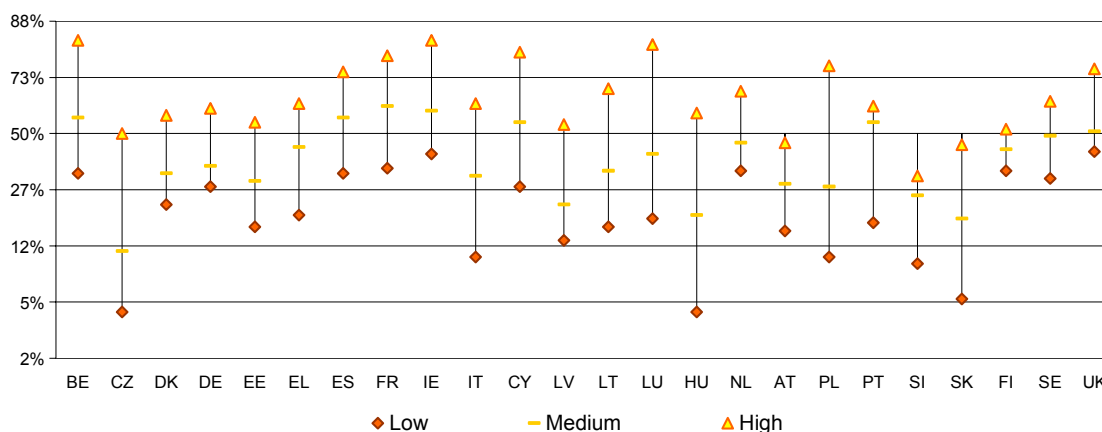
In all Member States for which data are available (with exception of Slovakia and Austria), the probability of someone aged 25-34 years having

completed higher education is over 50% if their father had higher education.

In Ireland and the United Kingdom, children of father with low educational level have the most chances to finish higher education.

In all countries, the chances of young people having higher educational level if their father had the same level are over twice as high as for people whose fathers had only low education. As we can see in the Chart 6.13, in the Czech Republic, Poland Hungary, Luxembourg, Italy and, Slovakia difference of probability to have obtained higher educational level according to the educational level of father is particularly visible.

Chart 6.13 Probability of attaining higher education, of women and men, aged 25-34, by educational level of father



Note: Percentages are in a logit scale. Graphically, differences between the percentages correspond to the logarithm of the odds-ratio.

While analysing intergenerational transmission of educational disadvantages for two age-groups of persons – 25-34 years old and 45-54 years old, we can notice that:

- ▶ The probability of someone whose father had low education attaining a university degree has tended to increase over time in most Member States, but this also reflects the general rise in participation in higher education.
- ▶ More relevantly, the chance of a person whose father had only basic schooling completing higher

education relative to someone whose father had higher education has risen over the long-term in 17 of the 24 Member States for which data are available.

- ▶ In Hungary, the Czech Republic, Poland and Lithuania, however, the odds ratio for persons whose fathers are university graduates relative to those whose fathers are low educated has increased – higher education seems to become still more "elitist".

Table 6.4: Probability of attaining higher education, of women and men, by age and education level of father

| Country | 25-34 years old | | | | 45-54 years old | | | |
|-------------------|--------------------------------------|--------|------|--------------------------|--------------------------------------|--------|------|--------------------------|
| | Highest education attained by father | | | Odds ratio (High/Low) | Highest education attained by father | | | Odds ratio (High/Low) |
| | Low | Medium | High | | Low | Medium | High | |
| HU | 0.04 | 0.19 | 0.59 | 34.5 | 0.06 | 0.17 | 0.58 | 21.6 |
| PL | 0.10 | 0.28 | 0.77 | 30.1 | 0.06 | 0.19 | 0.62 | 25.6 |
| CZ | 0.04 | 0.11 | 0.50 | 24.0 | 0.07 | 0.13 | 0.49 | 12.8 |
| LU | 0.18 | 0.41 | 0.83 | 22.2 | 0.08 | 0.28 | 0.74 | 32.7 |
| SK | 0.05 | 0.18 | 0.45 | 15.5 | 0.08 | 0.24 | 0.63 | 19.6 |
| IT | 0.10 | 0.32 | 0.63 | 15.3 | 0.08 | 0.49 | 0.61 | 18.0 |
| LT | 0.16 | 0.34 | 0.69 | 11.7 | 0.20 | 0.46 | 0.67 | 8.1 |
| CY | 0.28 | 0.55 | 0.81 | 11.0 | 0.18 | 0.62 | 0.81 | 19.4 |
| BE | 0.33 | 0.57 | 0.84 | 10.7 | 0.23 | 0.48 | 0.77 | 11.2 |
| PT | 0.17 | 0.55 | 0.62 | 8.0 | 0.09 | 0.62 | 0.79 | 38.0 |
| LV | 0.13 | 0.22 | 0.54 | 7.9 | 0.12 | 0.32 | 0.60 | 11.0 |
| IE | 0.41 | 0.60 | 0.84 | 7.6 | 0.18 | 0.59 | 0.81 | 19.4 |
| FR | 0.35 | 0.62 | 0.80 | 7.4 | 0.17 | 0.46 | 0.73 | 13.2 |
| EL | 0.19 | 0.44 | 0.63 | 7.3 | 0.14 | 0.49 | 0.55 | 7.5 |
| EE | 0.16 | 0.30 | 0.55 | 6.4 | 0.23 | 0.36 | 0.65 | 6.2 |
| ES | 0.33 | 0.57 | 0.75 | 6.1 | 0.16 | 0.46 | 0.69 | 11.7 |
| DK | 0.22 | 0.33 | 0.58 | 4.9 | 0.19 | 0.30 | 0.61 | 6.7 |
| AT | 0.15 | 0.29 | 0.46 | 4.8 | 0.13 | 0.25 | 0.62 | 10.9 |
| SI | 0.09 | 0.25 | 0.32 | 4.8 | 0.04 | 0.16 | 0.50 | 24.0 |
| UK | 0.42 | 0.51 | 0.76 | 4.4 | 0.27 | 0.46 | 0.72 | 7.0 |
| NL | 0.34 | 0.46 | 0.68 | 4.1 | 0.24 | 0.43 | 0.70 | 7.4 |
| DE ⁽¹⁾ | 0.28 | 0.36 | 0.61 | 4.0 | 0.28 | 0.35 | 0.58 | 3.6 |
| SE | 0.31 | 0.49 | 0.64 | 4.0 | 0.24 | 0.52 | 0.55 | 3.9 |
| FI | 0.34 | 0.43 | 0.52 | 2.1 | 0.29 | 0.50 | 0.62 | 4.0 |

Source: EU-SILC, 2005

Notes: Percentages are in a logit scale. Graphically, differences between the percentages correspond to the logarithm of the odds-ratio.

Low education – less than upper secondary (ISCED 3)

Medium education – at least upper secondary (ISCED 3 or ISCED 4)

High education – higher education (ISCED 5 or ISCED 6)

(1) For Germany older age groups compared because of later graduation (35-44 and 55-64).

7. EMPLOYABILITY

7.1. A key challenge –demographic induced decrease in employment

7.2 Educational attainment of the population

7.3 Labour market and educational attainment

7.3.1 Educational attainment and employment/unemployment rates

7.3.2 Other returns to education

7.4 Future skills needs

MAIN MESSAGES**Employability**

- The educational attainment of the working age population (15-64 year olds) has improved considerably since 2000. The share of population with at most lower secondary education is down by 5.3%, and the share with tertiary education is up 3.6%. Yet almost 108 million people in the age bracket 15-64 still have low educational qualification, below upper secondary level – one third of the EU working age population.
- There is a wide variation in the share of the working age population with high educational attainment, from 9.9% in Romania to 29.7% in Cyprus. In 10 Member States, Belgium, Denmark, Estonia, Ireland, Spain, Cyprus, the Netherlands, Finland, Sweden and the United Kingdom, more than 25% of the working age population have high educational attainment. Ireland, Denmark and Spain have experienced the strongest growth in high attainment.
- Higher educational attainment partly explains the improvement in the EU employment rate since 2000.
- The share of 25-64 year-olds with high educational attainment in the EU, which is at 23 %, is far behind the 40% of both the US and Japan.
- According to recent projections, in 2015, around 30% of jobs are expected to require qualifications on the level of higher education and almost half will require at least medium level qualifications at upper secondary education levels.

The Lisbon strategy is designed to enable the EU to regain the conditions for full employment and to strengthen social cohesion by 2010. Increasing employment rates is among the most important success criteria in the strategy. Specific targets were set by successive European Councils on overall employment rates (70%), employment rates of women (60%) and employment rates of older workers (55-64 year olds) of 50 %.

After re-launching the Lisbon strategy in 2005, and refocusing it on growth and jobs, Europe has, until very recently, produced relatively strong growth figures. Total employment has increased by almost 6.5 million in the last two years. Another 5 million are expected to be created up to 2009. Unemployment is expected to fall to under 7%, the lowest level since the mid-80's. The employment rate, currently at 65.4%, has moved closer to the overall Lisbon target of 70%. For the first time in a decade, strong increases in employment have gone hand in hand with robust productivity growth (European Commission, 2007i).

At the European Spring Council meeting in March 2008, the heads of state and government recognised the importance of reforms undertaken over the years and underlined the importance of further promotion of "flexicurity" and to pay continuing attention to the transition from education to employment in the context of the implementation of the European Youth Pact. The conclusions of the European Council invited the Commission to present a comprehensive assessment of future skills requirements in Europe until 2020 taking into account technological change and aging population and to propose steps to anticipate future needs (Council, 2008a, paragraphs 14 and 16).

This chapter focuses on skills or knowledge as central parameters for employability. The core indicator for measuring progress in this area is the share of the population with high educational attainment, which can be seen as a proxy for the high skilled workers available to an economy. Rules and institutions governing the labour market will not be analysed in great detail (European Commission, 2007g and 2007j).

Section 1 highlights the demographic challenge of employment growth and suggests that improving educational attainment is a key policy response. Section 2 explores the educational attainment of the population, which is the core indicator used by the Commission for monitoring progress in this field. In section 3, educational attainment is analysed in

relationship to outcomes on the labour market and other outcomes. Section 4 examines future skills needs.⁸⁵

What is employability?

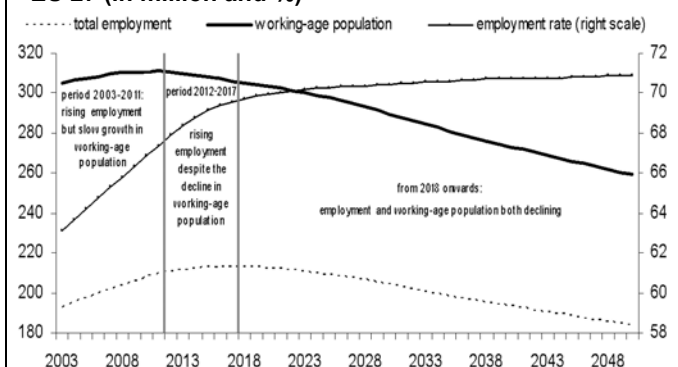
Employability refers to a person's capability of gaining employment. On the one hand a person's employability depends on the knowledge, skills and attitudes of this person. On the other hand labour market rules and institutions have significant impact on the ability of an individual to gain employment. Hence, a person with the same knowledge and skills characteristics might fare very differently in different national or regional labour markets.

7.1. A key challenge - demographic induced decrease in employment.

The political challenge of achieving higher employment rates should be seen in the light of demographic changes, which are projected to lead to a decline in the total working age population in approximately 10 years time (i.e. by 2018).

Chart 7.1 illustrates the importance of the employment rate⁸⁶ in the context of projected demographic changes (European Commission, 2007l).⁸⁷

Chart 7.1: Demographic change and employment in EU 27 (in million and %)



Source: European Commission

The chart identifies three distinct phases⁸⁸, namely:

1. Between 2003-2011, where there is scope for significant employment and economic growth as both the working age population and employment rates are expected to increase.
2. Between 2012 and 2017, rising employment rates can offset the decline in the size of the working age population due to the baby boom generation entering retirement and being replaced by much

smaller younger cohorts (due to the decline in birth rates). The overall number of persons employed in the EU will continue to increase albeit at a slower pace, and this period could be characterised by tightening labour market conditions.

3. After 2018, the ageing effect will dominate. By then, the cohort trend towards higher female employment rates will broadly come to an end putting an even higher pressure on active measures to increase employment among women. In the absence of further reforms to increase the labour force participation of older workers (and raise the effective retirement age) no significant further increases in the employment of older workers can be expected either. Consequently, the declining size of the working age population must be expected to translate into declining total employment and reduced growth prospects. Having increased by some 20 million between 2004 and 2017 employment is projected to contract gradually by almost 30 million until 2050.

The overall employment rate has improved by more than 3 percentage points (from 62.2% in 2000 to 65.4% in 2007, see table 7.1). The employment rate of people with low educational attainment levels⁸⁹ was steady (slightly below 49%); while the employment rates of people with medium (from 68.3% to 70.3%) and high educational attainment (from 82.4% to 83.8%) are moving upwards (see Table 7.2b).

Table 7.1: Educational attainment and employment rates (2000-2007) (15-64 year olds) to be further updated

| | Share of population (EU-27) | | | Employment rates (EU-27) | | |
|-------------------------------|-----------------------------|------|--------|--------------------------|------|--------|
| | 2000 | 2007 | Change | 2000 | 2007 | Change |
| Low educational attainment | 38 | 32.7 | -5.3 | 48.8 | 48.6 | -0.2 |
| Medium educational attainment | 45 | 46.7 | 1.7 | 68.3 | 70.3 | 2.0 |
| High educational attainment | 17 | 20.6 | 3.6 | 82.4 | 83.8 | 1.5 |
| Overall | N.A. | N.A. | N.A. | 62.2 | 65.4 | 3.2 |

Source: EUROSTAT (LFS)

The point is that while structural reforms might have had a clear impact on the overall improvement in the employment rate so have changes in the educational attainment of the population. The share

of the population with low educational attainment has decreased remarkably (by 5.3%) while the share with medium and high educational attainment has increased correspondingly resulting in an overall increase of the employment rate (See Gros, D., 2006a for a similar argument).

The demographic forecast suggests that 2018 is the point in time when total employment will no longer grow. Employment rates are at 70% and the only source of future economic growth by increasing productivity. This chapter argues that the response to the challenge of increases in total employment and increased productivity is the same, namely an up-grade of educational attainment.

7.2. Educational attainment of the population

The level of educational attainment of the working age population (aged 15 to 64) provides a crude measure of the knowledge and skills available in each country.⁹⁰ It presents the educational characteristics of the supply side of the labour market. In this context, the share of the population with high educational attainment was selected as the core indicator for measuring progress in the field of employability.

In 2007 in the EU nearly one third (32.7%) of the working age population had low level of educational attainment, almost half (46.7%) had a medium level and one fifth (20.6 %) a high level (see table Ann B.7.1). Compared with 2000, the share with low educational attainment had decreased by more than 5 % while the share with medium and high educational attainment had increased by 1.7% and 3.6% respectively. The table reveals important differences between countries in the educational attainment levels of the working age population.

The percentage of the working age population with low educational attainment varies between 16.2% in the Czech Republic to over 70% in Portugal and Malta. In the Czech Republic, Germany, Estonia, Latvia, Lithuania, Hungary, Austria, Poland, Slovenia, Slovakia, Finland, Sweden and the UK less than 30% of the working age population have low educational attainment, while in Greece, Spain, Italy, Malta and Portugal it is more than 40%. In 2007 almost 106 million persons aged 15-64 in Europe had low levels of formal educational qualifications, approximately 12 million fewer than in 2000.

At the intermediate level of educational attainment, Malta and Portugal have less than 20% of its

working age population, while the Czech-republic, Austria, Poland and Slovakia have more than 60%.

Finally, the percentage of the working age population with a high level of educational attainment (the core indicator) varies between 9.9% in Romania and 29.7% in Cyprus. Ten countries break the ceiling of 25% of the working age population with a high educational attainment level, namely Belgium, Denmark, Estonia, Ireland, Spain, Cyprus, the Netherlands, Finland, Sweden and the United Kingdom (table 7.2). The three countries, which have experienced the strongest growth over the period 2000-2007 are Ireland, Cyprus and Malta.

Between 2000 and 2007 in every Member State – except for Germany and Luxembourg (see table Ann B. 7.1) - there was a shift in the working age population from low levels of educational attainment to medium and high level. This shift is most pronounced in Spain where the proportion of the working age population with low educational attainment decreased by 9.8%. Other countries where high percentages of the working age population had a low level of educational attainment in 2000 experienced similar changes – Malta, Portugal and Greece.

Table 7.2: High educational attainment of 15-64 year olds (2000, 2007) (%)

| | EU27 | BE | BG | CZ | DK | DE | EE | IE | EL | ES | FR | IT | CY | LV | LT | LU | HU |
|-------------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|
| 2000 | 17 | 23.8 | 15.2 | 9.5 | 21.6 | 21.4 | 23.7 | 18.7 | 14.0 | 21.0 | 19.8 | 8.1 | 22.1 | 14.9 | 34.7 | 16.7 | 11.5 |
| 2007 | 20.6 | 28.1 | 18.5 | 11.6 | 27.1 | 20.7 | 27.3 | 28.1 | 19.2 | 27.0 | 24.3 | 12.0 | 29.7 | 18.8 | 24.1 | 22.7 | 15.4 |
| | MT | NL | AT | PL | PT | RO | SI | SK | FI | SE | UK | HR | MK | TR | IS | LI | NO |
| 2000 | 4.9 | 20.7 | 12.3 | 9.1 | 7.6 | 7.4 | 12.8 | 8.2 | 27.5 | 26.8 | 25.3 | | | | 19.0 | | 28.7 |
| 2007 | 11.5 | 26.7 | 14.8 | 15.7 | 12.0 | 9.9 | 18.5 | 11.9 | 29.5 | 27.0 | 28.2 | | | | 24.0 | | 29.1 |

Data source: EUROSTAT (LFS)

The core indicator for measuring progress in this area is: **Share of the population with high educational attainment**

Whereas the basic requirement for the post-war economy was secondary education, the one for an innovation-driven economy is higher education. The jobs currently being created as a result of innovation are not low paid-low skilled, but high paid-high skilled jobs. Countries endowed with a highly skilled and adaptable workforce are more able to create and make effective use of new technologies and to embrace change. This line of reasoning⁹¹ suggests that it is the skill composition of human capital and more precisely the share of high skilled workers in the labour force, which plays an important role in relation to economic growth.

In less developed countries, a highly skilled and adaptable workforce affect technological progress by adopting new technologies created abroad. The speed at which the countries "catch up" with those close to the technological frontier is a function of their human capital stock and their distance from the technological frontier. As these countries move closer to the technological frontier, the strength of the catch-up effect decreases, and investment in a highly skilled and adaptable workforce gains increasing significance. This is connected with the fact that in countries near the

world technological frontier, a highly skilled and adaptable workforce has an impact on technological progress predominantly through creation of new technologies.

The cause of the shift in educational attainment of the population is that young people with higher levels of formal educational qualifications enter the labour force, while older generations with lower levels gradually leave. As illustrated below (see table 7.3) - using a five year age group entering the labour market and a five year age group leaving the labour market - the skills profiles of the older generations are very different from the profiles of the younger generations.

Table 7.3: Educational attainment (EU-27) 2007 (in %)

| | Low | Medium | High |
|-----------------|------|--------|------|
| 25-29 year olds | 19.4 | 50.7 | 29.8 |
| 60-64 year olds | 55.3 | 32.3 | 12.4 |

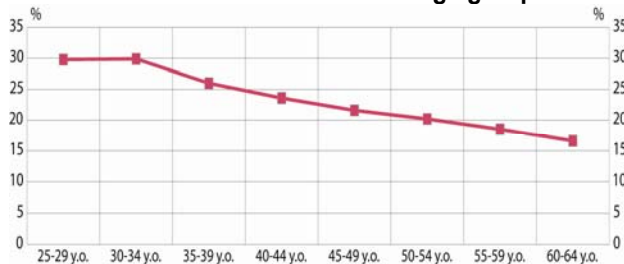
Source: EUROSTAT (LFS)

The proportion of 25-29 year olds with low educational attainment is close to 35 percentage points lower than the proportion of 60-64 year olds, while medium and higher levels are about 17% higher each. At the level of individual countries this shift is most noticeable in Ireland, Greece, Spain, Italy and Cyprus where the proportion of 25-29 year olds with low educational attainment is 40 percentage points lower than the proportion of 60-64 year olds with the same educational level. Medium

and higher education levels are correspondingly higher for the 25-29 year olds.

By analysing higher educational attainment separately this generational effect becomes very clear. Close to 30% of the 25-29 and 30-34 year olds have achieved higher educational attainment (see chart 7.2). Among the outgoing generations of 55-59 and 60-64 it is below 20 %. Women have experienced the strongest shift toward higher educational qualifications overall. In 2000 the percentages of females with low

Chart 7.2: Percentage of population with high educational attainment in different age groups. 2007



Source: EUROSTAT (LFS)

educational attainment (40%) was higher than for men (35,9%) while for medium and high educational attainment the percentage was lower than for men. In 2007, the overall distribution of females according to educational level resembles that of men. However, while the proportion of females with low educational attainment is still higher than that of men, females have now

surpassed men when it comes to the share with high educational attainment.

Table 7.4: Educational attainment of young men and women 2007

| | | Low | Medium | High |
|-------|-------|------|--------|------|
| 20-24 | Men | 24.3 | 65.2 | 10.5 |
| | Women | 18.9 | 65.5 | 15.6 |
| 25-29 | Men | 21.4 | 52.9 | 25.7 |
| | Women | 17.4 | 48.6 | 34.0 |

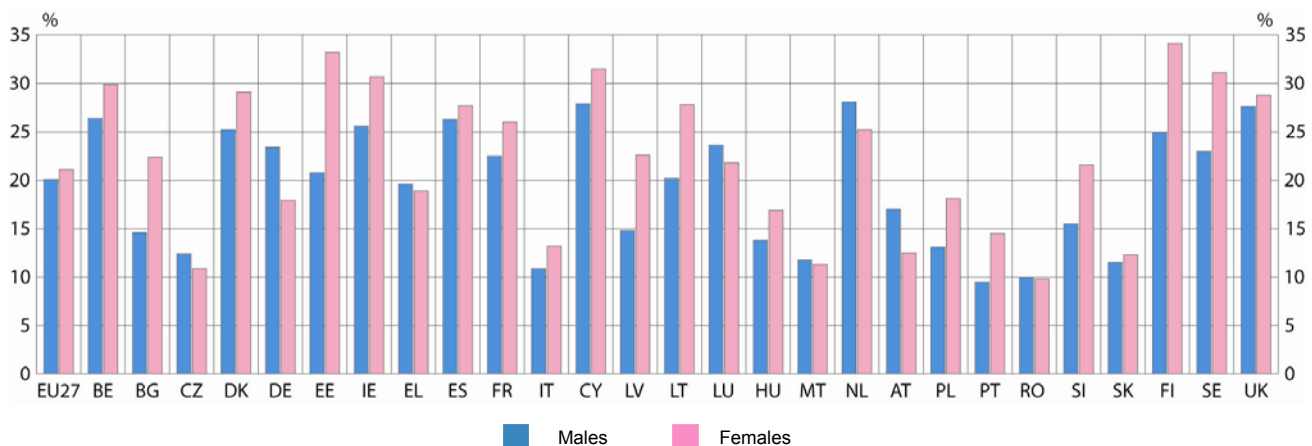
Source: EUROSTAT (LFS)

Chart 7.3 shows the share of working age (15-64 year olds) males and females with high educational attainment on country level. In the majority of countries females have a higher share with high educational attainment. However, in the Czech Republic, German, Luxembourg, the Netherlands, Romania, Slovakia and Austria the opposite is the case - males have a higher share with high educational attainment.

It is noticeable that in Bulgaria, the three Baltic States, Ireland, Slovenia, Finland, Sweden and Norway the share of women with high educational attainment is more than 5 percentage points higher than the corresponding figure for men.

Analysing the young population (see table 7.4) entering the labour market the share of females with high educational attainment is higher than the corresponding share for males, while the share of females with low educational attainment is lower than for males.

Chart 7.3: Gender and high educational attainment of working age population (15-64 year olds) 2007



Data source: Eurostat (EU-Labour Force Survey)

In an international context (see table 7.5) many of EU's key competitors perform at a higher level when it comes to the educational attainment of the adult population.⁹² US and Japan both have a share of around 40% of 25-64 year olds with higher

education. The Russian Federation is the best performer at 55% (though figures might be overstated) while Mexico, Brazil and Chile perform at substantially lower levels.

Table 7.5: High educational attainment of 25-64 year olds (in %)

| | EU27 | USA | Japan | Australia | Korea | Mexico | New Zealand | Russian Federation | Brazil | Chile |
|------|-----------------|-----|-------|-----------|-------|--------|-------------|--------------------|----------------|-----------------|
| 2005 | 23 ³ | 39 | 40 | 32 | 32 | 15 | 27 | 55 ² | 8 ¹ | 13 ¹ |

Data source: OECD and EUROSTAT (LFS)

1. Year of reference 2004

2. Year of reference 2003

3. Year of reference 2006

7.3. Labour market and educational attainment

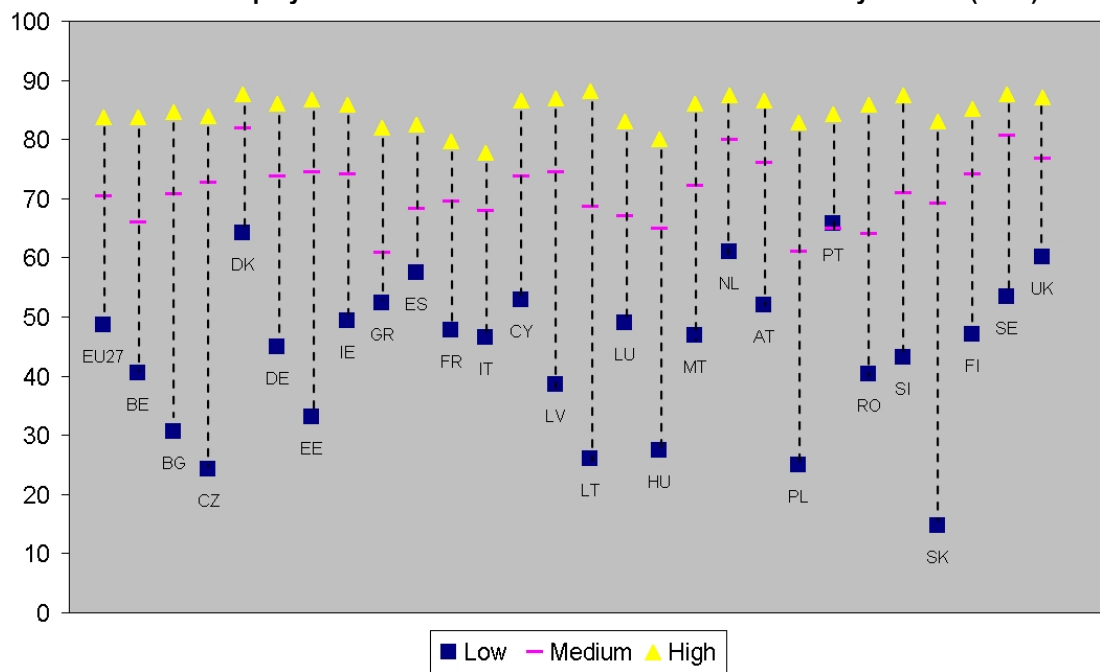
Research over the past decade has produced ample evidence that the monetary and non-monetary prosperity of individuals is related to their level of education and training. Education yields substantial returns to the individual in terms of earnings and employability and significant gains in economic growth and wider social benefits. Given that most European countries achieved virtually universal enrolment in primary and lower secondary schooling, policies that increase the quality of schooling in terms of pupils' cognitive and non-cognitive skills may bring considerable benefits in the long run. Evidence shows that the quantity and, especially, quality of schooling, in terms of student performance in cognitive achievement tests yield

substantial payoffs on the labour market for the individual and society alike (Barro 2001 and Wößmann 2002).

7.3.1 Educational attainment and employment/unemployment rates

This section analyses the performance of people with different educational attainment levels on the labour market. The analysis does not consider rules and institutions governing national labour markets. It does not consider the overall labour market situation which also impacts on the performance of workers with different educational attainment levels. Consequently, the analysis below only provides a crude illustration of labour market demand in relationship to people with different educational attainment levels.

Chart 7.4 : Employment rates and educational attainment for 15-64-year-olds (2007)



Data source: Eurostat, New Cronos database (extraction date: 6 May 2008)

The educational attainment of the population does not translate into corresponding performance on the labour market. The overall tendency is clear across European countries - the higher the educational attainment is, the higher the employment rates are (see chart 7.4); in many new member states the gap is higher than 50 percentage points (70 percentage

points in Slovakia and 60 percentage points in Lithuania and the Czech Republic).

Interestingly, however, there are clear differences between countries on how people with different educational attainments perform on the labour market. This is particularly true for people aged 15 to 64 with low educational attainment. In 2007, the

employment rate for this group varies between 15% in Slovakia to 66% in Portugal (see table 7.2b).

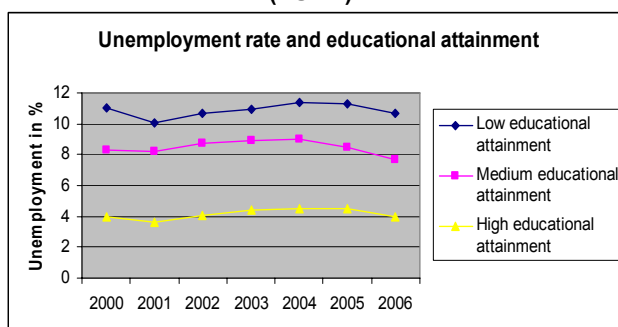
For people with medium levels of educational attainment the employment rate varies between 61% in Poland to 82% in Denmark.

Finally, within the EU, the employment rates for people with high educational attainment is below 80% only in Italy and France whereas in the majority of EU countries (two-third of the Member States) it is well-above above 85%.

Analysing unemployment rates for the age group 15 to 64 years give a similar picture. In all countries with the exception of Greece there is a clear tendency towards lower unemployment rates with the increase of the educational attainment level; in Slovakia this gap is as high as 40 percentage points. Moreover, the increase in the share of the working age population with medium and high educational attainment (see section 3) does appear to have been absorbed by the labour market. In chart 7.5, unemployment rates have showed slightly downwards trends since 2004 for all educational categories – strongest for medium educational attainment.

A more detailed look at the employment situation of the younger generation reveals that youth unemployment and difficulties in successfully integrating young people in the labour market remain a challenge for many EU Member State (see table Ann B.7.2). Despite signs of some overall recent improvements, a real breakthrough in reducing youth unemployment has yet to occur.

Chart 7.5: Unemployment and educational attainment (EU-27)



Eurostat (LFS)

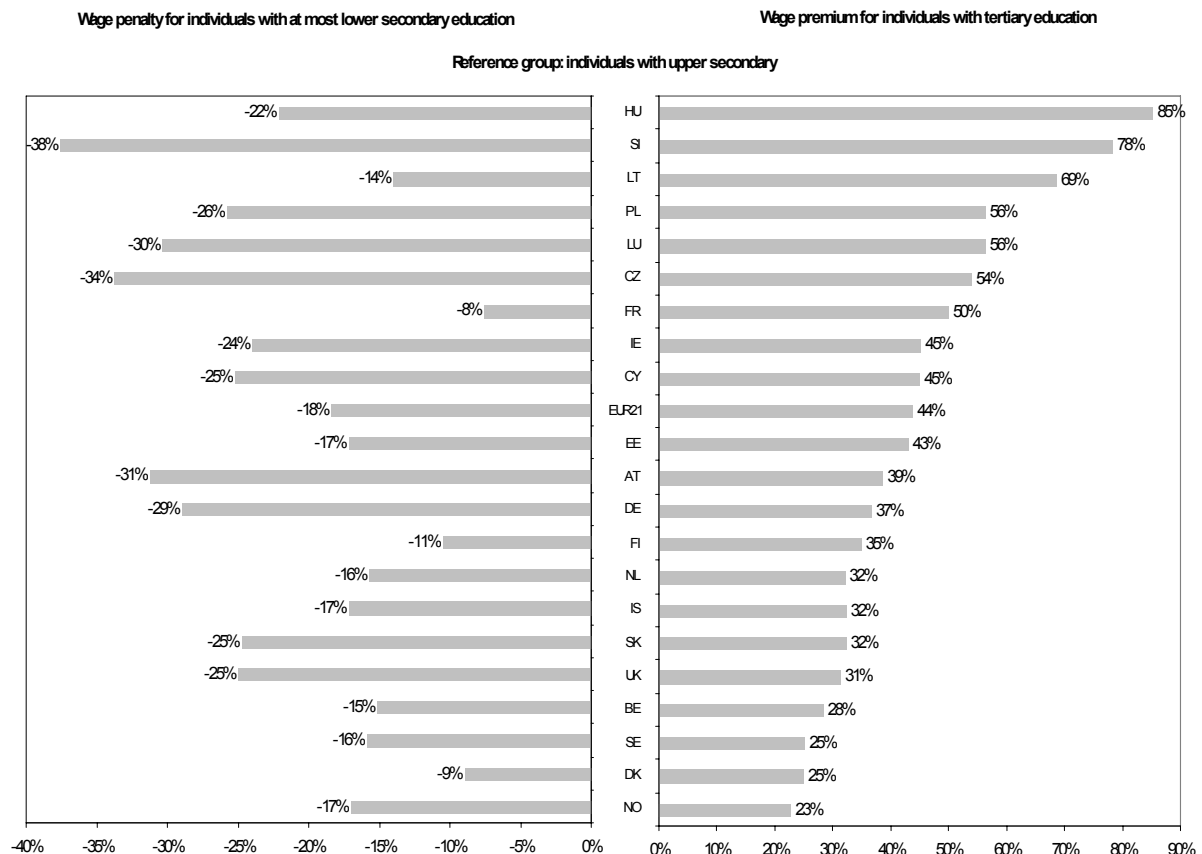
At 15.5% in 2007, the youth unemployment rate in the EU is almost 2 percentage points lower than in 2006. Furthermore, as a whole, the EU underperforms in the international context, with substantially more youth in unemployment and fewer working than in other industrialised countries, such as the United States, Canada or Japan (European Commission, 2007g).

7.3.2 Other returns to education

The research in economics of education over the past years has produced robust evidences on the effect of schooling on the individuals' wages. Schooling raises the individuals' productivity which is afterwards rewarded in the labour market in terms of higher earnings or wages (*cf.* Harmon *et al.* 2003).⁹³

A way of accounting the benefits of schooling is to look at the monetary benefits associated with the different levels of educational attainment through the econometric estimation of Mincerian earning equations. Recent estimations using data from the 2006 Survey on Income and Living Conditions (EU SILC) shows that, across European countries for which data exist, individuals with university degrees and advanced research education had gross monthly earnings that were 44% higher on average than their less educated counterparts (see chart 7.6). Tertiary education graduates earn substantially more than upper secondary and post-secondary non-tertiary graduates typically earn in all countries for which data exist. In one third of the countries the wage premia for tertiary graduates over 50%. The relative earnings from employment of tertiary graduates compared with upper secondary or post-secondary graduates can be as high as 85% in Hungary or 78% in Slovenia but are only less than 25% in Sweden, Denmark or Norway (CRELL, 2008a). On the other hand, in countries where data are available, the workers with a low level of education (at most lower secondary) have a gross monthly income which is 18 percent lower than the monthly earnings of a typical worker with a medium level of education.

Chart 7.6 Schooling and earning differentials compared to medium levels of education (upper secondary) in some European countries (2005)



Source: CRELL estimates based on EU SILC data

In some countries (especially the new member states) the wage premium associated with tertiary education could suggest an “under-supply” of tertiary graduates relative to the demand on the labour market. Indeed in countries like the Czech Republic, Hungary and Poland the proportion of working-age population (25-to-64-olds) with tertiary education is below the EU average. At the same time, the growing demand for higher education, driven partly by the introduction of new technologies biased in favour of highly skilled workers, also increases the wage premium attached to tertiary graduates. However, the wage responsiveness to changes in the supply of and demand for tertiary graduates varies between countries and other factors can affect the wage differentials.⁹⁴ Empirical evidence shows a negative relationship between wage differentials by level of education and the stringency of labour market institutions, the level of union membership or the degree of centralisation in wage bargaining (cf. Brunello et al. 2001).

7.4. Future skills needs

The integrated guidelines for growth and jobs 2005-2008, as well as 2008-2010, ask for better

anticipation of skill needs, labour market shortages and bottlenecks to improve the matching of labour market needs.⁹⁵

In November 2007, the Education Council adopted a resolution on the "new skills for new jobs" which stressed the need to raise the overall level of skills, anticipate skills needs and skills gaps emerging in the European labour markets and to improve the matching of knowledge, skills and competence with the needs of society and economy. This resolution aims at strengthening the identification of new types of jobs and skill needs at the European level, making use of existing initiatives, in order to develop regular foresight of medium-term skills needs and identify short term skills gaps. Such a coordinated approach based on existing structures should better respond to the objectives of several integrated guidelines of the Lisbon Strategy including guideline 20 on "improve matching of labour market needs" as well as guideline 7 on "R&D resources" and guideline 23 "investment on human capital" and guideline 24 on "Adapt education and training systems in response to new competence requirements."

As a consequence of these developments, Cedefop has embarked on the work on projecting the skill needs in Europe.⁹⁶ The first results of the skill needs forecasts at the EU level shows that the demand for skills and qualifications is being driven upwards in most occupations including in the so-called elementary jobs, by the continuing rise of the service sector and sweeping technological and organisational changes.⁹⁷ The forecast suggests that the total employment increase in Europe between 2006 and 2015 of around 13,5 million new jobs comprises more than 12.5 million additional jobs at the highest qualification level (tertiary education) and almost 9.5 million jobs at the medium level whereas the demand for jobs

requiring low qualifications (at most lower secondary education) will fall by 8.5 million. Jobs requiring only low level qualifications will have decreased from around a third in 1996 to around 20% of the working age population in 2015 (CEDEFOP, 2008a).

Based on the Cedefop projections, in 2015 around 30% of jobs will need high qualifications whereas almost half will require medium qualifications, including vocational qualifications. It is expected that this will increase the pressure on the upper and post-secondary levels of education. The challenge will be to improve the quality (and also the access) at these two levels of education.

8. INVESTMENT IN EDUCATION AND TRAINING

8.1 The level of investment in education

8.1.1 Public investment on education

8.1.2 Private investment on education

8.2 Measuring the efficiency of investment in education

8.2.1 Some measures of efficiency of investment on education

MAIN MESSAGES**Investment in education and Training**

- Denmark, Sweden and Cyprus allocate nearly 7% of their GDP into public investment in education. These are the highest levels in the EU and among the highest in the world. Japan (3.5%) and the US (4.8%) trail the EU (5%) on public investment. However, they both have much higher levels of private investment in education than any Member State.
- Bulgaria, Czech Republic and Romania are catching up on public investment in education while Estonia, Lithuania, Italy, Slovakia, Spain and Germany are losing ground.
- Although private investment in education is increasing in the EU, it is only significant in 4 Member States (the United Kingdom, Germany, Cyprus and Slovakia). For these, it reaches up to 17%, still well behind Japan and Australia (25%), the United States (30%) and Korea (40%).

8.1 The level of investment in education and training

Building on the Lisbon Council's call for increased and improved investment in human resources, making the best use of resources was one of the thirteen specific objectives of the Education and Training 2010 work programme (Council, 2002b) "expanding and improving investment in human resources" which was included in the renewed Lisbon strategy. The conclusions from the spring 2006 European Council underlined that "investments in education and training produce high returns which substantially outweigh the costs and reach far beyond 2010".

In its 2007 annual report the Commission issued recommendations for more than half of the Member States in relation to education and training, lifelong learning and skills development. In half of these cases, the recommendations addressed the need for further reforms of national education and training systems, including education investment (European Commission, 2007c). The Council Conclusions of March 2008 reiterates the need for "investing more and more effectively in human capital and creativity throughout people's lives" as crucial conditions for Europe's success in a globalised world (Council, 2008a).

This chapter analyses the patterns of investment in education in the European countries. Data presented and analysed in this chapter only covers the educational institutions as they are defined in the joint Unesco-OECD-Eurostat (UOE) data collection. Data on investment in vocational training is analysed in chapter 6. Although some information about other types of public investment

on training (e.g. for the unemployed) do exist, it is not covered in this chapter.

The volume of educational investment is discussed in sections 8.1. Some measure of investment performance are constructed and analysed in section 8.2.

8.1.1 Public investment on education

In the past years, the macro-economic situation in most EU countries (as reflected by their GDP level) has changed significantly: in some countries the rapid economic growth meant higher government revenue and hence a greater pool of public resources available for investment. At the EU level, in 2004, the main functional components of public spending (in % of total spending) were: social protection (41%), general public services and health (14% each) and education (11%); these items combined accounted for two thirds of total public spending.

The composition of public spending can reveal the priority set by an economy where a sizeable proportion of the public spending is allocated to a certain component. It can reflect country-specific objectives or inefficiencies in spending areas, if the input does not deliver the expected performance in terms of output and outcome (European Commission, 2008b).

In 2005 almost 90% of investment on educational institutions (all levels combined) at European level was covered by public sources. The public sector finances the educational sector by bearing directly

Table 8.1: Public expenditure on education as a percentage of GDP in European countries
Public expenditure on all levels of education as a % of GDP and average annual percentage change

| | EU 27 | BE | BG | CZ | DK | DE | EE | IE | EL | ES | FR | IT | CY | LV | LT | LU | HU |
|-------|--------|------|------|--------|--------|------|--------|--------|--------|------|--------|--------|--------|--------|--------|--------|--------|
| 2000 | 4.86 e | : | 4.19 | 4.04 | 8.28 i | 4.45 | 5.57 i | 4.29 | 3.71 i | 4.28 | 6.03 i | 4.47 | 5.44 i | 5.64 | 5.63 | : | 4.50 |
| 2004 | 5.06 e | 5.99 | 4.51 | 4.37 | 8.43 i | 4.59 | 4.98 | 4.72 | 3.84 i | 4.25 | 5.79 | 4.58 | 6.70 i | 5.07 | 5.2 i | 3.87 i | 5.43 |
| 2005p | 5.03 e | 5.95 | 4.51 | 4.25 | 8.28i | 4.53 | 4.87 | 4.77 | 3.98 | 4.23 | 5.65 | 4.43 | 6.92 i | 5.06 | 4.95 i | 3.81 i | 5.45 |
| avg % | 0.7 | : | 1.5 | 1.0 | 0 | 0.4 | -2.7 | 2.1 | 1.4 | -0.2 | -1.3 | -0.2 | 4.9 | -2.1 | -2.5 | : | 3.9 |
| | MT | NL | AT | PL | PT | RO | SI | SK | FI | SE | UK | HR | MK | TR | IS | LI | NO |
| 2000 | 4.52 | 4.86 | 5.66 | 4.87 i | 5.42 i | 2.88 | : | 4.15 i | 6.08 | 7.31 | 4.64 i | : | : | 3.48 i | 5.93 i | : | 6.81 i |
| 2004 | 4.85 | 5.16 | 5.44 | 5.41 i | 5.29 i | 3.29 | 5.85 | 4.19 i | 6.42 | 7.18 | 5.25 i | 4.46 | : | 4.05 | 7.48 i | 2.43 | 7.47 i |
| 2005p | : | 5.19 | 5.44 | 5.47 i | 5.40 i | 3.48 | 5.83 | 3.85 i | 6.31 | 6.97 | 5.45 i | 4.63 i | : | : | 7.61 i | 2.29 | 7.02 i |
| avg % | 1.8* | 1.3 | -0.8 | 2.4 | -0.1 | 3.9 | : | -1.5 | 0.7 | -0.9 | 3.3 | : | : | 3.9* | 5.1 | : | 0.6 |

Data source: Eurostat (UOE)

(:) Not available, (e) Estimated value, (i) See additional notes, (n) Nil or negligible

(*)Average annual percentage change between 2000 and 2004

For additional country specific notes, please see:

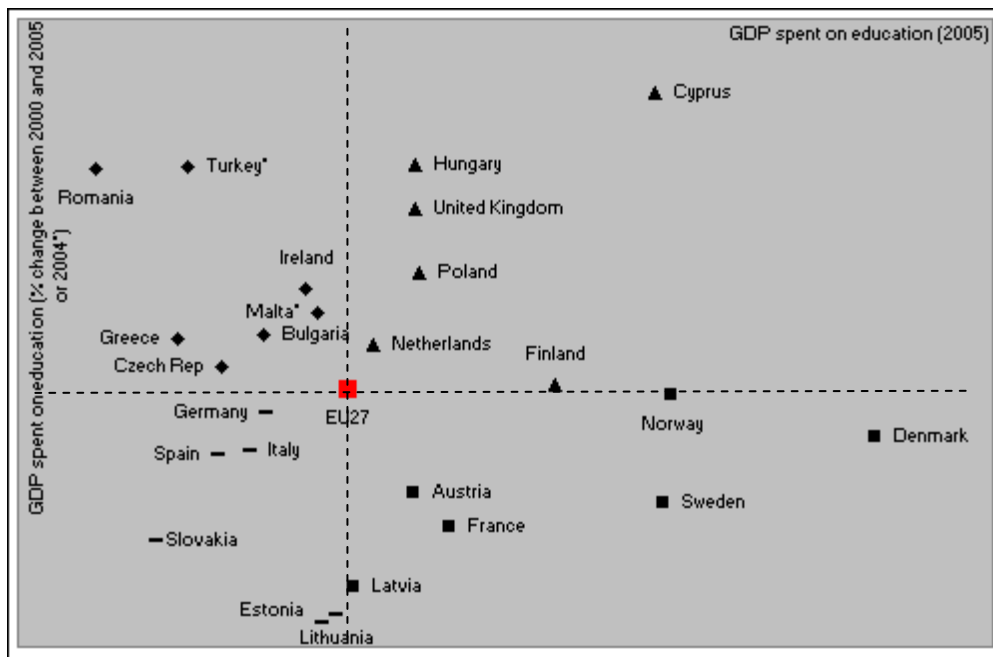
http://epp.eurostat.ec.europa.eu/portal/page?_pageid=0,1136184,0_45572595&_dad=portal&_schema=PORTAL

the expenses of educational institutions, by supporting students and their families with scholarships and public loans, or by transferring public subsidies for educational activities to private companies or non-profit organisations. All these transactions are reported as public expenditure on education and included in the indicator on public investment on education as a percentage of Gross Domestic Product (GDP), which is often seen as the commitment which governments make to the provision of education in a country.

There are large variations between European countries in their levels of total public investment on education as a percentage of GDP. In 2005 Denmark had the highest relative investment level in education among the Member States (8.3% of GDP), followed by Sweden and Cyprus (about 7% each of them) and Finland (6.3%). High level of public investment on education was recorded as well in Iceland (7.6%) and Norway (7.0%). In Romania, Slovakia and Greece public investment in education in 2005 was close to or below 4% of GDP (See Table 8.1); among the third countries for which data exists, Israel, Ukraine, Morocco and Tunisia, the public investment on education as a percentage of GDP was higher than the EU average in 2004 (see table Ann 8.1).⁹⁸

Chart 8.1 shows the average annual change in the relative investment on education (i.e. the proportion of GDP spent on education) between 2000 and 2005. The figure shows interesting trends in the relative investment on education in the European countries over the past five years. The countries in the lower-left quadrant (i.e. Lithuania, Estonia Italy, Slovakia, Spain, Germany) are falling behind the EU average in public investment as a percentage of GDP in 2005 whereas the countries in the lower-right quadrant (Denmark, Sweden, France etc.) are above the EU average but they are 'losing momentum' in terms of relative investment on education as a percentage of GDP. In the upper-left quadrant some countries with lower levels of GDP spent on education (e.g. Greece, Bulgaria, Romania) are catching up with EU investment average levels as proportion of GDP. Finally, some countries (Cyprus, the UK, Hungary, Poland, Netherlands, Finland) in the upper-right quadrant are moving ahead in their levels of relative investment on education as proportion of the GDP; between 2000 and 2005 the average annual growth in the proportion of GDP allocated in education was about 5% in Cyprus, 4% in Romania and Hungary and 3.3% in the United Kingdom.

Chart 8.1 Public expenditure on education as percentage of GDP in the EU (2005)



Source : CRELL; Data source: Eurostat (UOE) – Graphical display is based on June 2008 data.

Public investment on education in absolute figures (expressed on comparable basis in purchasing standards) can offer a complementary picture on the public effort made by a country to finance its educational system. Table 8.2 shows that more European countries (among which many new Member States) are making efforts to increase the public investment on education in absolute terms in the past years. In countries like Romania, Hungary or Cyprus the public resources allocated to education expressed in comparative Purchasing Power Standards (PPS)

have witnessed sizeable increases between 2000 and 2005 (over 10% annually). High average annual increases in the absolute figures of public investment on education between 2000 and 2005 were recorded as well in Ireland and Greece and in more than half of the Member States the average increase was at least 5% annually. In certain Member States changes in the national income were accompanied by high inflation rates, thus the figures expressed in constant terms (after adjusting for inflation) are lower.

Table 8.2: Public expenditure on education (all levels combined) in European countries
Total public expenditure on education in PPS (bill Euro) and average annual percentage change

| | EU 27 | BE | BG | CZ | DK | DE | EE | IE | EL | ES | FR | IT | CY | LV | LT | LU | HU |
|-------|--------------------|------|-----|-----|------|------|-----|-----|-----|------|------|------|------|-----|-----|-----|------|
| 2000 | 445.5 _e | : | 1.9 | 5.3 | 11.2 | 82.4 | 0.7 | 4.1 | 5.9 | 32.0 | 80.5 | 58.0 | 0.6 | 0.9 | 1.5 | : | 4.9 |
| 2004 | 532.3 _e | 16.7 | 2.6 | 7.2 | 12.4 | 95.4 | 0.8 | 5.9 | 8.6 | 39.7 | 86.1 | 61.5 | 1.0 | 1.2 | 1.9 | 1.0 | 7.5 |
| 2005p | 552.9 _e | 16.9 | 2.8 | 7.5 | 12.7 | 96.3 | 0.9 | 6.4 | 9.5 | 42.4 | 89.4 | 61.2 | 1.1 | 1.3 | 2.0 | 1.0 | 7.9 |
| avg % | 4.4 | : | 7.5 | 7.0 | 2.6 | 3.2 | 7.0 | 9.0 | 9.9 | 5.8 | 2.1 | 1.1 | 11.1 | 7.5 | 5.9 | : | 10.1 |

| | MT | NL | AT | PL | PT | RO | SI | SK | FI | SE | UK | HR | MK | TR | IS | LI | NO |
|-------|------|------|------|------|-----|------|-----|-----|-----|------|------|-----|----|------|------|------|------|
| 2000 | 0.3 | 18.6 | 11.5 | 17.5 | 9.0 | 3.2 | : | 2.1 | 7.1 | 15.5 | 58.3 | : | : | 14.1 | 0.4 | : | 9.8 |
| 2004 | 0.3 | 23.5 | 12.4 | 22.6 | 9.0 | 5.2 | 2.2 | 2.8 | 8.4 | 17.5 | 79.4 | 2.1 | : | 18.1 | 0.6 | 0.05 | 12.2 |
| 2005p | : | 24.9 | 12.9 | 23.9 | 9.6 | 6.0 | 2.3 | 2.8 | 8.5 | 17.5 | 85.0 | 2.3 | : | : | 0.7 | 0.05 | 13.1 |
| avg % | 4.1* | 6.0 | 2.4 | 6.5 | 1.4 | 13.0 | : | 5.8 | 3.6 | 2.4 | 7.8 | : | : | 6.4* | 10.1 | : | 6.0 |

Data source: Eurostat (UOE)

(:) Not available, (e) Estimated value, (i) See information notes, (n) Nil or negligible, (p) Provisional data

(*) Average annual percentage change between 2001 and 2004

For additional country specific notes, please see:

http://epp.eurostat.ec.europa.eu/portal/page?_pageid=0,1136184,0_45572595&_dad=portal&_schema=PORTAL

8.1.2 Private investment on education

Use of private sources for funding educational institutions is becoming important in Europe. Between 2000 and 2005 in nearly all countries for which comparable data are available the private sources of funding for all combined levels of education have increased, both as a proportion of total funding as well as a percentage of GDP (See Tables 8.3 and 8.4). In 2005 in the majority of Member States for which data are available, the private sources of funding represented less than 10% of total investment on educational institutions (with

12.4% at the EU average). In some Nordic countries like Finland and Sweden educational institutions continue to be largely financed from public sources and less than 5% is covered from private sources. For another group of countries (France, Italy, Lithuania, and Poland) private sources of funding accounted for some 10% of total investment on educational institutions. In only four member states (the United Kingdom, Germany, Cyprus and Slovakia) the educational institutions were funded from private sources in a proportion of around 16-20% compared to 33% in the United States

Table 8.3: Private expenditure on educational institutions as a percentage of GDP in European countries
Expenditure on educational institutions (all levels of education) from private sources as % of GDP (i)

| | EU 27 | BE | BG | CZ | DK | DE | EE | IE | EL | ES | FR | IT | CY | LV | LT | LU | HU |
|-------|-------------------|-------------------|------|------|-------------------|------|------|------|-------------------|------|-------------------|------|------|-------------------|------|----|------|
| 2000 | 0.56 _e | 0.43 _i | 0.77 | 0.43 | 0.27 _i | 0.97 | : | 0.42 | 0.24 _i | 0.60 | 0.56 _i | 0.44 | 1.72 | 0.63 _i | : | : | 0.58 |
| 2004 | 0.64 _e | 0.34 _i | 0.64 | 0.61 | 0.32 _i | 0.91 | : | 0.32 | 0.19 | 0.61 | 0.55 | 0.46 | 1.17 | 0.82 | 0.48 | : | 0.52 |
| 2005p | 0.67 _e | 0.35 _i | 0.62 | 0.57 | 0.57 | 0.92 | 0.38 | 0.29 | 0.25 | 0.53 | 0.55 | 0.44 | 1.21 | 0.76 | 0.49 | : | 0.49 |

| | MT | NL | AT | PL | PT | RO | SI | SK | FI | SE | UK | HR | MK | TR | IS | LI | NO |
|-------|-------------------|------|------|-------------------|-------------------|-------------------|------|-------------------|------|------|-------------------|----|----|-------------------|-------------------|----|-------------------|
| 2000 | 0.47 _i | 0.45 | 0.33 | : | 0.08 _i | 0.25 _i | : | 0.15 _i | 0.12 | 0.20 | 0.78 _i | : | : | 0.05 _i | 0.56 _i | : | 0.08 _i |
| 2004 | 0.45 | 0.50 | 0.39 | 0.59 _i | 0.13 _i | : | 0.84 | 0.75 _i | 0.13 | 0.20 | 0.95 _i | : | : | 0.11 | 0.74 _i | : | 0.05 _i |
| 2005p | : | 0.43 | 0.47 | 0.55 _i | 0.42 _i | 0.40 _i | 0.81 | 0.70 _i | 0.13 | 0.19 | 1.25 _i | : | : | : | 0.73 _i | : | : |

Data source: Eurostat (UOE), (:) Not available, (e) Estimated value, (i) See information notes

For additional country specific notes, please see:

http://epp.eurostat.ec.europa.eu/portal/page?_pageid=0,1136184,0_45572595&_dad=portal&_schema=PORTAL

Table 8.4: Private expenditure on educational institutions as a percentage of total educational expenditure in European countries*Expenditure on educational institutions (all levels of education) from private sources as a % of total public and private expenditure*

| | EU 27 | BE | BG | CZ | DK | DE | EE | IE | EL | ES | FR | IT | CY | LV | LT | LU | HU |
|-------|--------|-------|--------|-------|-------|--------|------|--------|-------|------|-------|-----|------|--------|-------|----|-------|
| 2000 | 11.2 e | 7.9 i | 14.7 i | 10.1 | 4.0 i | 18.9 | : | 7.0 | 6.2 i | 12.6 | 8.8 i | 9.1 | 34.9 | 11.1 i | : | : | 11.7 |
| 2004 | 11.6 e | 5.7 i | 14.3 | 12.7 | 4.4 i | 17.7 | : | 7.1 | 4.7 | 12.9 | 9.0 | 9.6 | 16.6 | 14.8 | 9.0 | : | 9.3 |
| 2005p | 12.4 e | 5.8 i | 13.9 | 12.4 | 7.7 | 18.0 | : | 6.3 | 6.0 | 11.4 | 9.2 | 9.5 | 16.7 | 13.8 | 9.8 | : | 8.7 |
| | MT | NL | AT | PL | PT | RO | SI | SK | FI | SE | UK | HR | MK | TR | IS | LI | NO |
| 2000 | 10.6 | 9.6 | 5.8 | : | 1.4 i | 8.3 i | : | 3.6 | 2.0 | 3.0 | 14.8 | : | : | 1.4 i | 8.9 i | : | 1.3 i |
| 2004 | 8.5 | 9.9 i | 7.2 | 9.9 i | 2.5 i | : | 13.7 | 16.0 i | 2.1 | 3.0 | 16.1 | : | : | 7.4 i | 9.4 i | : | 0.8 i |
| 2005p | 5.3 | 8.6 i | 8.6 i | 9.3 i | 7.4 i | 10.8 i | 13.2 | 16.1 i | 2.2 | 3.0 | 19.9 | : | : | : | 9.1 i | : | : |

Data source: Eurostat (UOE).

(:) Not available, (e) Estimated value, (i) See information notes, (p) Provisional data

For additional country specific notes, please see:

http://epp.eurostat.ec.europa.eu/portal/page?_pageid=0,1136184,0_45572595&_dad=portal&_schema=PORTAL

and 31% in Japan. But is there a link between different investment patterns and the educational outputs? In many Member States there is scope for making better use of public money and this topic will be addressed in the next section.

8.2 Measuring the efficiency of investment in education

A discussion about measures of investment efficiency should take into account the multi-faceted relationships between the data generated and the expected policy insights which an analysis of the data would yield. The translation of the educational variables into a coherent array of indicators which can be further used to measure the efficiency of investment in education has evolved in the past years especially due to increased availability of harmonised outcome data (mainly gathered through international large scale surveys). While the information collected through these surveys has created a lot of interest it can not at the moment be used for efficiency calculations since it should be contextualised with system level information. Consequently, identifying the most appropriate categories of indicators for measurement purposes in the field of investment efficiency in education remains a difficult exercise.⁹⁹

The choice of certain measures is a policy choice rather than underpinned by research and therefore there's still uncertainty as to what is most pertinent to measured in order to identify:

- Which countries are most effective in converting education inputs into educational outputs?
- What scope is there among countries to either achieve greater outputs from the given inputs or the current level outputs but with less input resources?

The Communication from the Commission on “*Efficiency and equity in European education and training systems*” states that education and training systems are efficient if the inputs used produce the maximum output (European Commission, 2006a). The document makes clear that education and training policies must, and can, combine the twin objectives of efficiency and equity in seeking to maximise their economic and social potential. Thus, reforms must be carried out to ensure high quality education and training systems that are both efficient and equitable. The Communication has set out *five key messages*:

- the need to establish in each country a culture of evaluation;
- the importance of investing in pre-primary education;
- the contribution of autonomy and accountability systems to improving efficiency;
- the role of private funding in ensuring the equity in higher education and;
- the importance of clear pathways to further learning and employment.

With the 2008 Joint progress report, the Council and the Commission stressed the fact that “*the level, efficiency and sustainability of funding remain critical*” and reiterated the need for sustainable funding of education and training (Council, 2008b). The efficiency of investment in education is defined as a measure of how resources allocated to the educational system are converted into outputs for individuals (such as earnings or employment prospects) as well as into broader economic and societal outcomes. *Internal efficiency* relates to outcomes within the education and training systems such as individual learning outcomes whereas *external efficiency* is related to broader outcomes such as increments to individual well-being or societal outcomes (European Commission,

2008b).¹⁰⁰ Below only the internal efficiency concept is addressed. In Chapter 7, the focus is on outcomes of education in terms of earnings of individuals, their skills and employability as a result of schooling.

Two categories of inputs can be distinguished for measurement purposes. The first type covers factors under the control of the education system such as teacher-student ratios, average instruction time, etc. The second category covers the so-called ‘non-discretionary’ factors such as students socio-economic background, which are not under the control of education providers but constitutes important determinants of the educational process; failing to notice them would bias the measurement.

Measuring investment efficiency imply using financial inputs. Ideally the financial data should be based on constant monetary units using Purchasing Power Parities (PPP) in order to filter out the effect of different price levels; even though, the use of PPP still does not filter out differences in salary levels (which relate to differences in per capita income). To correct this, one option is to use investment per student related to income per capita; this indicator filters out many of the structural and economic differences between countries but its unit is so small and is therefore rather difficult to be interpreted. Although no financial measure may eliminate all the possible bias, some are better proxies than others.

Outputs can be measured very broadly (in terms of educational attainment of the population) or more narrowly (in terms of graduation rates or study duration). From this perspective, the cost per typical graduate could be used as a proxy measure for measuring the investment efficiency and there would be value in being able to compare internationally the cost of producing a graduate (though these would be affected by measurement issues). EU member states are required to introduce direct measures of output for certain government services (including health care and education) with the dissemination of 2006 national accounts.¹⁰¹

The measures which could be envisaged to capture the outcomes are related to two main objectives of educational systems: educational achievement and equity. Some indicators that measure the learning outcomes of individuals (skills and knowledge acquisition) could be derived from data collected through surveys like PISA or PIRLS.¹⁰²

Although it is rather difficult to develop an overall measure of efficiency of investment in education, some aspects of it could be described using available

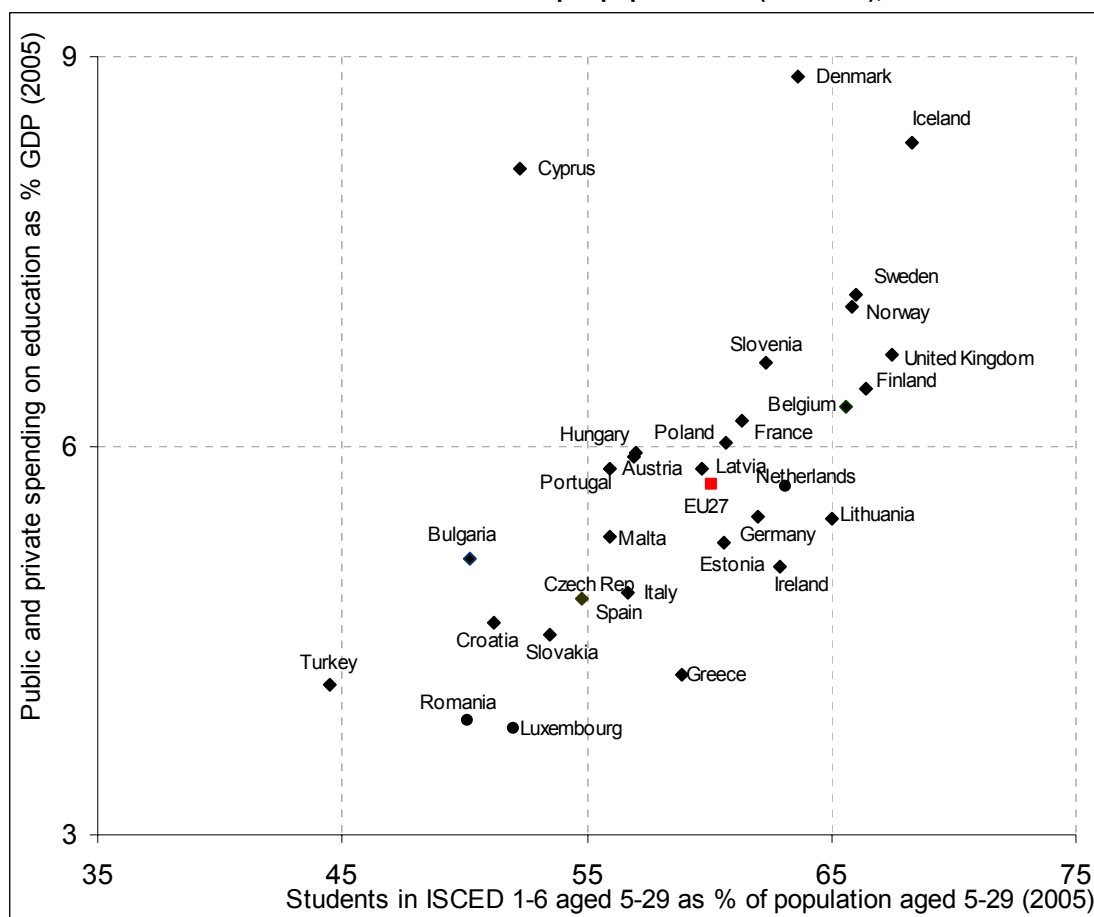
indicators. For instance, the *rate of return to investment in education* represents a more complete measure of the returns in time compared to the initial investment in education.¹⁰³ In terms of available measures, PISA remain a good source for outcome-related indicators not only in terms of coverage (25 member states currently participating in the assessment) but also as a way to account for the measurement of individual learning outcomes by testing skills and competences acquired by students towards the end of compulsory education (See also Chapter 7 on Employability). At the tertiary level of education where there is no equivalent to ‘PISA-type’ of information, the graduation data could be used as output measures. Producing graduates could be considered as a common objective of the national educational systems and there would be value in being able to compare internationally the cost of producing a graduate; though these are not measured on an internationally comparable scale, data could be used as representing the accreditation of the knowledge and skills transferred.

8.2.1 Some measures of efficiency of investment in education

Most governments seem to recognise that the necessary reforms in education and training cannot be accomplished within the current levels and patterns of investment. The upward trend noted between 2000 and 2005 in some countries with low levels of investment in education could be seen as a promising sign of giving priority to investment on education. Also some European countries have made progress in experimenting with new instruments and with incentives for private investment.

Adequate spending levels are especially important for countries that face low levels of participation in education and where the current investment levels may not be adequate to increasing the proportion of population which participates in lifelong learning. As can be seen in Chart 8.2, among the European countries there is a clear link between the overall investment level (measured by the proportion of public and private expenditure on education in the GDP) and the participation patterns in education. Participation in education is much higher in the Nordic countries (which also allocate high proportion of public and private spending) whereas countries like Romania, FYR of Macedonia or Turkey will have difficulties to increase their participation levels from the population if investment levels do not increase.

Chart 8.2 Investment in education per pupil/student (Isced 1-6), 2005



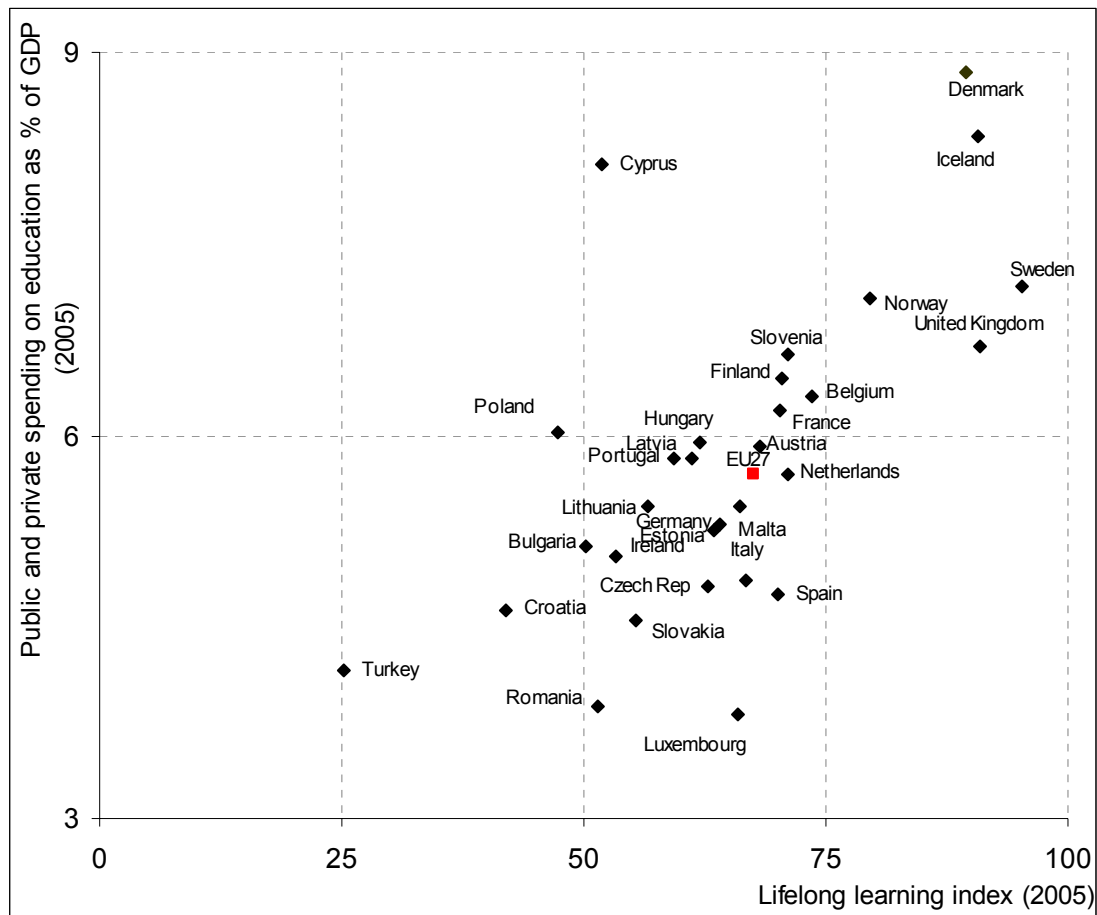
Source: CRELL, Joint Research Centre.

The same pattern can be observed if a composite measure of participation in education is used; progress in participation in lifelong learning (as measured by the LLL index - See Chapter B1) in the best performing countries (Denmark, Sweden, United Kingdom but also Iceland and Norway) went hand-in-hand with a sustainable higher investment patterns (see Chart 8.3).

With reference to best available country level performance, efficiency estimates can be computed for different combinations of inputs and outputs, showing how much less input a country could use to achieve the same level of output. Input efficiency measures the extent to which inputs can be reduced while maintaining the same level of outputs whereas output efficiency measures the extent to which outputs can be increased with the same level of inputs. Another way to measure efficiency in the use of resources is to look at which countries are most effective in converting financial inputs into a high level of educational outcomes (e.g. individual learning

outcomes relative to educational investment or the cost per typical graduate). The efficiency estimates which are available for some European countries are derived from a Data Envelopment Analysis (DEA).¹⁰⁴ The model uses teachers to student ratio, availability of computers, socio-economic and language backgrounds as inputs and PISA 2003 scores as output. They indicate that the potential for increasing learning outcomes while maintaining existing level of resources is high - over 20% across countries for which data exists (OCDE, 2007a, Indicator B7). Research evidences shows however that there is no clear, systematic relationship between the amount of resources which are invested on schools and the student achievement; hence, a substantial gain in individual learning outcomes measured through the test scores is not likely to change with the increase in investment unless changes also take place in the institutional structures of the educational systems.¹⁰⁵

Chart 8.3. Investment in education / Composite measure of participation in education is used; (LLL-index (2005))



Source : CRELL, Joint Research Centre

The estimates which are available at country level clearly illustrates the role of the indicators used in the model, thus other structural differences across countries can play a role in explaining the results. Efficiency of investment in education can be affected by various country-specific factors, like institutional and structural factors. More often these factors are beyond the control of public authorities but they are essential in the analysis and neglecting them would lead to biased measures of efficiency. For instance, the educational attainment of adult population could influence the educational outcomes.¹⁰⁶ Since countries are different in what concerns the mix of public and private funding of education and while almost 90% of the investment on educational institutions (for all levels combined) in Europe is public, a possible source for cross-country differences in the investment efficiency in education could also derive from this.¹⁰⁷

The efficiency estimates can be seen as a useful tool for cross-country comparisons but cannot account for all the structural differences at the system level; besides the general public might encounter some difficulties to grasp the results.

Some of the findings may point to cross-country differences in the public investment efficiency in education but the comparisons should be treated with care before drawing policy conclusions. Clearly, and after measuring investment efficiency in education, identifying the inefficiency source would be of great importance in policy terms.

The Directorate General Economics and Financial Affairs has established together with the Member States a work programme on the measurement of efficiency and effectiveness of public expenditures. This stepwise approach includes comprehensive data analyses, efficiency calculations and case studies to identify the determinants of efficiency. The Economic Policy Committee Working Group on the quality of public finances has decided that tertiary education is one of the spending items which should be investigated. This ongoing work is based on a Council (Economic and Financial Affairs Council) mandate.

| | |
|---------------|--|
| Part C | THE COHERENT FRAMEWORK OF INDICATORS AND BENCHMARKS - DEVELOPMENT OF NEW INDICATORS |
|---------------|--|

- 1. The coherent framework and new indicator developments**
- 2. Indicators based on data from the European Statistical system (ESS)**
- 3. Five new international surveys on competences organized by the European Commission and other International organisations**
 - 3.1. Language skills
 - 3.2. Learning to learn skills
 - 3.3. Teachers professional development
 - 3.4. Adult skills
 - 3.5. Civic skills

Appendix Measuring key competences

1. The coherent framework and new indicator developments

The 16 core indicators adopted by the Council in 2007 are mostly covered by statistical data that already exist and which have been used in monitoring the follow-up of the Lisbon objectives in education and training in this report. These indicators are continuously being improved within their specific statistical infrastructures: European statistical system (ESS), UNESCO/OECD/EUROSTAT (UOE) data collection and OECD/PISA survey.

However in the case of the five core indicator areas, mainly concerning the key competences, new data needs to be collected.

For two of the core indicators new surveys are being prepared by the European Union: "**Language skills**" where a European survey is being implemented and "**Learning to learn skills**" where a pilot survey is presently on-going.

In the case of the three other core indicator areas, new surveys are implemented in co-operation with other international organisations. In the areas of "**Adult skills**" and "**Teachers professional development**", EU data needs can be satisfied within new surveys organised by OECD. For the core indicator on "**Civic skills**" a European module has been included in the on-going International Civics and Citizenship Education Study (ICCS) prepared by the International Association for the Evaluation of Educational Achievements (IEA).

In organisational terms, work in these five areas has been undertaken in close co-operation with EU Member States. The Commission has created working groups of national experts in each of the areas and all countries involved in the Lisbon process have been invited to participate in the development of these indicators.

Below we will look further into the indicators based on data provided by the European Statistical System as well look into the development of new surveys in the five mentioned areas. The new surveys will provide the coherent framework. They will give valid and comparable data for the development of core indicators but also provide extensive

contextual data and information which will make it possible to carry out secondary analysis producing new knowledge about learning processes in these fields.

2. Indicators based on data provided by the European Statistical System

The statistical infrastructure needed for the production of data within the European Statistical System (ESS) is a combination of surveys, administratively collected data, common instruments and methodologies (manuals, classifications, registers, definitions, concepts etc.).

The UOE data collection

The annual UOE collection of data related to the formal education systems in the Member States (enrolments, entrants, graduations, personnel, class sizes, education finance, etc...) is already used for providing data on some core education indicators as well as for a large number of context indicators.

Referring to the Council Conclusions of May 2007, the UOE data collection provides data on participation in pre-school education, higher education graduates (including the benchmark on MST graduates), cross-national mobility of students in higher education and upper-secondary completion rates of young people (when it concerns graduate rates).

However, the potential of the UOE is not fully exploited, in terms of the use of existing data (for example on initial vocational training, student mobility and investment in education). Hence, more development work on indicators is expected which takes into account quality considerations for improving comparability of already existing data. In addition, the UOE may eventually provide some information on pupils who follow special needs education. This group of pupils are specifically included in the UOE coverage but cannot at the moment be separately identified. Methodological development work will need to be undertaken in order to develop this aspect of the UOE collection. It is therefore a medium term project which at the end will provide data according to national definitions at first.

The Adult Education Survey

The Adult Education Survey (AES) has been carried out in most EU Member States,

candidate countries and EFTA (European Free Trade Association) countries during the period 2005-2008. This EU AES is a pilot experience which for the first time proposed a common EU framework including a standard questionnaire, tools and quality reporting.

The pilot Adult Education survey covers issues such as participation in education and lifelong learning activities including job-related training activities, characteristics of learning activities, self-reported skills as well as modules on cultural participation, language learning and background variables related to main characteristics of the respondents.

The results of the Adult Education survey would enhance the understanding of learning and training patterns in the EU countries and would therefore shed light on lifelong learning issues which is of prime importance in the Lisbon objectives in terms of the knowledge society. It will also specifically report on language skills of the adult population (self-reported).

The Continuous Vocational Training Survey(CVTS)

The CVTS is conducted about every five year in all EU Member States; the third wave was carried out in 2005.

Vocational training is a central theme in European lifelong learning strategies. Enterprise investment in continuing vocational training, designed to promote human capital resources, is a key dynamic of economic performance, competitiveness, and employment in Europe and reflects the role of enterprises in resolving labour market imperfections and employment imbalances. CVTS is a quality data set reflecting the continuing vocational training activities of European enterprises for the assessment of enterprise competitiveness and workforce employability and provide information on:

- labour skills supply and demand,
- the forms, fields and volume of training offered and training needs,
- the enterprises' own internal provision of vocational training as a function of the amount provided on the external market,

- the training opportunities of disadvantaged groups,
- costs of enterprise based vocational training,
- the effectiveness of public funding initiatives.

General household surveys

The above specific surveys are complemented by general sources of information such as the Labour Force Survey (LFS) and the EU Survey on Income and Living Conditions (EU-SILC). Such surveys provide information on education and training which can be linked to socio-economic variables. Furthermore, ad-hoc modules linked to the surveys explore information on education but at more irregular intervals. Other specific sources (ICT household and enterprises surveys) provide data on specialised topics or as background elements.)

The EU Labour Force Survey

The EU Labour Force Survey results provide data on educational attainment levels as well as on lifelong learning through a number of recommended variables on education. These can be combined with for example information on labour market status, regional information and a number of socio-economic background variables.

Three benchmarks are presently based on the EU Labour Force Survey: early school leavers, youth educational attainment levels and participation in lifelong learning. Hence it also provides information on the core indicators underlined by the 2007 Council conclusions regarding participation of adults in lifelong learning and the educational attainment of the population. The data from the EU Labour Force Survey is also used for a large number of context indicators.

In addition LFS's specific ad-hoc modules would be of interest for further studying issues related to the core indicators on education. The 2008 ad-hoc module is on the situation of migrants in the labour market and their immediate descendants whereas the 2009 ad-hoc module covers the entry of young people into the labour market¹⁰⁸. The latter specifically concerns the relationship between

education and the labour market on issues related to employability.

The ICT household survey

The Information, Communication and Technology survey is an annual survey conducted in all EU member states on ICT issues. It is used in the education domain for looking at educational attainment related to use of ICT instruments. The ICT household survey could provide information on ICT skills although the definition of variables still has to be refined.

The EU Statistics on Income and Living Conditions

EU-SILC provides data from all EU Member States on income and living conditions combined with a large number of socio-economic background variables. The educational attainment level is one of the background variables surveyed. Whereas no core education indicators are based on EU-SILC, the survey does give a fairly wide scope for analysing education for example in relation to income, social exclusion and poverty. Data are for instance published on poverty rates by educational attainment levels.

Also other sources available at Eurostat would provide information on education like the structure of earnings survey, the national account data, the consumer price indexes etc.

Eurostat and the ESS are always concerned to maintain the quality of statistics, notably through the recognition and identification of fields where improvement and further work are needed.

3. Five new international surveys on competences organized by the European Commission and other International organisations

As mentioned above, five cross-national surveys will be implemented in the next couple of years in the core indicators' areas demanded by the Council. The planned schedules for the results' presentation from these surveys are from 2008 to 2013: The pilot survey on Learning to learn skills is presently being implemented and results are expected mid 2008; The Teachers survey (TALIS) of the OECD and the survey of IEA on Civic competences

are presently being implemented and results are foreseen in 2009; The European language skills survey has been launched and final results are being planned to be released in 2011 and finally the presentation of the OECD Adult skills survey (PIAAC) is planned for 2013.

In the case of developing new core indicators included in the coherent framework, the Commission considers that it is primordial that all countries follow the Lisbon process and especially all EU Member States and candidate countries. A European indicator based on data from few countries would be of lesser quality and would not be able to play its full role as a tool for monitoring progress and identify good performances.

3.1. Language skills

Languages are the first tool of communication: Knowing more languages opens doors to other cultures and improves intercultural understanding both within Europe and with the rest of the world. The benefits of knowing foreign languages are unquestionable. The ability to understand and communicate in more than one language is a desirable life-skill for all European citizens. Improving language skills in Europe is an important objective as part of the Lisbon growth and jobs strategy. The recognition of the importance of foreign language competences is continuously still growing. The Barcelona European Council expressed interest in this issue of language learning when it called for "the mastery of basic skills, in particular by teaching at least two foreign languages from a very early age." (Council, 2002c, part I, 43.1) As a consequence, knowledge of foreign languages is now recognised as one of the key competences that should be intensively cultivated within lifelong learning.

The Commission and the Member States are undertaking a range of activities aimed at promoting good policy approaches for language learning within the Education and Training 2010 strategy. The results of the Action Plan "Promoting language learning and linguistic diversity 2004-2006" (European Commission, 2007d) provides a basis for further action in the field of multilingualism policy both at European and national level.

In the context of the 2008 European Year of Intercultural Dialogue, the Commission has created a Group of Intellectuals for Intercultural Dialogue which has been entrusted with the task of defining the contribution of multilingualism to intercultural dialogue. One of the conclusions set out in their final report called for learning at least two foreign languages with one of them being a "*personal adoptive language*" (European Commission, 2008c).

The future indicator of Language Competences will help to measure how far the EU is advanced on the way towards the multilingualism of the European society and in the achievement of the goal set up by the Barcelona Council.

European indicator of language competences

In its Communication "The European Indicator of Language Competence" (European Commission, 2005c) the Commission outlined a detailed approach to set up a European survey on language competences to collect the data necessary to construct a European language indicator. In May 2006 the Council adopted conclusions on a number of key issues concerning the indicator and stressed that a survey should be carried out as soon as possible. In April 2007 the Commission presented the Communication "Framework for the European survey on language competence" (European Commission, 2007e) which outlined conclusions on all the outstanding issues regarding development and implementation of the European language survey.

The realisation of the first European Survey on Language Competences was attributed - through the call for tender procedure - to the consortium SurveyLang¹⁰⁹

The European Language Indicator will show the general level of the pupils' foreign language knowledge in the Member States and also show how close we are to achieve our objective of making Europe's citizens multilingual. This will provide invaluable, strategic information to policy makers, teachers and learners in all Member States wishing to improve the teaching and learning of foreign languages, thereby increasing the mobility of Europeans, and with it the

competitiveness of the European Union in relation to third countries.

Subsequent rounds will monitor progress towards the objective of improving foreign language learning.

The basic framework for developing the language indicator is as follows:

- In the first round, tests will be developed on three skills: *reading comprehension*, *listening comprehension* and *writing*. The Commission will take measures to develop instruments to cover the fourth skill – *speaking* – in subsequent surveys.
- The survey will cover tests in the most taught official languages of the European Union, namely *English, French, German, Spanish* and *Italian*.
- The survey should be based on measuring a continuum of increasing levels of competence, from level A1 (basic user) to B2.
- A questionnaire will be developed for pupils, teachers, head teachers and governments to gather contextual information that will allow analysis of factors which might have an impact on pupils' language competences.
- Pupils enrolled in the final year of lower secondary education (ISCED 2) (or the second year of upper secondary education (ISCED 3), if a second foreign language is not taught in lower secondary education) who are taught the language being tested will be surveyed.
- Both computer-based tests, using open source software, and paper and pencil tests will be made available to countries in the survey. The test instrument should permit adaptive testing.

Tests are planned to be carried out in the first half of 2010.

3.2 Learning to learn skills

The Council conclusions of May 2005 and May 2007 invited the European Commission to develop indicators in several fields, including learning to learn (Council, 2005c and

2007a). The 2005 conclusions stated that “with regard to indicator areas (including learning to learn) where no comparable data exist, to present to the Council detailed survey proposals for the development of new indicators strategies should be developed and submitted to the Council”.

Following this request, work has been undertaken to develop an instrument for measuring learning to learn skills. A European expert group has been set-up to oversee the development of a suitable instrument. CRELL, the research centre on lifelong learning at the Joint Research Centre, has guided development efforts based on research experiences in a number of Member States and supported by a European research network. The European Network of Policy Makers for the Evaluation of Education Systems has provided its advice on the launching of a pilot

survey as a first step in creating a European Wide survey on measuring learning to learn competences.

A suitable instrument has now been developed which express practically the definition of the Recommendation (Council and Parliament 2006) on learning to learn. The framework model is based on three dimensions of learning to learn, namely Cognition, Metacognition and affective aspects of learning to learn.

Learning to learn is a process rather than a specific cognitive outcome. The process of learning clearly requires cognitive skills such as the ability to identify a proposition and critical thinking when addressing a particular problem. In addition it is essential to reflect with accuracy on ones own learning and performance.

The learning to learn framework

The affective dimension;

- Learning motivation, learning strategies and orientation towards change
- Academic self-concept and self-esteem
- Learning environment

The cognitive dimension;

- Identifying a proposition
- Using rules
- Testing rules and propositions
- Using mental tools

Meta-cognition dimension;

- problem solving (metacognitive) monitoring tasks,
- metacognitive accuracy
- metacognitive confidence

Thus metacognition is central to the concept of learning to learn. Finally, and what is equally important for understanding learning to learn is the affective dimension and aspects such as motivation, learning strategies and self-esteem. The affective aspects highlight processes, actions and barriers to learning. This combination of cognitive and affective components makes learning to learn

particularly challenging to measure and compare across countries.

During spring 2008, the instrument was piloted in 8 countries, namely Italy, Slovenia, Spain, Austria, France, Finland, Portugal and Cyprus. Based on an evaluation of the outcome of the pilot test of the instrument, the Commission will propose a way to take the instrument

forward towards the development of a European indicator on learning to learn

3.3 Teachers professional development

In the Council Conclusions of May 2005 on New Indicators in Education and Training, the Council requested the Commission to cooperate with the OECD to satisfy EU data needs on the professional development of teachers, with a survey on teachers which was already in preparation by the OECD.

Following this request, an expert group of EU experts was created to define data needs in the professional development of teachers' area. The proposal of this group has been successfully implemented in the OECD survey.

The Teaching and Learning International Survey (TALIS) covers several aspects of the professional development of teachers, including:

- How many days of professional development undertaken during the last 18 month (including the number of compulsory days)
- Type of professional development and perceived impact of the professional development
- Payment for professional development (including private contributions)
- Informal professional development
- Professional development needs
- Obstacles to professional development.

The Commission has encouraged as many EU Member States as possible to take part in the survey to get comparable data. One million euros was set aside in the lifelong learning programme budget to encourage participation of EU Member States, acceding countries and candidate countries. 24 countries have committed to the survey including 19 EU, acceding, and EEA countries.

Analysing the results of TALIS

The first report on the results of TALIS will be published in June 2009. It will include a section on the professional development of teachers.

It has been agreed to publish a thematic report on teachers' professional development. The report will be drafted by the European Commission in collaboration with the OECD secretariat. It will be published as part of TALIS series. The introductory text of the report will set out the EU political context for having information on teachers' professional development; data for non-TALIS EU countries are included.

The report on the professional development of teachers is planned for end 2009.

3.4 Adult skills

If Europe wants to compete in the global knowledge society, it must also invest more in human capital. Skills, knowledge and competences are increasingly seen as crucial prerequisites for the productivity and competitiveness of the European economy. Europeans have to be equipped with the tools they need to adapt to an evolving labour market and this applies to all positions, high- and low-skilled, in both manufacturing and services.

The task of developing an indicator on adult skills was set by the Council conclusions of May 2005 on new indicators in education and training (Council, 2005c). In these conclusions the Council also requested the Commission to cooperate with the OECD to see if the EU's data needs on adult skills can be satisfied within the new survey on adult skills prepared by the OECD (PIAAC). This task was confirmed by the Council conclusions of 25 May 2007 (Council, 2007a). In 2007 the Council also invited the European Commission to report back on indicators on adult skills in due course, in particular on the EU Member States' participation and on the coverage of the EU's data needs.

The EU's data needs on adult skills were identified with the cooperation of the expert group on adult skills set up by the Commission in 2005. Already in 2005 this expert group concluded that it would be both policy-relevant and feasible to assess literacy, numeracy, ICT skills and certain job-related generic skills of adults.

The expert group also recommended examining the relationship between literacy, numeracy, problem-solving and ICT literacy

because they might be conceptually and empirically related. At the same time, it was recognised that for some adult skills identified as EU policy-relevant, such as learning to learn, interpersonal and civic competences, cultural awareness and entrepreneurship, more effort needs to be put into developing suitable methods and instruments. Therefore it does not seem feasible to assess them all in the short term. However, the possibility of focusing on some of these skills in the second round of a survey should be examined.

After comparing EU data needs on adult skills with the PIAAC strategy developed by the OECD, the Expert group on adult skills came in its meeting of the 19th January 2007 to the conclusion that the PIAAC survey could meet the EU's data needs on adult skills.

Based on this and to ensure high country coverage in PIAAC and reliable data to enable the measurement of progress in the area of adult skills in all countries following the Lisbon agenda, the European Commission has budgeted of 1.05 million Euros in the 2008 EU budget to support the countries' participation in PIAAC to cover international costs for development work on PIAAC in 2008.

At present, 17 European countries committed themselves to participate in development work focused on PIAAC in 2008¹¹⁰.

Competencies measured in The Programme for the International Assessment of Adult Competencies (PIAAC)

PIAAC will focus on the key cognitive and workplace skills that are required for successful participation in the economy and the society of the 21st century. There will be a direct test of the level of literacy and numeracy of adult population (age group 16 to 64 is considered), which will be expanded to include new competencies needed in the new information age. An effort will be made to assess in particular the competencies of the low skilled.

With the so called "Job Requirement Approach" (JRA module), individuals will be asked up to which extent they use certain competencies at the workplace. The data collected via this module will allow analysis on the nature of skill gaps and demands in individual countries.

PIAAC will also gather a range of other information to allow the interpretation and analysis of the assessment results. This will include information on the antecedents and outcomes of skills, as well as information on usage of information technology and literacy and numeracy practices generally.

Measurement of key cognitive and workplace skills

At the core of PIAAC will be an assessment of literacy in the information age, understood as the "interest, attitude and ability of individuals to appropriately use socio-cultural tools, including digital technology and communication tools, to access, manage, integrate and evaluate information, construct new knowledge, and communicate with others". To achieve this goal, four areas of competency will be assessed – problem-solving in a technology-rich environment, reading literacy, numeracy, and mastering of the basic building blocks of literacy.

In addition, PIAAC will collect information from respondents concerning their use of key work skills in their jobs – a first for an international study. Questions will cover a range of generic work skills in areas such as computer use, communication, team working and management. It will possible to use the resulting data to investigate differences between countries regarding the utilisation of these skills (for example, in the proportion of adults that are in jobs which require highly specialised knowledge of computers) and to identify the presence and the nature of skill gaps.

Data from PIAAC will allow investigation of the links between key cognitive skills and a range of demographic variables, economic and other outcomes as well as the use of skills in the workplace and other settings. This will constitute a rich evidence base for policy-relevant analysis. In particular, data from PIAAC will facilitate a better understanding of the labour market returning to education (by taking into account skills), identify the role played by cognitive skills in improving the labour market prospects of the at-risk populations and examine the efficiency of matching the skills possessed by individuals and the skills demanded in the workplace.

Measurement of the stock of skills

By providing a direct measure of key cognitive skills and measures of formal educational attainment, PIAAC will offer a far more complete and nuanced picture of the amount of human capital in individual countries. In particular, PIAAC will show the population proficiency's distribution according to the types and levels of cognitive tasks they can perform together with the levels of formal education and training achieved. PIAAC will also have links to previous international adult skills assessments. Some analysis of the changes will be possible for countries which participated in either the International Adult Literacy Survey and/or the Adult Literacy and Life skills Survey.

Performance of education and training systems

PIAAC will enhance the understanding of the effectiveness of education and training systems in developing basic cognitive skills and key generic work skills. For younger cohorts, PIAAC will complement the results of PISA by providing measures of skill following completion of initial education. For older cohorts, PIAAC will allow examination and analysis of the processes of skills loss and maintenance and the effectiveness of education and skills formation systems in supporting skills development over the lifecycle.

Countries participating in PIAAC will have the possibility of completing the core components of PIAAC in order to address additional policy issues of national relevance. For example, participating countries will be able to enhance the PIAAC sample by providing reliable data for particular geographic regions or subgroups of the population and by adding questions designed to assess national policy settings.

Participation, management and time schedule

PIAAC is steered by a Board of Participating Countries (BPC) established in 2008 which is supported by staff of the OECD Secretariat. The operational elements of PIAAC are undertaken by external contractor. PIAAC is open for participation for all European countries following Lisbon agenda, including non OECD Member States (under a special regime in cooperation with external consultant).

The survey will take place in 2011, with results being released in early 2013.

3.5 Civic skills

The data available on education and active citizenship are limited in terms of scope, content, frequency and freshness. In the past one important source was the 1999 IEA CIVED survey. The Commission is cooperating with Member States to identify the data needs and to prepare a European module in the forthcoming International Civics and Citizenship Education Study (ICCS) which will be carried out in 2008/09 and will cover the needs for indicators on education and training for active citizenship.

The purpose of the ICCS is to investigate the ways young people are prepared and to a certain extent if they have already begun to perform their roles as citizens. The study will report on student achievement with a test of conceptual understandings and competencies in civics and citizenship. As parts of this test it will also collect and analyze affective learning outcomes variables, including student activities, dispositions and attitudes related to the practise of active citizenship. The proposal is built on the previous IEA studies of civic education and is a response to today's challenges of educating young people in a fluctuating context of cohesion, democracy and civic participation.

The European Module of the ICCS will consist of a questionnaire and a test that will be given to 14 years old in school across Europe in 2009. The outcome of the module will be a comprehensive database about 14 years old Europeans and active citizenship. The study will provide information on the young people's behaviour, attitudes and knowledge.

Behaviour – Active citizenship

The European module will provide a knowledge based on participation rates of young people in European related activities (meeting people or chatting on the internet with other European youngsters, participation rates in cultural and sport activities relating to other European countries and visits to other European countries.)

Civic competence - Attitudes

This module will deliver a significant amount of information on young people's civic competences (the learning outcomes necessary for active citizenship which includes attitudes, identity and knowledge). The module focus is predominantly on attitudes, for example, attitudes towards pertinent issues in Europe such as intercultural understanding and migration. It will give data on young people's attitudes towards European integration and their attitudes towards learning foreign languages. The study will also ask questions to young people about whether they identify with Europe or a region in Europe.

Civic competence - Knowledge

To complete the questionnaire a limited cognitive test will be included which will give the contextual background for understanding the young people's attitudes, identity and practices. These items will refer to their basic knowledge of European Union affairs such as recognition of the European Union flag, basic understanding of the Euro and self-reported evaluation of their knowledge on Europe. This will enable researchers to explore the extent to which young people's attitudes to Europe are based on knowledge.

Appendix

Measuring key competences

“Competences” refer to a complex combination of knowledge and understanding, skills, values, attitudes that lead to effective, embodied human action in the world, in a particular domain. One’s achievement at work, in personal relationships or in civil society are not based simply on the accumulation of second hand knowledge stored as data, but as a combination of this knowledge with skills, values, attitudes and desires that enable us to learn and to successfully use our previous experiences. Competence implies a sense of agency, action and value (Hoskins and Deakin-Crick 2008).

Competencies are broader than knowledge or skills and are acquired in an ongoing, lifelong learning process across the whole range of personal, social and political contexts. The use of the concept of competence stresses the connections between our actions and our surroundings, between the subjective and the objective, and between personal development and achievement. The term competence is strongly value dependent (Westera, 2001) because a competence is expressed in action in the real world, for example a person could be a competent thief, a competent mechanic or a competent carer (Hoskins and Deakin-Crick 2008).

Importantly, competences are expressed in action and by definition are embedded in narratives and shaped by values – this action or way of doing something is more important or desirable than that one because it leads to a particular end. Just as a competence is recognised in the context of the real world the development of competences are also based in real world experiences and take into account the full spectrum of learning opportunities (informal, non-formal and formal learning) throughout the life span (Hoskins and Deakin-Crick 2008).

In general it is much easier to test the outcome of learning rather than the process. This presents particular difficulties when trying to test the concept of learning to learn. This concept from its very definition is described in terms of process rather than an outcome. In

contrast the PISA test focuses predominantly on the outcomes of the learning and much less on the process and measuring the affective dimension of a competence. The process of learning requires particular cognitive skills such as the ability to identify propositions, or to think critically about a particular problem, but successful performance in a test situation does not necessarily mean that the individual is disposed to think critically, or is able to identify propositions in the process of learning how to learn. It may simply mean that they have acquired the ability to perform in this specific manner by being taught how to do it. In other words they may be high achievers, but fragile in their capacity for learning how to learn in other domains and in life. So it is possible that testing of cognitive skills alone may indicate little more than the fact that the individual has acquired the knowledge, skills and understanding which is the focus of the formal curriculum. Thus the new European learning to learn test focuses on trying to capture some of this process through measuring the affective and metacognitive dimensions of learning.

Measuring the affective dimension of a competence is challenging. Values, attitudes and intention are difficult to measure because they are personal and subjective. Self awareness and metacognition takes place internally, and is often not articulated. What someone feels about something, what they value, experience intra or interpersonally or what they think about what they do can only be measured in a written test by self-report. By definition therefore, whilst cognitive skills can be measured by the quality of an individual’s performance in a written test, and marked against agreed criteria, the strength of an individual’s values, attitudes and dispositions in a particular domain is most authentically validated by that individual. A large scale test does not afford the opportunity for this data to be triangulated by observation of behaviour or 360 degree reports from parents, teachers and peers. Nevertheless, there is sufficient evidence to suggest that what individuals report about their values, attitudes and dispositions in relation to a particular domain

is an important indicator of developing a competence. It is also important data for school and system self-evaluation in relation to pedagogical strategies, school culture and leadership.

Paper and pencil tests, however, will always have limitations in term of measuring certain aspects of competences that require interaction with others and/or require observations to measure. One clear example of this is the testing of foreign language competence and in particular the testing of spoken language. Testing spoken language is not possible through paper and pencil tests and what is required is that ‘pupils will need to be tested individually on a one-to-one basis by highly trained examiners’. Another example of the limitation of measurement from measuring civic competence is the interactive and observable aspects of this competence such as the ability to lobby and to deliver a persuasive speech. It is necessary to ensure that the aspects of a competence that can not be measured in the paper and pencil test should not be diminished in their importance and when producing tests and indicators from tests on certain competences it is necessary to highlight what can not be tested in order to demonstrate the limitations of the indicator. It remains to be seen whether in the future computer based testing can tackle some of the limitations afforded by paper and pencil tests.

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LIST OF ABBREVIATIONS

General abbreviations

| | |
|----------|---|
| ACCI | the active citizenship Composite indicator |
| AES | Adult Education Survey |
| ALL | Adult Literacy and Life-skills Survey |
| ARWU | The <i>Academic ranking of World Universities</i> |
| CLA | Classification of Learning Activities |
| CEDEFOP | European Centre for the Development of Vocational Training Centre européen pour le développement de la formation professionnelle |
| CEPES | Centre Européen pour l'enseignement supérieur/ European Centre for Higher Education (UN organisation based in Bucharest) |
| CEPS | Centre for European Policy Studies |
| CHE | Centre for Higher Education Development |
| CILT | UK National Centre for Languages |
| CIS | Community Innovation Survey |
| CIVED | Citizenship Education Survey (IEA study of 1999) |
| CPS | Current Population Survey |
| CRELL | Centre for Research on Lifelong Learning |
| CVET | Continuing vocational education and training |
| CVT | Continuing Vocational Training |
| CVTS | Continuing Vocational Training Survey |
| DEA | Data Envelopment Analysis |
| DTI | Danish Technological Institute |
| ECTS | the European Credit Transfer System |
| ECVET | European Credit for Vocational Education and Training |
| EEA | European Economic Area (EU 27+Norway, Iceland and Liechtenstein) |
| EIT | European Institute of Technology |
| EMU | European Monetary Union |
| ENQA | European Network of Agencies |
| EPL | Employment Protection Legislation |
| ESI | Essential Science Indicator |
| ETF | European Training Foundation |
| ESCS | Economic, social and cultural status |
| ESPAIR | Education par le sport de plein air contre le décrochage scolaire |
| ESS | European Social Survey |
| EQF | European qualifications framework |
| EUA | European University Association |
| EUR PPS | Euro in purchasing power parities (taking into account different price levels) |
| EURYDICE | Education Information Network in the European Community |
| EU-SILC | EU-Statistics on Income and Living Conditions |
| FTE | Full-time equivalent |
| FYR | Former Yugoslav Republic (of Macedonia) |
| GCSE | General Certificate of Secondary Education |
| GDP | Gross Domestic Product |
| GERESE | European Group of Research on Equity of Educational Systems |
| GED | General Education Diploma |
| GNP | Gross National Product |
| HEI | Higher Education Institution |
| IALS | International Adult Literacy Survey |
| ICCS | International Civic and Citizenship education survey |
| ICT | Information and Communication Technology |
| IEA | International Association for the Evaluation of Educational Achievement |
| ILO | International Labour Organisation (UN-Organisation based in Geneva) |
| IREG | International Ranking Expert Group |
| ISCED | International Standard Classification of Education |
| ISCO | International Standard Classification of Occupations |
| LFS | Labour Force Survey |

| | |
|---------|--|
| MEDSTAT | Regional co-operation programme between the European Union and 10 Mediterranean Countries (Algeria, Egypt, Israel, Jordan, Lebanon, Morocco, Palestinian Authority, Syria, Tunisia and Turkey) |
| MST | Maths, science and technology |
| NACE | Classification of Economic Activities in the European Community |
| NEET | Not in employment, education or training |
| NER | Net Enrolment Rate |
| NFER | National Foundation for Educational Research |
| NGOs | Non-government organisations |
| OMC | Open Method of Co-ordination |
| OECD | Organisation for Economic Co-operation and Development |
| OJC | Official Journal of the European Communities |
| PIAAC | Programme for the International Assessment of Adult Competencies (OECD study) |
| PIRLS | Progress in International Reading Literacy Survey |
| PISA | Programme for International Student Assessment |
| PLA | Peer Learning Activity |
| PPS | Purchasing Power Standards |
| R&D | Research and development |
| SCI | Science Citation Index |
| SEN | Special Educational Needs |
| S&E | Science and engineering |
| SENDDD | Statistics on students with disabilities, learning difficulties and disadvantages |
| SES | socioeconomic status |
| SSCI | Social Science Citation Index |
| TALIS | Teaching and Learning International Survey (OECD study) |
| TAFE | Technical and Further Education College |
| THES | Times Higher Education Supplement |
| TIMSS | Trends in International Mathematics and Science Study |
| UIS | UNESCO Institute for Statistics (based in Montreal) |
| UN | United Nations |
| UNESCO | United Nations Educational, Scientific and Cultural Organization (based in Paris) |
| UOE | UIS/OECD/Eurostat (common data collection) |
| VET | Vocational education and training |
| WUR | World University Ranking |

Country abbreviations

| | | | |
|-----------|-----------------------|---------------|-------------------------------|
| EU | European Union | PT | Portugal |
| BE | Belgium | RO | Romania |
| BG | Bulgaria | SI | Slovenia |
| CZ | Czech Republic | SK | Slovakia |
| DK | Denmark | FI | Finland |
| DE | Germany | SE | Sweden |
| EE | Estonia | UK | United Kingdom |
| EL | Greece | CC | Candidate Countries |
| ES | Spain | HR | Croatia |
| FR | France | MK | FYR Macedonia |
| IE | Ireland | TR | Turkey |
| IT | Italy | EEA | European Economic Area |
| CY | Cyprus | IS | Iceland |
| LV | Latvia | LI | Liechtenstein |
| LT | Lithuania | NO | Norway |
| LU | Luxembourg | Others | |
| HU | Hungary | JP | Japan |
| MT | Malta | US/USA | United States of America |
| NL | Netherlands | | |
| AT | Austria | | |
| PL | Poland | | |

STATISTICAL ANNEX

Table Ann A.1: Country positioning in terms of HDI Rank, UN Education Index, and percentage of EU27 average

| Country | HDI Rank | Education index | % of EU27 average |
|-------------------------|----------|-----------------|-------------------|
| Austria | 15 | 0.966 | -- |
| Belgium | 17 | 0.977 | -- |
| Bulgaria | 53 | 0.926 | -- |
| Cyprus | 28 | 0.904 | -- |
| Czech Republic | 32 | 0.936 | -- |
| Denmark | 14 | 0.993 | -- |
| Estonia | 44 | 0.968 | -- |
| Finland | 11 | 0.993 | -- |
| France | 10 | 0.982 | -- |
| Germany | 22 | 0.953 | -- |
| Greece | 24 | 0.970 | -- |
| Hungary | 36 | 0.958 | -- |
| Ireland | 5 | 0.993 | -- |
| Italy | 20 | 0.958 | -- |
| Latvia | 45 | 0.961 | -- |
| Lithuania | 43 | 0.965 | -- |
| Luxembourg | 18 | 0.942 | -- |
| Malta | 34 | 0.856 | -- |
| Netherlands | 9 | 0.988 | -- |
| Poland | 37 | 0.951 | -- |
| Portugal | 29 | 0.925 | -- |
| Romania | 60 | 0.905 | -- |
| Slovakia | 42 | 0.921 | -- |
| Slovenia | 27 | 0.974 | -- |
| Spain | 13 | 0.987 | -- |
| Sweden | 6 | 0.978 | -- |
| United Kingdom | 16 | 0.970 | -- |
| Norway | 2 | 0.991 | 104 |
| Iceland | 1 | 0.978 | 102 |
| Belarus | 64 | 0.956 | 100 |
| Russian Federation | 67 | 0.956 | 100 |
| Israel | 23 | 0.946 | 99 |
| Switzerland | 7 | 0.946 | 99 |
| Ukraine | 76 | 0.948 | 99 |
| Georgia | 96 | 0.914 | 96 |
| Armenia | 83 | 0.896 | 94 |
| Croatia | 47 | 0.899 | 94 |
| Moldova | 111 | 0.892 | 93 |
| Albania | 68 | 0.887 | 93 |
| Palestinian Territories | 106 | 0.891 | 93 |
| Macedonia (FYROM) | 69 | 0.875 | 92 |
| Bosnia and Herzegovina | 66 | 0.874 | 91 |
| Jordan | 86 | 0.868 | 91 |
| Turkey | 84 | 0.812 | 85 |
| Tunisia | 91 | 0.750 | 78 |
| Egypt | 112 | 0.732 | 77 |
| Algeria | 104 | 0.711 | 74 |
| Morocco | 126 | 0.544 | 57 |

Data source: UN Education Index (reference year 2005)

Table Ann B.1.1: Making lifelong learning a reality in European countries (d)
A composite index on participation in lifelong learning for 4-to-64 year olds (i)

| 2000 | EU27 | BE | BG | CZ | DK | DE | EE | IE | EL | ES | FR | IT | CY | LV | LT | LU | HU |
|--------------|-------|--------|------|------|--------|------|-------|--------|--------|--------|--------|-------|------|------|------|------|------|
| ECE | 82.8 | 99.2 i | 67 | 81 | 90.6 | 81.4 | 78.2 | 51.1 i | 53.9 | 99 | 100 | 100 | 55.7 | 60.6 | 51 | 94.9 | 89.5 |
| EDU | 57 | 62.7 | 48.7 | 51.6 | 56.9 | 60.3 | 61.4 | 62.4 | 52.3 | 55.8 | 61 | 52 | 51.9 | 57.2 | 59.6 | 49.3 | 52.7 |
| LLL | 7.1 e | 6.2 i | : | : | 19.4 b | 5.2 | 6.5 b | : | 1 | 4.1 b | 2.8 | 4.8 b | 3.1 | : | 2.8 | 4.8 | 2.9 |
| INDEX | 62.5 | 69.9 | 47.5 | 57.0 | 77.3 | 61.8 | 62.5 | 54.8 | 44.5 | 64.3 | 65.9 | 63.5 | 47.0 | 54.1 | 48.8 | 60.5 | 58.4 |
| 2000 | MT | NL | AT | PL | PT | RO | SI | SK | FI | SE | UK | HR | MK | TR | IS | LI | NO |
| ECE | 100 | 99.5 | 79.5 | 33 | 72.3 | 60.3 | 67.7 | : | 41.9 | 72.8 | 100 | : | 12.4 | : | 90.9 | : | 78.1 |
| EDU | 55.8 | 60.7 | 55.5 | 59.2 | 56.9 | 48.4 | 56.3 | : | 64.2 | 62.8 | 64.7 | : | 47.9 | : | 64.2 | : | 62.7 |
| LLL | 4.5 | 15.5 | 8.3 | : | 3.4 | 0.9 | : | : | 17.5 b | 21.6 | 20.5 b | : | : | 1 | 23.5 | : | 13.3 |
| INDEX | 65.1 | 78.3 | 61.9 | 44.3 | 55.3 | 44.6 | 57.2 | 56.6 | 62.8 | 76.5 | 85.4 | 40.8 | 28.5 | 21.5 | 85.1 | : | 69.9 |
| 2005 | EU27 | BE | BG | CZ | DK | DE | EE | IE | EL | ES | FR | IT | CY | LV | LT | LU | HU |
| ECE | 85.6 | 100 i | 73.2 | 91.4 | 93.5 | 84.6 | 84.2 | 45.4 i | 57.8 | 99.3 | 100 | 100 | 61.4 | 72.2 | 56.8 | 95.4 | 90.7 |
| EDU | 60.1 | 65.6 | 50.2 | 54.8 | 63.6 | 62 | 60.6 | 62.9 | 58.9 | 54.1 | 61.3 | 56.7 | 52.3 | 59.7 | 65 | 52 | 57 |
| LLL | 9.7 | 8.3 | 1.3 | 5.6 | 27.4 | 7.7 | 5.9 | 7.4 | 1.9 | 10.5 | 7.1 | 5.8 | 5.9 | 7.9 | 6 | 8.5 | 3.9 |
| INDEX | 67.6 | 73.6 | 50.2 | 62.8 | 89.6 | 66.1 | 63.5 | 53.2 | 49.9 | 70 | 70.3 | 66.8 | 51.9 | 61.1 | 56.6 | 66.0 | 61.9 |
| 2005 | MT | NL | AT | PL | PT | RO | SI | SK | FI | SE | UK | HR | MK | TR | IS | LI | NO |
| ECE | 94.4 | 73.4 | 82.5 | 38.1 | 84 | 76.2 | 75.9 | 74 | 46.7 | 88.9 | 91.8 | 44.7 | 15.4 | 5 | 95.3 | 50.6 | 88.9 |
| EDU | 55.9 | 63.1 | 56.9 | 60.7 | 55.9 | 50.1 | 62.3 | 53.5 | 66.4 | 66 | 67.5 | 51.2 | 48.2 | 44.5 | 68.3 | : | 65.8 |
| LLL | 5.3 | 15.9 | 12.9 | 4.9 | 4.1 | 1.6 | 15.3 | 4.6 | 22.5 | 33.4 e | 27.5 | 2.1 | : | 1.9 | 25.7 | : | 17.8 |
| INDEX | 64.0 | 71.1 | 68.1 | 47.2 | 59.4 | 51.4 | 71 | 55.4 | 70.4 | 95.2 | 91 | 42 | 29.2 | 25.3 | 90.7 | : | 79.5 |

Source: CRELL, Data source: Eurostat (UOE, Labour Force Survey)

(:) Missing or not available, (d) See definitions, (i) See information notes

(d) The Composite Index of Lifelong Learning in Europe (LLL-INDEX) is a proxy measure of participation in education and lifelong learning for the population aged 4 to 64. One indicator is used for each stages of lifelong learning: the Early Childhood Education (ECE) measures the participation of 4-years old in education at ISCED levels 0 and 1, EDU shows the participation in primary, secondary and tertiary education of population aged 5 to 29 and LLL is the EU benchmark on participation in lifelong learning (i.e. the persons aged 25 to 64 who stated that they received education or training in the four weeks preceding the Labour Force Survey as percentage of population aged 25-64). Each those LLL-INDEX components are assigned equal weight in the overall index in accordance with the principle of considering each stage of lifelong learning participation as being of equal importance

(i) Country notes are available in Table Anns 1.1 and 1.3a. Imputations are used for missing data.

Table Ann.B.1.2: Participation in education and training in European countries (d)

Enrolment of students as percentage of population (i)

| 2000 | EU27 | BE | BG | CZ | DK | DE | EE | IE | EL | ES | FR | IT | CY | LV | LT | LU | HU |
|--------------|------|--------|--------|--------|--------|------|------|--------|------|------|------|--------|--------|--------|------|------|--------|
| ISCED 0 | : | 96.2 | 65.5 | : | 88.2 | : | 76 | : | 70 | 92.6 | 99.9 | 95 | 53.3 e | : | 50 | 77.5 | 78 |
| ISCED 1 | : | 99.5 | 96.9 | : | 97.3 | : | 96.4 | 93.6 | 93.5 | 99.9 | 99.1 | 98.4 | 95.3 e | : | 95.7 | 96.6 | 87.9 |
| ISCED 2 to 3 | : | : | 85.7 | : | 88.5 | : | 83.8 | 83.8 | 81.3 | 89.4 | 93.5 | 87.6 e | 88 e | : | 91.7 | 84.3 | 85.4 |
| ISCED 5 to 6 | : | 57.8 | 44.4 | 29.4 | 57.6 | : | 55.6 | 48.6 | 51.2 | 59.3 | 52.9 | 48.6 | 19.6 e | 56.3 | 50.3 | 9.6 | 36.7 |
| 2000 | MT | NL | AT | PL | PT | RO | SI | SK | FI | SE | UK | HR | MK | TR | IS | LI | NO |
| ISCED 0 | 88.3 | 96.6 | : | 48.6 | 70.2 | 68.6 | 76.9 | : | 48.9 | 73.2 | 75.9 | 42.3 | 27.2 | : | 86.8 | : | 76 |
| ISCED 1 | 95.5 | 99.4 | : | 96.6 | : | 93.8 | 94.5 | : | 99.7 | 99.4 | 100 | 85.9 | 92.1 | : | 98.9 | : | 99.7 |
| ISCED 2 to 3 | : | 91.1 e | : | 90.4 e | 83.9 e | 76.3 | 91.4 | : | 95 | 95.6 | 94.4 | 82.1 | 80.8 e | : | 83.3 | : | 94.9 e |
| ISCED 5 to 6 | 21.4 | 52.1 | 55.8 | 49.7 | 48.2 | 24 | 55.7 | 28.7 | 82.8 | 67.2 | 58.1 | 30.8 | 22.6 | 23.2 e | 45.5 | : | 69.3 |
| 2005 | EU27 | BE | BG | CZ | DK | DE | EE | IE | EL | ES | FR | IT | CY | LV | LT | LU | HU |
| ISCED 0 | : | 100 | 76.6 | : | 90.4 | : | 93.6 | : | 68 | 99.8 | : | 99 | 60.4 e | 85 | 63.2 | 84.7 | 82.7 |
| ISCED 1 | : | 97.6 | 92.9 | 92.5 | 95.8 | : | 94.7 | 94.6 | 99.6 | 99.6 | 98.6 | 98.6 | 99.3 e | 90.1 e | 88 | 96.7 | 88.8 |
| ISCED 2 to 3 | : | 96.7 | 89.1 | : | 91.2 | : | 90.8 | 86.7 | 91.1 | 93.9 | 99 | 92.5 | 94.1 e | : | 94.2 | 83.3 | 89.9 |
| ISCED 5 to 6 | : | 62.4 | 43.7 | 47.8 | 80.8 | : | 66 | 58.2 | 90.4 | 66.2 | 56.1 | 65.3 | 33.2 e | 74.9 | 76.5 | : | 65.3 |
| 2005 | MT | NL | AT | PL | PT | RO | SI | SK | FI | SE | UK | HR | MK | TR | IS | LI | NO |
| ISCED 0 | 83.3 | 89.7 | 83.3 e | 53.6 | 77.8 | 72.7 | 76.4 | : | 59 | 92.6 | 66.3 | : | 31.7 | 10.4 | 95.4 | : | 87.7 |
| ISCED 1 | 86.3 | 97.9 | 96.9 e | 96.7 | 98 | 91.3 | 95.7 | 86.2 e | 98.5 | 97.1 | 98.7 | : | 91.8 | 90.2 | 98.1 | : | 98 |
| ISCED 2 to 3 | 84.8 | 86.6 | : | 92.9 | 81.6 | 80.8 | 91 | 92 e | 95.3 | 99.3 | 95.3 | : | 81.3 | 66 e | 88.7 | : | 95.8 |
| ISCED 5 to 6 | 31.5 | 59 | 48.9 | 64.1 | 55.1 | 45.2 | 79.5 | 40.7 | 91.9 | 81.6 | 59.4 | : | 29.8 | 31 | 70.4 | : | 78.5 |

Data source: UNESCO Institute for Statistics (UOE data collection)

(-) Missing or not available, (d) See definitions, (e) Estimated data, (i) See information notes

(i) Net enrolment rates (NER) are presented for the pre-primary (ISCED 0), primary (ISCED 1) and secondary (ISCED 2 and 3) levels whereas for the tertiary level (ISCED 5 and 6) the gross enrolment ratio (GER) is shown in the table. For details see the definitions below.

(d) The Gross Enrolment Ratio (GER) is the number of pupils enrolled in a given level of education, regardless of age, expressed as a percentage of the population in the theoretical age group for the same level of education. For the tertiary level, the population used is the five-year age group following on from the secondary school leaving age. The Net Enrolment Rate (NER) is the number of pupils of the theoretical school-age group for a given level of education, expressed as a percentage of the total population in that age-group. When the NER is compared with the GER the difference between the two ratios highlights the incidence of under-aged and over-aged enrolment.

**Table Ann B.1.3: Pupils and students participating in education (aged 5-29)
as percentage of the corresponding population group. (ISCED 1-6)**

| | 2000 | 2005 | 2006 |
|----------------|-------------|-----------|-------------|
| EU-27 | 56.9 | 60 | 59.2 |
| Belgium | 62.7 | 65.6 | 65.7 |
| Bulgaria | 48.7 | 50.2 | 49.8 |
| Czech Republic | 51.6 | 55.4 | 55.2 |
| Denmark | 56.9 | 63.6 | 63.7 |
| Germany | 60.3 | 62.0 | 61.9 |
| Estonia | 61.4 | 60.6 | 59.0 |
| Ireland | 62.4 | 62.9 | 61.7 |
| Greece | 52.3 | 58.9 | 62.3 |
| Spain | 55.8 | 54.1 | 53.9 |
| France | 61.0 | 61.2 | 61.0 |
| Italy | 52.0 | 56.7 | 57.3 |
| Cyprus | 51.9 | 52.3 | 51.0 |
| Latvia | 57.2 | 59.7 | 58.2 |
| Lithuania | 59.6 | 65.0 | 63.8 |
| Luxembourg | 49.3 | 50.8 | 52.6 |
| Hungary | 52.7 | 57.0 | 57.3 |
| Malta | 55.8 | 55.9 | 54.9 |
| Netherlands | 60.7 | 63.1 | 64.5 |
| Austria | 55.5 | 56.9 | 57.2 |
| Poland | 59.2 | 60.7 | 60.2 |
| Portugal | 56.9 | 55.9 | 55.7 |
| Romania | 48.4 | 50.1 | 50.5 |
| Slovenia | 56.3 | 62.3 | 62.0 |
| Slovakia | : | 53.5 | 53.5 |
| Finland | 64.2 | 66.4 | 66.4 |
| Sweden | 62.8 | 66.0 | 65.6 |
| UK | 64.7 | 67.5 | 60.1 |
| Croatia | : | 51.2 | 51.5 |
| FYR Macedonia | 47.9 | 48.2 | 47.5 |
| Turkey | 39.6 | 44.5 | 46.0 |
| Iceland | 64.2 | 68.3 | 67.8 |
| Liechtenstein | 37.7 | 55.0 | 56.6 |
| Norway | 62.7 | 65.8 | 66.3 |
| United States | 58.8 | 60.8 | 60.6 |
| Japan | 41.3 | 42.2 | 43.1 |

Source: Eurostat (UOE)

Chart Ann B.2.1 Young people (20-24) with upper secondary attainment

| | All | | Females | Males |
|----------------|------|----------|----------|----------|
| | 2000 | 2007 | 2007 | 2007 |
| EU-27 | 76.6 | 78.1 | 80.8 | 75.4 |
| Belgium | 81.7 | 82.6 | 84.9 | 82.6 |
| Bulgaria | 75.2 | 83.3 | 83.6 | 83.0 |
| Czech Republic | 91.2 | 91.8 | 92.4 | 91.3 |
| Denmark | 72.0 | 70.8 b | 77.7 | 64.2 |
| Germany | 74.7 | 72.5 | 74.4 | 70.6 |
| Estonia | 79.0 | 80.9 | 89.6 | 72.2 |
| Ireland | 82.6 | 86.7 | 89.7 | 83.7 |
| Greece | 79.2 | 82.1 | 87.0 (p) | 77.5 (p) |
| Spain | 66.0 | 61.1 | 67.3 | 55.1 |
| France | 81.6 | 82.4 | 85.0 | 79.8 |
| Italy | 69.4 | 76.3 | 80.0 | 72.7 |
| Cyprus | 79.0 | 85.8 | 91.0 | 79.8 |
| Latvia | 76.5 | 80.2 | 84.1 | 76.4 |
| Lithuania | 78.9 | 89.0 | 91.5 | 86.5 |
| Luxembourg | 77.5 | 70.9 | 76.4 | 65.6 |
| Hungary | 83.5 | 84.0 | 85.6 | 82.5 |
| Malta | 40.9 | 54.7 | 58.6 | 51.1 |
| Netherlands | 71.9 | 76.2 | 80.5 | 71.9 |
| Austria | 85.1 | 4.1 | 85.4 | 82.7 |
| Poland | 88.8 | 91.6 | 93.4 | 89.7 |
| Portugal | 43.2 | 53.4 | 60.8 | 46.3 |
| Romania | 76.1 | 77.4 | 77.7 | 77.1 |
| Slovenia | 88.0 | 91.5 | 94.3 | 89.0 |
| Slovakia | 94.8 | 91.3 | 92.1 | 90.5 |
| Finland | 87.7 | 86.5 | 88.0 | 4.8 |
| Sweden | 85.2 | 87.2 | 89.0 | 85.4 |
| United Kingdom | 76.6 | 78.1 | 79.0 | 77.2 |
| Croatia | 90.6 | 94.6 | 95.0 | 94.3 |
| FYR Macedonia | : | : | : | : |
| Turkey | 38.6 | 46.4 | 40.0 | 54.2 |
| Iceland | 46.1 | 49.3 | 58.7 | 40.7 |
| Liechtenstein | : | : | : | : |
| Norway | 95.0 | 93.3 (p) | 95.4 (p) | 91.2 (p) |

Source: Eurostat (LFS), Iceland, Norway: 2006 instead of 2007

(p) provisional value

HR: 2002 instead of 2000, 2005 instead of 2006

Additional notes:

CY: Pupils usually living in the country but studying abroad are not yet covered by the survey. Hence results for CY are understated.

Since the 5 December 2005 release, Eurostat has been applying a refined definition of the "upper secondary" educational attainment level in order to improve the comparability of results in the EU. For the 1998 data onwards ISCED level 3C programmes shorter than two years no longer fall under the "upper secondary" level but come under "lower secondary". This change implies revision of the results in DK (from 2001), ES, CY and IS. However, the definition cannot yet be implemented in EL, IE and AT, where all ISCED 3C levels are still included

Table Ann B.4.1: Life science graduates (field 42) 2000-2006

| Life sciences grad. | 2000 | 2004 | 2005 | 2006 | % growth 2000-2006 |
|---|-------|-------|-------|-------|-----------------------|
| EU 27 | 92633 | 93187 | 91101 | 92504 | -0.1 |
| Belgium | 2217 | 2339 | 1926 | 1798 | -18.9 |
| Bulgaria | 295 | 381 | 408 | 398 | 34.9 |
| Czech Republic | 658 | 949 | 1023 | 991 | 50.6 |
| Denmark | 873 | 816 | 859 | 782 | -10.4 |
| Germany | 6170 | 7232 | 8183 | 9666 | 56.7 |
| Estonia | 124 | 240 | 315 | 241 | 94.4 |
| Ireland | : | : | : | : | : |
| Greece | : | 1880 | 2030 | : | : |
| Spain | 5356 | 4873 | 4624 | 4582 | -14.5 |
| France | 27859 | : | 21860 | 17411 | -37.5 |
| Italy | 6684 | 11260 | 10311 | 9498 | 42.1 |
| Cyprus | 0 | 0 | 3 | 6 | : |
| Latvia | 141 | 156 | 130 | 138 | -2.1 |
| Lithuania | 162 | 238 | 262 | 295 | 82.1 |
| Luxembourg | : | : | : | : | : |
| Hungary | 299 | 319 | 453 | 366 | 22.4 |
| Malta | 0 | : | 0 | 25 | : |
| Netherlands | 842 | 1135 | 1542 | 1020 | 21.1 |
| Austria | 549 | 767 | 985 | 1236 | 125.1 |
| Poland | 3797 | 2508 | 3241 | 10299 | 171.2 |
| Portugal | 666 | 1551 | 1704 | 1577 | 136.8 |
| Romania | 2116 | 5252 | 5083 | 4998 | 136.2 |
| Slovenia | 89 | 180 | 212 | 155 | 74.2 |
| Slovakia | 215 | 906 | 1019 | 964 | 348.4 |
| Finland | 481 | : | 509 | 528 | 9.8 |
| Sweden | 889 | 1400 | 1308 | 1451 | 63.2 |
| United Kingdom | 27875 | 22551 | 22068 | 22049 | -20.9 |
| Croatia | : | 253 | 260 | 321 | : |
| FYR Macedonia | 44 | 58 | 98 | 96 | 118.2 |
| Turkey | 2711 | 3464 | 3555 | 3806 | 40.4 |
| Iceland | 75 | 82 | 92 | 95 | 26.7 |
| Liechtenstein | : | 0 | 10 | 0 | : |
| Norway | 326 | 308 | 365 | 581 | 78.2 |
| United States | 74597 | 74408 | 78388 | 83634 | 12.1 |
| Japan | : | : | : | : | : |
| incl. an estimate for Greece for 2000 (1000 graduates) | | | | | |
| Source: Eurostat (UOE) | | | | | |
| Additional note : Since the attribution of graduates to fields has changed in some countries between years, data have to be interpreted with care | | | | | |

Table Ann B.4.2: Physical science graduates (field 44) 2000-2006

| Physics grad. | 2000 | 2004 | 2005 | 2006 | % growth 2000- 2006 |
|-----------------------|--------------|--------------|--------------|--------------|---------------------------|
| EU 27 | 86908 | 82536 | 84707 | 82204 | -5.4 |
| Belgium | 746 | 997 | 1203 | 1217 | 63.1 |
| Bulgaria | 660 | 690 | 737 | 758 | 14.9 |
| Czech Republic | 652 | 1041 | 1084 | 1243 | 90.6 |
| Denmark | 942 | 701 | 709 | 637 | -32.4 |
| Germany | 11772 | 9589 | 10552 | 13348 | 13.4 |
| Estonia | 139 | 163 | 252 | 213 | 53.2 |
| Ireland | : | : | 675 | : | : |
| Greece | : | 2980 | 2384 | : | : |
| Spain | 6990 | 5855 | 5210 | 5055 | -27.7 |
| France | 24728 | : | 20454 | 17800 | -28.0 |
| Italy | 3218 | 5117 | 5969 | 3575 | 11.1 |
| Cyprus | 19 | 51 | 69 | 83 | 336.8 |
| Latvia | 254 | 205 | 233 | 181 | -28.7 |
| Lithuania | 259 | 393 | 385 | 466 | 79.9 |
| Luxembourg | : | : | : | : | : |
| Hungary | 420 | 602 | 430 | 524 | 24.8 |
| Malta | 57 | : | 52 | 22 | -61.4 |
| Netherlands | 1841 | 1824 | 1378 | 1050 | -43.0 |
| Austria | 633 | 546 | 634 | 685 | 8.2 |
| Poland | 2813 | 5888 | 6365 | 6563 | 133.3 |
| Portugal | 878 | 2107 | 2153 | 2085 | 137.5 |
| Romania | : | : | : | : | : |
| Slovenia | 124 | 134 | 134 | 119 | -4.0 |
| Slovakia | 237 | 836 | 775 | 904 | 281.4 |
| Finland | 668 | : | 787 | 851 | 27.4 |
| Sweden | 913 | 1053 | 871 | 929 | 1.8 |
| United Kingdom | 23360 | 19458 | 21212 | 21512 | -7.9 |
| Croatia | : | 265 | 264 | 333 | : |
| FYR Macedonia | 122 | 174 | 206 | 225 | 84.4 |
| Turkey | 6987 | 8024 | 8263 | 8846 | 26.6 |
| Iceland | 32 | 48 | 60 | 65 | 103.1 |
| Liechtenstein | : | 0 | 0 | 0 | : |
| Norway | 374 | 271 | 292 | 345 | -7.8 |
| United States | 27244 | 29318 | 31511 | 33631 | 23.4 |
| Japan | : | : | : | : | : |

incl. an estimate for Greece for 2000 (3000 graduates)

Source: Eurostat (UOE)

Additional note : Since the attribution of graduates to fields has changed in some countries between years, data have to be interpreted with care

Table Ann B.4.3: Mathematics and statistics graduates (field 46) 2000-2006

| Mathematics and statistics grad. | 2000 | 2004 | 2005 | 2006 | % growth 2000-2006 |
|----------------------------------|-------|--------|-------|-------|--------------------|
| EU 27 | 37536 | 42819 | 43000 | 43948 | 17.1 |
| Belgium | 192 | 374 | 417 | 410 | 113.5 |
| Bulgaria | 159 | 197 | 155 | 165 | 3.8 |
| Czech Republic | 302 | 376 | 364 | 521 | 72.5 |
| Denmark | 171 | 669 | 711 | 478 | 179.5 |
| Germany | 3858 | 3778 | 4524 | 8470 | 119.5 |
| Estonia | 49 | 47 | 79 | 67 | 36.7 |
| Ireland | : | : | 306 | : | : |
| Greece | : | 1576 | 1415 | : | : |
| Spain | 3055 | 2153 | 1911 | 1598 | -47.7 |
| France | 11352 | : | 10783 | 9558 | -15.8 |
| Italy | 4049 | 5571 | 3939 | 2496 | 38.4 |
| Cyprus | 30 | 69 | 57 | 77 | 156.7 |
| Latvia | 52 | 78 | 88 | 79 | 51.9 |
| Lithuania | 89 | 271 | 379 | 371 | 316.9 |
| Luxembourg | : | : | : | : | : |
| Hungary | 97 | 346 | 273 | 203 | 109.3 |
| Malta | 0 | : | 0 | 1 | : |
| Netherlands | 227 | 347 | 436 | 304 | 33.9 |
| Austria | 155 | 152 | 173 | 217 | 40.0 |
| Poland | 2919 | 2641 | 3885 | 4049 | 38.7 |
| Portugal | 689 | 1249 | 1192 | 1221 | 77.2 |
| Romania | 2092 | 2581 | 2686 | 2906 | 38.9 |
| Slovenia | 48 | 77 | 63 | 84 | 75.0 |
| Slovakia | 120 | 240 | 228 | 203 | 69.2 |
| Finland | 284 | : | 299 | 348 | 22.5 |
| Sweden | 241 | 378 | 303 | 371 | 53.9 |
| United Kingdom | 5998 | 7971 | 8334 | 8336 | 39.0 |
| Croatia | : | 113 | 183 | 172 | : |
| FYR Macedonia | 87 | 102 | 106 | 65 | -25.3 |
| Turkey | 3721 | 4434 | 4823 | 5146 | 38.3 |
| Iceland | 7 | 15 | 2 | 1 | -85.7 |
| Liechtenstein | : | 0 | 0 | 0 | : |
| Norway | 70 | 84 | 92 | 124 | 77.1 |
| United States | 16588 | 18578 | 20004 | 20793 | 25.4 |
| Japan | : | 195241 | : | : | : |

incl. an estimate for Greece for 2000 (1000 graduates)

Source: Eurostat (UOE)

Additional note : Since the attribution of graduates to fields has changed in some countries between years, data have to be interpreted with care

Table Ann B.4.4: Computing graduates (field 48) 2000-2006

| Computing graduates | 2000 | 2004 | 2005 | 2006 | % growth 2000-2006 |
|---------------------|--------------|---------------|---------------|---------------|--------------------|
| EU 27 | 83954 | 137460 | 154413 | 150951 | 79.8 |
| Belgium | 1858 | 3235 | 2992 | 2827 | 52.2 |
| Bulgaria | 643 | 967 | 990 | 1089 | 69.4 |
| Czech Republic | 2587 | 1754 | 1965 | 2524 | -2.4 |
| Denmark | 1177 | 2188 | 1881 | 1546 | 31.4 |
| Germany | 6071 | 11579 | 14193 | 16049 | 164.4 |
| Estonia | 185 | 429 | 605 | 564 | 204.9 |
| Ireland | : | : | 1758 | : | : |
| Greece | : | 1856 | 3122 | : | : |
| Spain | 11095 | 19935 | 18726 | 17472 | 57.5 |
| France | 14136 | : | 28549 | 26136 | 84.9 |
| Italy | 1626 | 3762 | 4519 | 3541 | 117.8 |
| Cyprus | 107 | 227 | 228 | 209 | 95.3 |
| Latvia | 546 | 825 | 793 | 824 | 50.9 |
| Lithuania | 714 | 939 | 1116 | 1429 | 100.1 |
| Luxembourg | : | : | : | : | : |
| Hungary | 563 | 1403 | 1498 | 2950 | 424.0 |
| Malta | 26 | : | 53 | 120 | 361.5 |
| Netherlands | 1308 | 3603 | 4119 | 5102 | 290.1 |
| Austria | 527 | 1120 | 1586 | 2244 | 325.8 |
| Poland | 2150 | 13065 | 19133 | 19931 | 827.0 |
| Portugal | 909 | 2871 | 3550 | 3673 | 304.1 |
| Romania | : | : | : | : | : |
| Slovenia | 105 | 167 | 229 | 243 | 131.4 |
| Slovakia | 836 | 1328 | 1278 | 1376 | 64.6 |
| Finland | 1295 | : | 1843 | 1785 | 37.8 |
| Sweden | 2103 | 2327 | 2242 | 2196 | 4.4 |
| United Kingdom | 27452 | 36751 | 37445 | 33999 | 23.9 |
| Croatia | : | 397 | 472 | 478 | : |
| FYR Macedonia | 43 | 61 | 69 | 94 | 118.6 |
| Turkey | 4088 | 8651 | 8667 | 11254 | 175.3 |
| Iceland | 127 | 169 | 108 | 108 | -15.0 |
| Liechtenstein | : | 0 | 0 | 0 | : |
| Norway | 1697 | 1891 | 1858 | 1688 | -0.5 |
| United States | 71686 | 122385 | 109819 | 97197 | 35.6 |
| Japan | : | : | : | : | : |

incl. an estimate for Greece for 2000 (1000 graduates)

Source: Eurostat (UOE)

Additional note : Since the attribution of graduates to fields has changed in some countries between years, data have to be interpreted with care

Table Ann B.4.5: Engineering, manufacturing and construction graduates (field 5) 2000-2006

| Engineering graduates | 2000 | 2004 | 2005 | 2006 | % growth 2000-2006 |
|-----------------------|---------------|---------------|---------------|---------------|-----------------------|
| EU 27 | 391605 | 468146 | 490414 | 480288 | 22.6 |
| Belgium | 7906 | 7630 | 7589 | 7587 | -4.0 |
| Bulgaria | 6319 | 7418 | 7429 | 7079 | 12.0 |
| Czech Republic | 5159 | 8018 | 8728 | 10377 | 101.1 |
| Denmark | 5293 | 4695 | 5221 | 5176 | -2.2 |
| Germany | 52174 | 53725 | 55998 | 56189 | 7.7 |
| Estonia | 986 | 854 | 1133 | 1148 | 16.4 |
| Ireland | 5415 | 7061 | 7157 | 7147 | 32.0 |
| Greece | : | 4864 | 7374 | 9137 | : |
| Spain | 38584 | 50368 | 48030 | 47181 | 22.3 |
| France | 76682 | : | 97198 | 94737 | 23.6 |
| Italy | 31013 | 53203 | 61213 | 44429 | 43.3 |
| Cyprus | 180 | 119 | 66 | 162 | -10.0 |
| Latvia | 1438 | 1845 | 2036 | 1794 | 24.8 |
| Lithuania | 5340 | 6489 | 6890 | 6892 | 29.0 |
| Luxembourg | 26 | : | : | : | : |
| Hungary | 5820 | 5301 | 5217 | 4669 | -19.8 |
| Malta | 103 | : | 101 | 129 | 25.2 |
| Netherlands | 8254 | 8693 | 8940 | 9691 | 17.4 |
| Austria | 5642 | 6281 | 6704 | 6880 | 21.9 |
| Poland | 27561 | 34144 | 37304 | 42564 | 54.4 |
| Portugal | 6942 | 10008 | 10585 | 10871 | 56.6 |
| Romania | 12866 | 26015 | 27501 | 27653 | 114.9 |
| Slovenia | 2253 | 2219 | 2259 | 2168 | -3.8 |
| Slovakia | 3317 | 5220 | 6085 | 6018 | 81.4 |
| Finland | 7376 | : | 8329 | 8365 | 13.4 |
| Sweden | 8824 | 11945 | 10623 | 11209 | 27.0 |
| United Kingdom | 55874 | 48284 | 50704 | 52799 | -5.5 |
| Croatia | : | 2269 | 2319 | 2388 | : |
| FYR Macedonia | 882 | 793 | 802 | 895 | 1.5 |
| Turkey | 39579 | 49910 | 51145 | 53311 | 34.7 |
| Iceland | 110 | 145 | 168 | 219 | 99.1 |
| Liechtenstein | : | 4 | 46 | 46 | : |
| Norway | 2351 | 2559 | 2449 | 2518 | 7.1 |
| United States | 179276 | 189402 | 189938 | 189532 | 5.7 |
| Japan | 209938 | 195241 | 195670 | 194129 | -7.5 |

incl. an estimate for Greece for 2000 (4000 graduates)

Source: Eurostat (UOE)

Additional note : Since the attribution of graduates to fields has changed in some countries between years, data have to be interpreted with care

Table Ann B.4.6: Distribution of graduates by main subject field (2006)

| | Science and mathematics | Engineering | Education and training | Humanities and art | Social science, business and law | Agriculture and veterinary | Health and welfare | Services |
|---------------|-------------------------|-------------|------------------------|--------------------|----------------------------------|----------------------------|--------------------|----------|
| EU-27 | | | | | | | | |
| Belgium | 6252 | 7587 | 14002 | 7971 | 23060 | 1881 | 15386 | 1689 |
| Bulgaria | 2410 | 7079 | 3139 | 3811 | 21700 | 928 | 2814 | 3472 |
| Czech Rep. | 5268 | 10377 | 10181 | 5217 | 19914 | 2506 | 8614 | 3904 |
| Denmark | 3443 | 5176 | 4012 | 6567 | 14463 | 992 | 11313 | 1573 |
| Germany | 47533 | 56189 | 39467 | 66139 | 98619 | 7648 | 84685 | 13006 |
| Estonia | 1085 | 1148 | 1180 | 1322 | 4226 | 250 | 1339 | 996 |
| Ireland | 8194 | 7147 | 3703 | 11328 | 20566 | 326 | 6490 | 1430 |
| Greece | : | 9137 | : | : | : | : | : | : |
| Spain | 28707 | 47181 | 35117 | 26166 | 80830 | 5211 | 40726 | 21745 |
| France | 71520 | 94737 | 13542 | 77650 | 267695 | 9753 | 83474 | 25233 |
| Italy | : | : | : | : | : | : | : | : |
| Cyprus | 375 | 162 | 432 | 384 | 1687 | 7 | 260 | 551 |
| Latvia | 1222 | 1794 | 4015 | 1625 | 14792 | 266 | 1375 | 1300 |
| Lithuania | 2561 | 6892 | 7089 | 2891 | 17739 | 767 | 3896 | 1508 |
| Luxembourg | : | : | : | : | : | : | : | : |
| Hungary | 4037 | 4669 | 12962 | 5269 | 30529 | 1829 | 6151 | 6109 |
| Malta | : | : | : | : | : | : | : | : |
| Netherlands | 7955 | 9691 | 18642 | 9617 | 44892 | 1800 | 19361 | 5234 |
| Austria | 4379 | 6880 | 4867 | 3043 | 10334 | 720 | 3444 | 1285 |
| Poland | 42824 | 42564 | 87259 | 43713 | 214939 | 8312 | 39457 | 24983 |
| Portugal | 8134 | 10871 | 10859 | 7423 | 23102 | 1303 | 17374 | 5194 |
| Romania | 7904 | 27653 | 4773 | 20744 | 84205 | 4756 | 16810 | 3734 |
| Slovenia | 601 | 2168 | 1578 | 867 | 8504 | 412 | 1703 | 1312 |
| Slovakia | 3447 | 6018 | 6470 | 2515 | 11026 | 1156 | 6873 | 2685 |
| Finland | 3520 | 8365 | 2616 | 5445 | 9451 | 912 | 7743 | 2420 |
| Sweden | 4934 | 11209 | 10333 | 3723 | 15044 | 625 | 15348 | 1310 |
| UK | : | : | : | : | : | : | : | : |
| Croatia | 1304 | 2388 | 1505 | 1948 | 8153 | 753 | 1850 | 2786 |
| FYR Maced. | 480 | 895 | 1099 | 871 | 1746 | 262 | 797 | 351 |
| Turkey | 29052 | 53311 | 64376 | 24072 | 140672 | 14895 | 21271 | 23278 |
| Iceland | 271 | 219 | 900 | 379 | 1160 | 25 | 398 | 46 |
| Liechtenstein | | 46 | 0 | 4 | 72 | 0 | 10 | 0 |
| Norway | 2738 | 2518 | 5969 | 2951 | 9058 | 375 | 8210 | 1617 |
| United States | 235255 | 189532 | 303917 | 347206 | 1005047 | 29129 | 357323 | 171597 |
| Japan | 31685 | 194129 | 75580 | 162226 | 288599 | 23411 | 136192 | 103573 |

Source : Eurostat (UOE)

Table Ann B.4.7: Countries of origin of foreign students (2006)

| | Number of foreign students | Main countries of origin (% of foreign students) |
|---------------|----------------------------|--|
| Belgium | 47 012 | France 37.6, Netherlands 7.0, Morocco 6.4 |
| Bulgaria | 8 996 | FYR Macedonia 40.4, Turkey 18.6, Greece 8.9 |
| Czech Rep. | 21 395 | Slovakia 68.5, Russian Federation 3.7, Ukraine 3.2 |
| Denmark | 19 123 | Norway 11.4, China 10.8, Iceland 8.5 |
| Germany | 261 363 | China 10.5, Turkey 9.7, Poland 6.2 |
| Estonia | 2 151 | Russia 52.5, Finland 18.5, Latvia 9.2 |
| Ireland | 12 745 | United States 16.1, China 13.5, United Kingdom 9.4 |
| Greece | 16 558 | Cyprus 54.1, Albania 16.0, Bulgaria 3.1 |
| Spain | 51 013 | Morocco 9.2, Colombia 9.0, Argentina 6.6 |
| France | 247 510 | Morocco 11.8, Algeria 8.7, China 6.9 |
| Italy | 48 766 | Albania 22.5, Greece 11.2, Germany 3.4 |
| Cyprus | 5 630 | China 22.0, Bangladesh 14.9, India 14.1, Greece 7.4 |
| Latvia | 1 423 | Lithuania 37.0, Russian Federation 24.9, Sri Lanka 4.8 |
| Lithuania | 1 226 | Poland 14.3, Belarus 8.2, Germany 8.2, Israel 8.2, Lebanon 8.0 |
| Luxembourg | 1 137 | France 34.0, Portugal 15.9, Belgium 14.1, Germany 9.8 |
| Hungary | 14 491 | Romania 23.0, Slovakia 16.0, Ukraine 9.2 |
| Malta | 639 | China 34.3, Bulgaria 11.9, Russian Federation 6.6 |
| Netherlands | 36 427 | Germany 32.7, China 10.5, Belgium 6.0 |
| Austria | 39 329 | Germany 25.9, Italy 15.7, Turkey 5.3 |
| Poland | 11 365 | Ukraine 21.8, Belarus 13.0, Lithuania 4.3 |
| Portugal | 17 077 | Angola 24.1, Cape Verde 23.9, Brazil 11.2 |
| Romania | 11 790 | Moldova 52.0, Israel 5.2, Greece 5.1 |
| Slovenia | 1 390 | Croatia 43.0, Bosnia-H. 15.8, Serbia-Montenegro 10.1 |
| Slovakia | 1 733 | Czech Republic 27.8, Serbia-Mont. 12.0, Greece 5.7 |
| Finland | 8 955 | China 16.1, Russia 12.4, Estonia 7.0 |
| Sweden | 41 410 | Finland 9.4, Germany 7.4, Norway 3.5 |
| UK | 759 771 | China 6.9, Greece 7.4, Ireland 3.4, India 3.2 |
| Croatia | 749 | Bosnia-H. 42.7, Slovenia 11.2, Serbia-Mont. 11.1 |
| FYR Maced. | 182 | Bulgaria 46.2, Albania 30.8, Serbia-Montenegro 14.3 |
| Turkey | 19 079 | Azerbaijan 8.3, Turkmenistan 6.3, Greece 5. |
| Iceland | 715 | Germany 13.7, Denmark 8.1, Sweden 7.4 |
| Liechtenstein | 573 | Austria 46.2, Switzerland 22.5, Germany 17.5 |
| Norway | 14 296 | Sweden 8.2, Denmark 6.0, Russian Federation 5.4 |
| Japan | 130 124 | China 66.4, Korea 17.2, Malaysia 1.5 |
| United States | : | : |

Source: Eurostat (UOE)

Table Ann B.5.1: Percentage of pupils learning two foreign languages, by ISCEL level

| | Percentage of pupils at ISCED level 2 (GEN) learning 2 foreign languages, 2005 | Percentage of pupils at ISCED level 2 (GEN) learning 2 foreign languages, 2006 | Percentage of pupils at ISCED level 3 (GEN) learning 2 foreign languages 2005 | Percentage of pupils at ISCED level 3 (GEN) learning 2 foreign languages 2006 | Percentage of pupils at ISCED level 3 (Pre vocational and vocational) learning 2 foreign languages 2005 | Percentage of pupils at ISCED level 3 (Pre vocational and vocational) learning 2 foreign languages 2006 |
|-----------------|--|--|---|---|---|---|
| EU | 47.9 | 52.3 | 51.4 | 50.1 | 27.6s | 27.8 |
| Belgium | 28.6 | 28.6 | 59.9 | 59.9 | 41.6 | 41.5 |
| Belgium French | 0.6 | 0.5 | 73.6 | 73.4 | 20.0 | 19.7 |
| Belgium Flemish | 48.1 | 47.9 | 45.2 | 45.6 | 55.8 | 55.8 |
| Bulgaria | 23.9 | 27.6 | 76.9 | 77.4 | 46.4 | 47.5 |
| Czech Republic | 5.3 | 9.6 | 96.2 | 96.9 | 26.9 | 28.6 |
| Denmark | 97.1 | 97.2 | 72.6 | 74.6 | - | - |
| Germany | : | : | : | : | : | : |
| Estonia | 67.1 | 67.1s | 34.1 | 34.1s | 83.9 | 83.9s |
| Ireland | 11.8 | 11.3 | 7.8 | 7.6 | 2.2 | 2.8 |
| Greece | 94.3 | 95.0 | 6.7 | 6.9 | 1.4 | 1.0 |
| Spain | 40.4 | 40.4 | 28.0 | 27.3 | 3.6 | 2.7 |
| France | 50.2 | 50.7 | : | 83.2 | : | 10.2 |
| Italy | 43.8 | 71.9 | 14.3 | 18.5 | 36.2 | 34.7 |
| Cyprus | : | : | : | : | : | : |
| Latvia | 60.3 | 62.1 | 63.7 | 63.7s | : | : |
| Lithuania | 78.0 | 78.8 | 50.9 | 52.0 | 13.9 | 12.2 |
| Luxembourg | 47.1 | 47.2 | 9.9 | 9.1 | 18.8 | 19.3 |
| Hungary | : | : | : | : | : | : |
| Malta | 73.9 | 77.5 | 13.2 | 18.5 | - | - |
| Netherlands | 33.1 | 32.7 | 44.4 | 43.7 | : | : |
| Austria | 9.1 | 9.1s | 63.7 | 63.7s | 25.1 | 25.1s |
| Poland | : | : | : | : | : | : |
| Portugal | 90.7 | 95.4 | 17.1 | 9.2 | 28.7 | 17.1 |
| Romania | 94.8 | 96.0 | 88.3 | 88.3 | 30.3 | 37.0 |
| Slovenia | 24.0 | 34.1 | 86.7 | 92.5 | 34.6 | 35.3 |
| Slovakia | 12.6 | 15.7 | 97.4 | 97.3 | 31.2 | 32.5 |
| Finland | 73.8 | 76.0 | 39.1 | 40.1 | : | : |
| Sweden | 70.5 | 71.0 | 72.4 | 71.8 | 10.7 | 9.9 |
| United Kingdom | 6.4 | 6.2 | : | 1.6 | : | : |
| Croatia | : | : | 85.8 | 84.1 | 15.1 | 15.8 |
| FYR Macedonia | 51.5 | 68.1 | : | : | : | : |
| Turkey | : | : | : | 7.6 | : | 4.5 |
| Iceland | 90.3 | 89.1 | 39.5 | 37.7 | 16.2 | 17.0 |
| Norway | : | : | : | : | : | : |

Source: Eurostat (UOE)
S: Eurostat calculations

Table Ann B.5.2: Percentage of individuals carrying out computer tasks

| | Percentage of individuals who have | | | | | |
|----------------|------------------------------------|----------------------------|---|-------------------------------------|------------------|----------------------------|
| | copied or moved a file or folder | used copy or cut and paste | used basic arithmetic formulae in a spreadsheet | connected and installed new devices | compressed files | written a computer program |
| EU | 56 | 54 | 39 | 40 | 30 | 9 |
| Belgium | 59 | 53 | 40 | 37 | 31 | 8 |
| Bulgaria | 30 | 27 | 18 | 9 | 19 | 3 |
| Czech Republic | 53 | 49 | 33 | 21 | 29 | 5 |
| Denmark | 74 | 71 | 60 | 57 | 41 | 14 |
| Germany | 69 | 68 | 51 | 53 | 34 | 10 |
| Estonia | 49 | 48 | 43 | 34 | 34 | 10 |
| Ireland | 52 | 48 | 35 | 27 | 25 | 6 |
| Greece | 40 | 39 | 25 | 26 | 22 | 7 |
| Spain | 55 | 54 | 38 | 40 | 39 | 11 |
| France | 59 | 58 | 43 | 49 | 35 | 13 |
| Italy | 42 | 42 | 29 | 29 | 26 | 7 |
| Cyprus | 46 | 43 | 32 | 28 | 25 | 7 |
| Latvia | 51 | 47 | 35 | 19 | 25 | 5 |
| Lithuania | 48 | 46 | 35 | 25 | 30 | 5 |
| Luxembourg | 73 | 70 | 54 | 59 | 56 | 18 |
| Hungary | 54 | 54 | 46 | 38 | 33 | 9 |
| Netherlands | 76 | 74 | 49 | 58 | 43 | 13 |
| Austria | 70 | 68 | 52 | 47 | 44 | 12 |
| Poland | 45 | 39 | 27 | 25 | 18 | 5 |
| Portugal | 46 | 43 | 35 | 29 | 29 | 7 |
| Romania | 27 | 23 | 10 | 8 | 13 | 3 |
| Slovenia | 59 | 54 | 47 | 41 | 35 | 8 |
| Slovakia | 63 | 58 | 46 | 29 | 27 | 5 |
| Finland | 64 | 62 | 48 | 49 | 35 | 19 |
| Sweden | 70 | 70 | 49 | 50 | 36 | 11 |
| United Kingdom | 65 | 63 | 47 | 50 | 31 | 11 |
| Iceland | 79 | 76 | 70 | 53 | 45 | 14 |
| Norway | 65 | 75 | 59 | 64 | 46 | 15 |

Source: Eurostat (ICT household survey)

Table Ann B.5.3: E-skills Internet

| | Percentage of individuals who have | | | | | |
|----------------|------------------------------------|-----------------------------------|---|---------------------------------------|---|--------------------|
| | used a search engine | sent an email with attached files | posted messages to chat rooms, newsgroups or an online discussion forum | used the Internet to make phone calls | used peer-to-peer file sharing for exchanging movies, music, etc. | created a Web page |
| EU | 57 | 50 | 24 | 15 | 13 | 10 |
| Belgium | 66 | 59 | 21 | 12 | 10 | 8 |
| Bulgaria | 32 | 27 | 20 | 16 | 10 | 4 |
| Czech Republic | 50 | 49 | 18 | 17 | 6 | 9 |
| Denmark | 80 | 72 | 33 | 25 | 13 | 18 |
| Germany | 73 | 60 | 28 | 14 | 8 | 10 |
| Estonia | 61 | 59 | 43 | 28 | 22 | 18 |
| Ireland | 55 | 47 | 12 | 8 | 6 | 6 |
| Greece | 36 | 26 | 11 | 6 | 9 | 5 |
| Spain | 55 | 45 | 29 | 9 | 20 | 9 |
| France | 59 | 55 | 25 | 29 | 14 | 14 |
| Italy | 41 | 38 | 25 | 13 | 13 | 9 |
| Cyprus | 37 | 29 | 8 | 9 | 7 | 5 |
| Latvia | 58 | 48 | 34 | 21 | 13 | 7 |
| Lithuania | 50 | 40 | 25 | 25 | 16 | 6 |
| Luxembourg | 75 | 70 | 37 | 26 | 24 | 16 |
| Hungary | 54 | 48 | 27 | 13 | 12 | 9 |
| Netherlands | 83 | 75 | 26 | 25 | 24 | 16 |
| Austria | 68 | 58 | 22 | 17 | 9 | 12 |
| Poland | 48 | 35 | 23 | 15 | 12 | 7 |
| Portugal | 42 | 37 | 24 | 11 | 11 | 7 |
| Romania | 23 | 21 | 12 | 5 | 7 | 4 |
| Slovenia | 58 | 49 | 24 | 12 | 20 | 12 |
| Slovakia | 62 | 55 | 21 | 16 | 9 | 9 |
| Finland | 79 | 65 | 27 | 22 | 16 | 17 |
| Sweden | 76 | 64 | 19 | 12 | 19 | 13 |
| United Kingdom | 67 | 62 | 22 | 10 | 13 | 14 |
| Iceland | 86 | 76 | 37 | 33 | 23 | 31 |
| Norway | 80 | 73 | 31 | 22 | 23 | 21 |

Source: Eurostat (ICT household survey)

Table Ann B.6.1: Difference in performance in reading between pupils with both parents born in the country and neither of parents born in the country, 2006

| | Both parents born in the country | Only one parent born in the country | Neither parent born in the country | Difference between both parents born in the country and neither parent born in the country |
|-------------|----------------------------------|-------------------------------------|------------------------------------|--|
| EU average | 542 | 522 | | 37* |
| Belgium Fl. | 554 | 530 | 511 | 43 |
| Belgium Fr. | 511 | 498 | 479 | 32 |
| Bulgaria | 552 | 504 | : | 48* |
| Denmark | 551 | 546 | 511 | 40 |
| Germany | 564 | 543 | 515 | 49 |
| Spain | 521 | 509 | 481 | 40 |
| Italy | 553 | 538 | 524 | 29 |
| Latvia | 543 | 537 | 547 | +4 |
| Lithuania | 540 | 525 | : | 15* |
| Luxembourg | 583 | : | 528 | 55 |
| Hungary | 553 | 541 | | 12* |
| Netherlands | 553 | : | 513 | 40 |
| Poland | 522 | 498 | : | 24* |
| Romania | 495 | 452 | : | 43* |
| Slovenia | 527 | 517 | 488 | 39 |
| Slovakia | 533 | 521 | : | 12* |
| Sweden | 557 | 547 | 520 | 37 |
| UK (Eng.) | 552 | 539 | 502 | 50 |
| Iceland | 516 | 504 | 462 | 54 |
| Norway | 504 | 500 | 446 | 58 |

Data source: 2006 PIRLS data set

Additional notes:

* - Calculated based on data for only one parent born in the country for some countries

- To calculate the EU average, data for at least 14 of the EU-27, accounting for at least 60% of the total EU population, must be present. Since the data cover only 12 of the EU-27 countries the average has not been calculated for 2003. Only data statistically significant were taken into account for the calculations of EU averages.

Table Ann B.6.2: Difference in average score in mathematics between native and foreign pupils (first generation), 2003 and 2006

| | Difference | |
|--------------|------------|------|
| | 2003 | 2006 |
| EU average | 60 | 61 |
| Belgium | 100 | 112 |
| Luxembourg | 38 | 55 |
| Denmark | 68 | 80 |
| Germany | 81 | 65 |
| Ireland | 4 | 19 |
| Greece | 43 | 45 |
| Spain | 45 | 59 |
| France | 54 | 62 |
| Italy | : | 44 |
| Latvia | 3 | : |
| Luxembourg | 38 | 55 |
| Netherlands | 66 | 58 |
| Austria | 61 | 65 |
| Portugal | 61 | 59 |
| Sweden | 64 | 64 |
| UK | : | 25 |
| Norway | 52 | 58 |
| USA | 28 | 37 |
| Australia | : | +11 |
| OECD average | : | 49 |

Source: DTI, OECD (PISA 2003 dataset). The figures concern average performance on the PISA mathematics scale.

Additional notes:

Because the number of observations was insufficient to provide reliable estimates, the data for the countries with very low proportions of foreign pupils have been omitted. The OECD average performance in PISA was fixed as 500 points in 2000. Differences in bold are statistically significant.

To calculate the EU average, data for at least 14 of the EU-27, accounting for at least 60% of the total EU population, must be present. Since the data cover only 12 of the EU-27 countries the average has not been calculated for 2003. Only data statistically significant were taken into account for the calculations of EU averages.

Chapter B.7

Table Ann B.7.1: Educational attainment of the adult population aged 15-64 in %

| | 2000 | | | 2007 | | | Change between 2000 and 2007 | | |
|----------------|---|--------|------|---|--------|------|------------------------------|--------|-------|
| | Percentage of the population with low, medium and high educational attainment | | | Percentage of the population with low, medium and high educational attainment | | | | | |
| | Low | Medium | High | Low | Medium | High | Low | Medium | High |
| EU-27 | 38.0 | 45.0 | 17.0 | 32.7 | 46.7 | 20.6 | -5.3 | 1.7 | 3.6 |
| Belgium | 43.0 | 33.2 | 23.8 | 34.8 | 37.1 | 28.1 | -8.3 | 3.9 | 4.4 |
| Bulgaria | 36.4 | 48.4 | 15.2 | 28.7 | 52.8 | 18.5 | -7.7 | 4.4 | 3.3 |
| Czech Republic | 19.6 | 70.9 | 9.5 | 16.2 | 72.2 | 11.6 | -3.5 | 1.3 | 2.1 |
| Denmark | 27.0 | 51.4 | 21.6 | 31.0 | 41.9 | 27.1 | 4.0 | -9.5 | 5.5 |
| Germany | 21.5 | 57.1 | 21.4 | 23.0 | 56.3 | 20.7 | 1.5 | -0.8 | -0.7 |
| Estonia | 22.2 | 54.1 | 23.7 | 20.4 | 52.4 | 27.3 | -1.8 | -1.7 | 3.6 |
| Ireland | 43.8 | 37.5 | 18.7 | 34.9 | 37.0 | 28.1 | -8.9 | -0.5 | 9.5 |
| Greece | 48.4 | 37.6 | 14.0 | 41.0 | 39.7 | 19.2 | -7.4 | 2.1 | 5.2 |
| Spain | 59.1 | 19.9 | 21.0 | 49.3 | 23.7 | 27.0 | -9.8 | 3.8 | 6.0 |
| France | 40.1 | 40.1 | 19.8 | 33.6 | 42.1 | 24.3 | -6.5 | 2.1 | 4.4 |
| Italy | 55.2 | 36.7 | 8.1 | 48.6 | 39.3 | 12.0 | -6.5 | 2.6 | 4.0 |
| Cyprus | 40.7 | 37.2 | 22.1 | 31.1 | 39.1 | 29.7 | -9.6 | 1.9 | 7.6 |
| Latvia | 24.1 | 61.0 | 14.9 | 23.5 | 57.6 | 18.8 | -0.6 | -3.3 | 3.9 |
| Lithuania | 23.5 | 41.7 | 34.7 | 19.6 | 56.3 | 24.1 | -4.0 | 14.6 | -10.6 |
| Luxembourg | 38.5 | 44.8 | 16.7 | 38.7 | 38.6 | 22.7 | 0.2 | -6.2 | 6.0 |
| Hungary | 33.3 | 55.2 | 11.5 | 26.2 | 58.5 | 15.4 | -7.1 | 3.3 | 3.9 |
| Malta | 79.4 | 15.6 | 4.9 | 71.4 | 17.0 | 11.5 | -8.0 | 1.4 | 6.6 |
| Netherlands | 37.4 | 41.9 | 20.7 | 31.6 | 41.7 | 26.7 | -5.8 | -0.2 | 6.0 |
| Austria | 28.3 | 59.4 | 12.3 | 25.2 | 60.0 | 14.8 | -3.1 | 0.6 | 2.5 |
| Poland | 26.6 | 64.3 | 9.1 | 20.4 | 63.9 | 15.7 | -6.2 | -0.3 | 6.5 |
| Portugal | 79.0 | 13.4 | 7.6 | 71.3 | 16.7 | 12.0 | -7.7 | 3.3 | 4.4 |
| Romania | 35.9 | 56.7 | 7.4 | 30.9 | 59.1 | 9.9 | -5.0 | 2.4 | 2.6 |
| Slovenia | 29.4 | 57.8 | 12.8 | 22.2 | 59.3 | 18.5 | -7.2 | 1.5 | 5.7 |
| Slovakia | 22.1 | 69.7 | 8.2 | 18.4 | 69.7 | 11.9 | -3.7 | 0.0 | 3.7 |
| Finland | 30.8 | 41.6 | 27.5 | 25.6 | 44.9 | 29.5 | -5.2 | 3.2 | 2.0 |
| Sweden | 26.8 | 46.8 | 26.8 | 20.6 | 52.4 | 27.0 | -5.7 | 5.6 | 0.2 |
| United Kingdom | 35.5 | 39.2 | 25.3 | 27.8 | 44.1 | 28.2 | -7.7 | 4.8 | 2.9 |
| Iceland | 50.6 | 30.4 | 19.0 | 43.8 | 32.2 | 24.0 | -6.8 | 1.8 | 5.0 |
| Norway | 17.1 | 54.2 | 28.7 | 28.9 | 42.0 | 29.1 | 11.8 | -12.3 | 0.4 |

Source: Eurostat (LFS), database extraction: 1 July 2008

Table Ann B.7.2.: Labour force statistics by educational attainment of 15- to 24-year-olds (d) 2007

| EU country (2007) | | Low educational attainment level | | | Medium educational attainment level | | | High educational attainment level | | |
|-----------------------|--------------|----------------------------------|------------|--------------|-------------------------------------|------------|--------------|-----------------------------------|------------|--------------|
| | | Activity | Employment | Unemployment | Activity | Employment | Unemployment | Activity | Employment | Unemployment |
| EU average | EU-27 | 31.6 | 25.3 | 19.9 | 56.3 | 48.8 | 13.3 | 69.7 | 61.7 | 11.4 |
| Belgium | BE | 17.0 | 12.1 | 29.1 | 42.3 | 34.9 | 17.5 | 75.2 | 66.5 | 11.5 |
| Bulgaria | BG | 9.5 | 6.7 | 29.5 | 50.0 | 43.8 | 12.3 | 74.3 | 67.4 | : |
| Czech Republic | CZ | 6.5 | 4.4 | 31.2 | 53.9 | 49.2 | 8.6 | 53.7 | 48.9 | 8.8u |
| Denmark | DK | 65.4 | 59.6 | 8.8 | 82.3 | 77.5 | 5.8 | 82.8 | 76.8 | : |
| Germany | DE | 39.1 | 33.0 | 15.5 | 70.2 | 64.0 | 8.6 | 83.5 | 78.1 | : |
| Estonia | EE | 20.1 | 16.4 | : | 55.0 | 51.0 | : | 81.2u | 77.5u | : |
| Ireland | IE | 27.4 | 22.6 | 17.5 | 70.6 | 65.4 | 7.4 | 84.1 | 79.5 | 5.5u |
| Greece | EL | 21.5 | 17.6 | 17.8 | 34.7 | 26.5 | 23.7 | 83.2 | 56.6 | 32.0 |
| Spain | ES | 52.4 | 41.7 | 20.4 | 46.3 | 38.6 | 16.6 | 68.1 | 58.8 | 13.6 |
| France | FR | 23.5 | 16.5 | 29.9 | 49.2 | 41.5 | 15.6 | 56.0 | 49.2 | 12.1 |
| Italy | IT | 20.6 | 16.0 | 22.5 | 43.8 | 35.5 | 19.0 | 33.0 | 26.6 | 19.3 |
| Cyprus | CY | 18.3 | 16.1 | 12.3u | 53.3 | 48.5 | 9.0 | 83.8 | 74.9 | 10.7u |
| Latvia | LV | 21.7 | 18.1 | 16.8u | 63.2 | 57.2 | 9.4 | 85.5 | 81.8 | : |
| Lithuania | LT | 9.0 | 8.0 | : | 38.9 | 35.7 | 8.1u | 75.8 | 71.1 | : |
| Luxembourg | LU | 19.3 | 15.1 | 21.4u | 35.1 | 31.8 | : | 58.2u | 49.4u | : |
| Hungary | HU | 9.7 | 6.7 | 30.5 | 38.7 | 32.7 | 15.6 | 80.0 | 70.2 | 12.3u |
| Malta | MT | 47.4 | 39.4 | 16.9 | 57.9 | 53.0 | : | 83.0 | 76.4 | : |
| Netherlands | NL | 64.4 | 59.0 | 8.4 | 81.2 | 78.0 | 3.9 | 85.8 | 83.5 | : |
| Austria | AT | 46.7 | 40.9 | 12.4 | 74.6 | 70.0 | 6.2 | 81.3 | 73.0 | : |
| Poland | PL | 8.9 | 6.9 | 22.8 | 51.0 | 39.9 | 21.7 | 71.5 | 57.2 | 20.0 |
| Portugal | PT | 41.3 | 34.6 | 16.2 | 38.3 | 32.7 | 14.8 | 77.0 | 57.1 | 25.9 |
| Romania | RO | 20.2 | 16.5 | 18.6 | 40.3 | 31.8 | 21.0 | 80.4 | 63.4 | 21.1 |
| Slovenia | SI | 18.9 | 16.4 | 13.2u | 56.5 | 51.2 | 9.4 | 87.6 | 79.4u | : |
| Slovakia | SK | 7.2 | 2.5 | 66.2 | 56.4 | 47.8 | 15.3 | 76.5 | 62.0 | 19.0 |
| Finland | FI | 34.9 | 25.9 | 25.8 | 72.8 | 64.2 | 11.8 | 87.7 | 78.5 | : |
| Sweden | SE | 45.1 | 31.7 | 29.7 | 75.5 | 66.4 | 12.4 | 68.2 | 59.9 | 12.3 |
| United Kingdom | UK | 58.0 | 42.5 | 26.7 | 70.0 | 62.2 | 11.3 | 85.0 | 86.6 | 7.5 |

Source: Eurostat (LFS) , database extraction: 1 July 2008

Additional notes:

m: Missing or not available.

u: Unreliable data.

DE and FR: provisional data

(d) The indicators are based on the EU Labour Force Survey. The employment rate is the number of employed as a percentage of the corresponding age-group population. The activity rate is the number of persons who are in the labour force (i.e. are either employed or unemployed) as a percentage of the corresponding total population (the employed, the unemployed and the inactive) by single year of age or by age group. Persons are regarded as participating in the labour market if they were either employed or unemployed in the four weeks prior to being questioned in the Labour Force Survey (LFS). The unemployment rate is the number of unemployed as a percentage of the labour force (employed and unemployed). The unemployed are persons who: were without work during the reference period of the survey AND were available for work (i.e. could start a job within two weeks) AND had been actively seeking work during the past four weeks.

Table Ann B.7.3. Labour force statistics by educational attainment of 25- to 64-year-olds (d)

| EU country (2007) | Low educational attainment level | | | Medium educational attainment level | | | High educational attainment level | | |
|-----------------------|----------------------------------|------------|--------------|-------------------------------------|------------|--------------|-----------------------------------|------------|--------------|
| | Activity | Employment | Unemployment | Activity | Employment | Unemployment | Activity | Employment | Unemployment |
| EU average | 63.0 | 57.2 | 9.2 | 79.4 | 74.6 | 6.0 | 88.5 | 85.3 | 3.6 |
| Belgium | 56.2 | 49.8 | 11.3 | 79.1 | 74.2 | 6.2 | 87.8 | 84.9 | 3.3 |
| Bulgaria | 53.5 | 44.5 | 16.8 | 79.7 | 75.7 | 5.0 | 87.1 | 85.1 | 2.2 |
| Czech Rep | 56.4 | 45.7 | 19.1 | 79.5 | 76.1 | 4.3 | 86.6 | 85.2 | 1.5 |
| Denmark | 69.5 | 66.6 | 4.2 | 84.7 | 82.5 | 2.5 | 90.5 | 87.8 | 2.9 |
| Germany | 66.9 | 54.9 | 17.7 | 81.6 | 74.9 | 8.2 | 89.5 | 86.1 | 3.7 |
| Estonia | 62.1 | 56.7 | : | 83.2 | 79.4 | 4.6u | 89.5 | 87.4 | : |
| Ireland | 62.5 | 58.7 | 6.1 | 79.7 | 77.1 | 3.5 | 88.7 | 86.7 | 2.3 |
| Greece | 64.5 | 59.9 | 7.0 | 75.7 | 69.5 | 8.2 | 88.3 | 83.0 | 6.0 |
| Spain | 66.6 | 60.6 | 9.0 | 81.9 | 76.3 | 6.8 | 88.6 | 84.4 | 4.8 |
| France | 64.6 | 58.0 | 10.2 | 80.6 | 75.8 | 5.9 | 87.8 | 83.5 | 4.8 |
| Italy | 56.4 | 52.8 | 6.3 | 77.7 | 74.5 | 4.1 | 83.7 | 80.2 | 4.2 |
| Cyprus | 69.1 | 66.1 | 4.4 | 82.0 | 79.3 | 3.2 | 90.1 | 87.6 | 2.8 |
| Latvia | 65.5 | 59.7 | 8.8 | 82.2 | 77.7 | 5.4 | 90.7 | 87.3 | 3.7 |
| Lithuania | 52.8 | 49.1 | 6.9 | 79.6 | 75.8 | 4.8 | 91.1 | 89.4 | 1.8u |
| Luxembourg | 65.0 | 62.3 | 4.1 | 76.1 | 73.9 | 2.8u | 87.1 | 84.5 | 3.0u |
| Hungary | 45.8 | 38.5 | 16.0 | 74.6 | 70.2 | 5.9 | 82.5 | 80.4 | 2.6 |
| Malta | 52.2 | 48.8 | 6.6 | 84.3 | 82.3 | : | 88.9 | 87.9 | : |
| Netherlands | 64.5 | 61.9 | 4.0 | 82.5 | 80.3 | 2.7 | 89.3 | 87.7 | 1.8 |
| Austria | 62.5 | 57.9 | 7.4 | 79.5 | 76.9 | 3.3 | 88.9 | 86.8 | 2.4 |
| Poland | 48.6 | 41.0 | 15.5 | 71.5 | 65.2 | 8.7 | 87.8 | 84.5 | 3.8 |
| Portugal | 77.8 | 71.6 | 8.0 | 85.7 | 79.8 | 6.8 | 92.0 | 85.9 | 6.6 |
| Romania | 57.7 | 53.8 | 6.6 | 74.2 | 70.1 | 5.5 | 88.8 | 86.9 | 2.2 |
| Slovenia | 60.1 | 56.2 | 6.5u | 78.5 | 75.1 | 4.3 | 90.6 | 87.7 | 3.2 |
| Slovakia | 49.7 | 29.1 | 41.5 | 80.0 | 73.2 | 8.6 | 87.2 | 84.2 | 3.4 |
| Finland | 64.4 | 58.6 | 8.9 | 81.1 | 76.2 | 6.1 | 88.4 | 85.2 | 3.6 |
| Sweden | 71.5 | 66.6 | 7.0 | 86.8 | 83.1 | 4.2 | 91.6 | 88.5 | 3.4 |
| United Kingdom | 68.3 | 64.2 | 5.9 | 84.1 | 81.1 | 3.6 | 89.8 | 87.9 | 2.1 |

Source: Eurostat (LFS), database extraction: 1 July 2008

Additional note:

d: See definitions in Table Ann 8.2a.

m: Missing or not available.

p: Provisional data.

u: Unreliable data.

**Table Ann B.7.4: Schooling (d) and earning differentials (i)
in European countries in 2005 (p)**

Earning differentials (in percentages) for gross monthly income of individuals with 'High', respectively 'Low' level of education compared to income of individuals with 'Medium' level of education

| | EUR 21 | BE | BG | CZ | DK | DE | EE | IE | EL | ES | FR | IT | CY | LV | LT | LU | HU |
|-------------|--------|------|------|------|-----|------|------|------|------|------|------|----|------|----|------|------|------|
| Low | - 18 | - 15 | : | - 34 | - 9 | - 29 | - 17 | - 24 | : | : | - 8 | : | - 25 | : | - 14 | - 30 | - 22 |
| High | 44 | 28 | : | 54 | 25 | 37 | 43 | 45 | : | : | 50 | : | 45 | : | 69 | 56 | 85 |
| | MT | NL | AT | PL | PT | RO | SI | SK | FI | SE | UK | HR | MK | TR | IS | LI | NO |
| Low | : | - 16 | - 31 | - 26 | : | : | - 38 | - 25 | - 11 | - 16 | - 25 | : | : | : | - 17 | : | - 17 |
| High | : | 32 | 39 | 56 | : | : | 78 | 32 | 35 | 25 | 31 | : | : | : | 32 | : | 23 |

Source: CRELL estimates based on EU SILC data

(:) Not available, (d) See definitions, (i) See information notes, (p) Provisional data

(d) The 3 levels of educational attainment are based on ISCED levels, as follows: 'Low' includes ISCED levels 0 to 2 and 3C short, 'Medium' includes ISCED levels 3AB, 3C long and 4 and 'High' includes ISCED levels 5 and 6

(i) Schooling wage premium (Mincerian returns to schooling) for individuals aged 16 to 70 who were full time employed, worked at least 15 hours per week in the main job and whose gross earning during reference period was positive. Gross monthly income is computed as cash or near cash income received divided by the number of months worked full-time during the reference period.

Table Ann B.8.1: Public expenditure on education as a percentage of GDP in third countries
Public expenditure on all levels of education as a % of GDP

| | EU 27 | USA | Japan | China | India | Russian Fed. | Albania | Serbia* | Bosnia-Herzegovina | Ukraine | Rep. Of Moldova |
|-------------|---------|--------|--------|--------|---------|--------------|------------------|-----------|--------------------|-----------|-----------------|
| 2000 | : | 4.94 i | 3.82 i | : | 4.41 | 2.94 | : | 3.29 | : | 4.17 | 4.0 |
| 2004 | 5.07 e | 5.12 i | 3.62 i | : | 3.75 | 3.54 e | : | : | : | 5.31 | : |
| EU-Med* | Algeria | Egypt | Israel | Jordan | Lebanon | Morocco | Palestinian Aut. | Syrian AR | Tunisia | Libyan AJ | |
| 2000 | : | : | 7.01 | : | 2.0 | 6.40 | : | : | 6.85 e | : | |
| 2004 | : | : | 6.89 | : | 2.6 | 6.32 | : | : | 7.45 | : | |

Data source: UNESCO Institute for Statistics (UOE data collection)

(:) Missing or not available, (e) Estimated data, (i) See information notes

(*) Include data for Montenegro

(**) This group include 9 countries and territories which are part of the Euro-Mediterranean partnership (Algeria, Egypt, Israel, Jordan, Lebanon, Morocco, Palestinian Authority, Syrian Arab Republic, and Tunisia) and Libyan Arab Jamahiriya, which has an observer status

Additional notes:

US: Adjustment of GDP to the financial year that is running from 1st of July to 30th of June; expenditure on educational institutions from public sources

JP: Adjustment of GDP to the financial year that is running from 1st of April to 31st of March

Table Ann B.8.2: Private expenditure on educational institutions as a percentage of GDP in third countries
Expenditure on educational institutions (all levels of education) from private sources as a % of GDP (i)

| | EU 27 | USA | Japan | China | India | Russian Fed. | Albania | Serbia* | Bosnia and Herzegovina | Ukraine | Rep. of Moldova |
|-------------|---------|-------|--------|--------|---------|--------------|------------------|-----------|------------------------|-----------|-----------------|
| 2000 | : | 2.11 | 1.19 | : | 0.24 | : | : | : | : | : | 1.60 |
| 2004 | 0.63 e | 2.46 | 1.23 | : | 1.26 | : | : | : | : | : | : |
| EU-Med* | Algeria | Egypt | Israel | Jordan | Lebanon | Morocco | Palestinian Aut. | Syrian AR | Tunisia | Libyan AJ | |
| 2000 | : | : | 1.70 | : | : | : | : | : | : | : | |
| 2004 | : | : | 2.06 | : | : | : | : | : | : | : | |

Data source: UNESCO Institute for Statistics (UOE data collection)

(:) Missing or not available, (e) Estimated data, (i) See information notes

(*) Include data for Montenegro

(**) This group include 9 countries and territories which are part of the Euro-Mediterranean partnership (Algeria, Egypt, Israel, Jordan, Lebanon, Morocco, Palestinian Authority, Syrian Arab Republic, Tunisia) and Libyan Arab Jamahiriya, which has an observer status

Additional notes:

US: Adjustment of GDP to the financial year that is running from 1st of July to 30th of June; expenditure on educational institutions from public sources

JP: Adjustment of GDP to the financial year that is running from 1st of April to 31st of March

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| | Ms | Arlette | DELHAXHE | Eurydice European Unit |

NOTES

- ¹ Due to changes in the PISA tests, the number of test-items changes according to the focus areas of the surveys. In 2000 reading was the major domain. Reading will be the major domain in 2009 and hence provide more reliable estimates of trends compared to the results in 2000 than the results from 2003 and 2006.
- ² See the Joint Employment Report 2007/2008 and the Council Decision 2005/600/EC of 12 July 2005 on guidelines for the employment policies of the Member States.
- ³ The Eurostat Classification of Learning Activities is one of the tools required for key statistical measurement of lifelong learning issues intended to cover all types of learning opportunities and education and learning pathways. The classification is designed to serve as an instrument for compiling and presenting comparable statistics and indicators on learning activities both within individual countries and across countries. It was constructed to be applied to statistical surveys to collect quantitative information on different aspects of participation of individuals in learning. It covers all intentional and organised learning activities for all age groups. The definition of lifelong learning remains consistent with the ISCED where learning is understood to be “any improvement in behaviour, information, knowledge, understanding, attitude, value or skills”. While ISCED describes learning by the intended outcome, in the Classification the focus is on the activities of learning. (European Commission, 2006h) The Classification of Learning Activities has been originally designed to serve the scope of the European Union Adult Education Survey.
- ⁴ Caution is required when school life expectancy is used for inter-country comparison; neither the length of the school-year nor the quality of education is necessarily the same in each country.
- ⁵ This indicator refers to persons aged 25 to 64 who stated that they received education or training in the four weeks preceding the survey (numerator). The denominator consists of the total population of the same age group, excluding those who did not answer to the question 'participation to education and training'. Both the numerator and the denominator come from the EU Labour Force Survey. The information collected relates to all education or training whether or not relevant to the respondent's current or possible future job.
- ⁶ Data for 2003 are break in series for most of the countries as a result of changes in definitions. Also, from 2006 onwards, the calculations are made based on annual averages instead of one unique reference quarter. In most of the countries the annual and quarterly results are not significantly different.
- ⁷ See Chapter 4 on Key competences.
- ⁸ See chapter 8 on Employability.
- ⁹ See chapter 1 on Equity
- ¹⁰ Indicator: Percentage of those aged 22 who have successfully completed at least upper secondary education (ISCED level 3). For statistical reasons (the sample size in the Labour Force Survey for a one-year cohort is too small to produce reliable results) the following proxy indicator is used in the analysis: Percentage of those aged 20-24 who have successfully completed at least upper secondary education (ISCED level 3).
- ¹¹ Unless otherwise specified, the figures are derived from Eurydice (2005a).
- ¹² For an exhaustive description of the models currently adopted in Europe please see: Atkinson, M. et al (2005a).
- ¹³ I.e. the knowledge available at local level is relevant and substantially different from the information available at centralised level.
- ¹⁴ See Paletta & Vidoni 2006, partly derived from Bush, 2000.
- ¹⁵ The construct socioeconomic status (SES) is defined as the relative position of a family or individual in a hierarchical social structure, based on their access to, or control over, wealth, prestige and power (Mueller & Parcel, 1981). In many education and health surveys, it is operationalised as a composite measure built on the level of education of the parents, their income and occupational prestige (Dutton & Levine, 1989).

The aspect of family SES under analysis is the cultural capital which depends mostly on the highest level of education pursued within the family. The report on the project can be downloaded from: <http://crell.jrc.ec.europa.eu>.

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- ¹⁶ If this data are compared with those published by the PISA study it is important to note that EUROSTAT reports numbers of students on ISCED 1-4 while PISA only reports students aged 15 and definitions might vary slightly¹⁶. In general terms, there are no substantial differences, except in the case of the UK where PISA reports 98% of students in public schools while EUROSTAT reports only 59%; and Ireland, with 40% in PISA and 99% in EUROSTAT (Ireland reports catholic schools that are publicly financed as public).
- ¹⁷ Teachers' professional development is among the sixteen core-indicators adopted by the Council for monitoring progress. Presently, an international survey is on-going (the OECD/TALIS survey that will provide the necessary data. (See Part C of below).
- ¹⁸ Common European Principles for Teacher Competences and Qualifications:
http://ec.europa.eu/education/policies/2010/doc/principles_en.pdf
- 2006 Joint Interim Report of the Council and the Commission on progress under the Education and Training 2010 work programme (2006/C 79/01), p. 8.
- Conclusions of the Council and the Representatives of the Governments of the Member States, meeting within the Council, on efficiency and equity in European education and training systems (2006/C 298/03), p. 2.
- ¹⁹ The question was: "In your school, how many computers are used for educational purposes for pupils, either to use alone or with a teacher? Please do not include computers that are only accessible to teachers or staff members." Indicator: % of schools answering "1" or more to Q6. Source: Empirica: LearnInd 2006 (HTS).
- ²⁰ For Portugal education expenditure at local government is not included in the data, this affects mainly primary education and can hence distort the difference between spending on primary and on secondary level
- ²¹ ISCED 5A includes programmes which are theoretically based/research preparatory (history, philosophy, mathematics, etc.) or giving access to professions with high skills requirements (e.g. medicine, dentistry, architecture, etc.), while 5B are programmes which are practical/technical/occupationally specific. (See UNESCO International Standard Classification of Education ISCED 1997)
- ²² This indicator is based on the UOE data collection. In some countries the differences in coverage between the two data sources (UOE and LFS) can be sizeable for the completion of upper secondary education. Starting with 2006, Eurostat implements a refined definition of the educational attainment level 'upper secondary' in order to increase the comparability of results in the EU.
- ²³ It should be noted that much of this reduction comes from the reduced figures for the UK from a share of 67.3% in 2000 to 41.7% in 2006. This represents a reduction of 2.5 million students. The data should be interpreted with caution since there is a break in the series.
- ²⁴ ISCED 3 corresponds to the final stage of secondary education in most EU countries. The entrance age to this level is typically 15 or 16 years and the typical duration of programmes range from 2 to 5 years of schooling. The ISCED level 3 programmes are sub-classified according to the destination for which the programmes have been designed to prepare pupils.
- ²⁵ Discrimination in vocational training is already covered and forbidden by Directive 2000/78/EC establishing a general framework for equal treatment in employment and occupation.
- ²⁶ Programme for International Student Assessment-PISA (OECD) and Trends in International Mathematics and Science Study-TIMSS (IEA)
- ²⁷ Source: OECD PISA 2003 database, Table C1.3. PISA presents data for countries with more than 3% of students in the aggregated category of pre-vocational and vocational programmes.
- ²⁸ Systems where class-based and work-based training are provided in parallel are known as "dual" systems. In a "dual" system framework-typical of Austria, Denmark, Germany and more recently Norway-youths spend some time in educational institutions and the remainder at the workplace. Apprenticeships are then part of the formal educational structure, and are usually entered into after completion of compulsory education. They involve an employment relationship *plus* formal schooling-normally one and a half to two days per week-over a period of three or sometimes four years. At the end of the programme, apprentices graduate through a final examination in which they have to prove their theoretical and practical grasp of the occupation concerned.
- ²⁹ <http://ec.europa.eu/education/policies/educ/bologna/bologna.pdf>

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- ³⁰ <http://register.consilium.europa.eu/pdf/en/07st16/st16096re01.en07.pdf>
- ³¹ See the annex for a more detailed presentation of the weights and indicators.
- ³² Defined here as full members of the European University Association (EUA), i.e; institutions that awarded at least one doctorate in the three years prior to becoming a member of the EUA.
- ³³ It must be remembered, however, that the definition of university differs between countries. The comparability of statistics on the number of institutions is therefore limited.
- ³⁴ The faculty/student ratio in the *WUR* ranking is a proxy for teaching quality.
- ³⁵ In addition, in the context of a pilot funded by the European Commission, to design an international system for the comparison of the quality of institutions and programmes in higher education, the CHE approach is currently examining the Dutch and Flemish university system.
- ³⁶ Every year, one third of the entire subject range is analysed. See <http://www.daad.de/deutschland/hochschulen/hochschulranking/06543.en.html> for further details. Recently, the CHE has created a « Ranking of Excellent European Graduates Programmes » in the field of mathematics, biology, chemistry and physics which looks at excellence throughout the whole of Europe. See <http://www.che-ranking.de/cms/?getObject=487&getName=CHE-ExcellenceRanking+english&getLang=de> for additional details.
- ³⁷ Indicator: *Total number of tertiary (ISCED level 5A, 5B and 6) graduates in mathematics, science and technology. MST includes life sciences, physical sciences, mathematics and statistics, computing, engineering and engineering trades, manufacturing and processing, architecture and building.*
- ³⁸ For example, the Socrates Action 6 project “GRID - Growing Interest in the Development of Teaching Science (2006)”, coordinated by the Pôle universitaire européen de Lorraine.
- ³⁹ Eurostat estimates.
- ⁴⁰ “The transnational mobility of people contributes to enriching different national cultures and enables those concerned to enhance their own cultural and professional knowledge and European society as a whole to benefit from those effects.” Recommendation, 10 July 2001.
- ⁴¹ The UNESCO-UIS/OECD/EUROSTAT data collection on education statistics.
- ⁴² For a comprehensive overview of the present state of mobility statistics see “European Parliament Statistics on Student Mobility within the European Union.” Final report to the European Parliament prepared by Kassel University, October 2002.
- ⁴³ The above-mentioned study estimated that non-mobile students with foreign citizenship make up between 18.3% and over 50% of all students with foreign citizenship.
- ⁴⁴ The proportion of students with home citizenship among mobile students ranges from over 5% to almost 17%.
- ⁴⁵ The term “degree” is used in a wide sense and may refer to a degree, certificate, diploma or other qualification.
- ⁴⁶ This is based on the 18 Member States where the figures in 2000 and 2006 are comparable, viz. Belgium, Bulgaria, the Czech Republic, Denmark, Germany, Ireland, Greece, Spain, France, Italy, Latvia, Hungary, Austria, Poland, Portugal, Romania, Finland, Sweden.
- ⁴⁷ No data for the US in 2006, but an increase from 17.9 in 2000 to 19.4 in 2003.
- ⁴⁸ This is calculated for the 17 Member States for which data are available for both years, viz. Belgium, the Czech Republic, Denmark, Germany, Ireland, Greece, Spain, France, Italy, Luxembourg, Netherlands, Austria, Poland, Portugal, Slovakia, Finland and Sweden.
- ⁴⁹ This includes main computer applications such as word processing, spreadsheets, databases, information storage and management and an understanding of the opportunities and potential risks of the internet and communication via electronic media for work, leisure, information sharing and collaborative networking, learning and research. Individuals should understand how ICT can support creativity and innovation and be aware of issues concerning the validity and reliability of the information available and the legal and ethical principles involved in interactive use of ICT.
- ⁵⁰ For further explanation of the working model of measuring active citizenship refer to Hoskins, 2008.

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- ⁵¹ The IEA carried out another study on 16-21 year olds but this is not used as the data is regarded by IEA as non comparable.
- ⁵² For details on the Factor analysis and the results please see the report (Hoskins 2006a).
- ⁵³ For more details on the four-dimension framework and the limitations of the existing data refer to the CRELL report online :
http://crell.jrc.ec.europa.eu/Publications/CRELL%20Research%20Papers/BryonyCCI_JRC42904_final.pdf
- ⁵⁴ For an explanation of these results see Hoskins et al., 2006b. See also van Deth, Montro and Westholm 2007.
- ⁵⁵ Composite indicators are often highly complex and are sometimes contested. In-depth and qualitative and statistical analysis of the results is needed.
- ⁵⁶ The denominator consists of the total population of the same age group, excluding no answers to the questions “highest level of education or training attained” and “participation in education and training”. In this indicator, a very low level of upper secondary education (ISCED 3C short courses) is taken to mean a level which is not sufficient for full participation in the knowledge based economy. However, the ratio of 18 to 24 years old with this qualification in the EU is very low: non-existent in some countries and no higher than 2% in the EU as a whole. The numerators and the denominators both come from the EU Labour Force Survey.
- ⁵⁷ Data for Slovenia are unreliable because of the small sample size.
- ⁵⁸ Peer learning activities are organised by the European Commission in selected areas within the Education and Training 2010 programme. From 2006 on, site visits within this cluster were organised in Belgium, Ireland and Hungary.
- ⁵⁹ Nationality is interpreted as citizenship. Citizenship is defined as the particular legal bond between an individual and his/her State acquired by birth or naturalisation, whether by declaration, option, marriage or other means according to national legislation. It corresponds to the country issuing the passport. For persons with dual or multiple citizenship who hold the citizenship of the country of residence, that citizenship should be coded. The variable about nationality takes into account own-country national, a person from another EU15 country or a person from a non-EU15 country. The comparability of the data is limited because this variable is linked to the Member State’s specific laws on naturalisation.
- ⁶⁰ See http://www.standaardsite.nl/createsite/page/createpage.asp?b_id=13758&pg=9
- ⁶¹ See <http://www.acceleratedschools.net/>
- ⁶² See http://www.uscharterschools.org/pub/uscs_docs/index.htm
- ⁶³ See http://www.ssb.no/english/subjects/04/02/30/vgogjen_en/fig-2007-09-20-01-en.html
- ⁶⁴ The Learning County: Vision into Action. Department for Education, Lifelong Learning and Skills.
- ⁶⁵ The USA has a longer tradition of and more comprehensive approach to measuring dropouts using several types of rate. The “status dropout” rate is a cumulative rate that estimates the proportion of young adults aged 16 to 24 in the civilian, non-institutionalised population who are dropouts (i.e. who are not enrolled in a high school programme and have not received a high school diploma or obtained an equivalent certificate), regardless of when they dropped out. The “event dropout” rate measures the number of “new” dropouts in a given year, i.e. the percentage of young people aged 15-24 who dropped out of grades 10 and 12 in the previous year. The “cohort dropout” rate measures what happens over time for a particular cohort of pupils sharing similar characteristics. Combining these measurements yields a more robust understanding of the situation with early school leaving. The limitations of one indicator are counterbalanced by the advantages of another.
- ⁶⁶ Using data from the Current Population Survey (CPS), a US household survey similar to the EU's LFS, status dropout rates show the percentage of young people aged 16-24 who are not in school and who have not gained any high school credential (either diploma or equivalent credential such as a General Educational Development certificate). That means that not only the age groups observed are different (18-24 for the EU and 16-24 for the USA), but also the definition (participation in formal, non-formal and informal education in the EU in contrast to only formal education in the US definition).
- ⁶⁷ <http://www.un.org/disabilities/countries.asp?navid=17&pid=16>
- ⁶⁸ See information on methodological difficulties of this approach in Annex

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- ⁶⁹ Additional resources are those made available over and above the resources generally available to pupils regardless of the needs of pupils likely to have particular difficulties with access to the standard curriculum. Resources can be of many different kinds, including personnel (e.g. additional teachers), material (e.g. hearing aids, Braille or conversion of classrooms) and financial (e.g. favourable funding formulae) OECD (2004). *Equity in Education — Students with Disabilities, Difficulties, and Disadvantages: Statistics and Indicators*. Paris.
- ⁷⁰ Segregation refers to education where the pupil with special needs follows education in separate special classes or special schools for the largest part (80% or more) of the school day.
- ⁷¹ Data are collected and published by the Agency according to their date of collection and refer to a period longer than one year. As of April 2008 confirmed data were available from Austria, Cyprus, Czech Republic, Denmark, Estonia, Finland, France, Germany, Greece, Hungary, Italy, Latvia, Lithuania, Malta, Norway, Poland, Portugal, Slovenia, Spain, Sweden, Switzerland, UK (England) and UK (Scotland). All information in this report is based on this confirmed data. It might be that data from some other countries will be available for later drafts of this report.
- ⁷² 2006 data covered 28 countries, but not Slovenia or the UK (Scotland).
- ⁷³ For all calculations, percentages are calculated against the total number of pupils in compulsory education. Raw data are available in the Agency publication *SEN Data 2008* (in press).
- ⁷⁴ See also Soriano, V. (Editor) (2002) *Transition from School to Employment. Main problems, issues and options faced by students with special educational needs in 16 European countries*. Middelfart: European Agency for Development in Special Needs Education
- ⁷⁵ The percentage of pupils in compulsory education who are taught in segregated settings because of their special education needs is calculated as a percentage of the total compulsory school-age population. The data show public and private grant-aided provision but exclude pupils educated in private non-grant-aided schools. This indicator takes two reference periods. Although national definitions of segregated setting may differ; the definition applied here is that the student spends most of the school week in a non-mainstream (separate) school or class.
- ⁷⁶ Additional resources are those made available over and above the resources generally available to pupils regardless of the needs of pupils likely to have particular difficulties with access to the standard curriculum. Resources can be of many different kinds, including personnel (e.g. additional teachers), material (e.g. hearing aids, Braille or conversion of classrooms) and financial (e.g. favourable funding formulae) OECD (2004). *Equity in Education — Students with Disabilities, Difficulties, and Disadvantages: Statistics and Indicators*. Paris.
- ⁷⁷ Pupils with disabilities or impairments viewed in medical terms as organic disorders attributable to organic pathologies (e.g. related to sensory, motor or neurological defects). OECD (2005). *Students with Disabilities, Difficulties and Disadvantages: Statistics and Indicators*. Paris.
- ⁷⁸ For the definition of dropouts in the USA see footnote 27.
- ⁷⁹ Heckman, Friedrich (2008) *Integration and Migration. Strategies for integrating migrant children in European schools and societies*, prepared for the Commission, are presented here.
- ⁸⁰ Bundesministerium für Arbeit und Soziales 2007a: *Nationaler Integrationsplan. Arbeitsgruppe 3, Dokumentation des Beratungsprozesses*. CD Berlin
- ⁸¹ European Monitoring Centre on Racism and Xenophobia (EUMC) 2004: *Migrants, Minorities and Education. Documenting Discrimination and Integration in 15 Member States of the European Union*. Luxembourg
- ⁸² See more information on participation in pre-primary education in the 2007 Progress report.
- ⁸³ Ibid
- ⁸⁴ See more in the 2007 Progress report.
- ⁸⁵ For an analysis of school to work transition patterns please see European Commission, 2007k.
- ⁸⁶ According to the projections, which are based on current policies, the overall employment rate of the EU-25 would rise from 63% in 2004 to 67% in 2010 and to 70% in 2020
- ⁸⁷ The description of the graphical display is from the same publication

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- ⁸⁸ The graphical display and the analysis illustrate the overall European situation. However, there are clear country differences in terms of when the distinct phases will materialise depending on historic development in fertility rates and migration. For the specific national situation, see Europe's demographic future (op.cit.)
- ⁸⁹ The 3 levels of educational attainment are based on ISCED levels, as follows: 'Low' includes ISCED levels 0 to 2 and 3C short, 'Medium' includes ISCED levels 3A and B, 3C long and 4 and 'High' includes ISCED levels 5 and 6.
- ⁹⁰ Two issues should be underlined: 1. educational attainment is solely an attainment measure. It does not consider possible differences in the quality of the skills and knowledge across countries with similar attainment levels. 2. The age group 15-64 has been selected to ensure correspondence with labour market statistics where employment and un-employment figures are based on this age-span. It is obvious that this age-span implies an over-representation of the low skilled. In most countries people do not reach their final educational attainment level before in the beginning of the twenties (or even mid to late twenties).
- ⁹¹ See also European Economy 2006 –chapter 4 for a full exposition of these arguments.
- ⁹² Please note that educational attainment is computed for 25-64 year olds.
- ⁹³ Education is also associated with other benefits like its impact on health, civic participation and well-being of individuals (cf. McMahon 2004). A positive association was found between education and health-related behaviour, diet habits and job satisfaction (cf. Blanchflower and Oswald 2004).
- ⁹⁴ Individual salaries can largely depend on other labour market factors and different institutional arrangements (for details see Card, 1999). The measurement limitations can also influence the results when using this indicator to search for evidences of higher returns from education.
- ⁹⁵ The presidency conclusions of the European Council meeting on 13/14 March 2008 invites the Commission to present a comprehensive assessment of future skills requirement in Europe up to 2020.
- ⁹⁶ Cedefop is the European Centre for the Development of Vocational Training www.cedefop.europa.eu
- ⁹⁷ See also Levy, F. and R. J. Murnane, 2005a", which presents a theoretical framework for understanding changes to skill demands.
- ⁹⁸ Data source: UNESCO Institute for Statistics (UOE data collection)
- ⁹⁹ For details see OECD (2007) and CRELL (2007)
- ¹⁰⁰ In the field of public finance one distinguishes between efficiency and effectiveness whereas overall efficiency consists of technical and allocative efficiency.
- ¹⁰¹ The United Kingdom is one of the front-runners in implementing the output-based approach, a direct measure of education output introduced in 1998. The current measure reflects pupil attendance (rather than number of pupils) and adjustments based on past trends in exam results (*Atkinson Review*, 2005).
- ¹⁰² **PIRLS** (Progress in International Reading Literacy Study) is an international study conducted by the International Association for Evaluation of Educational Achievement (IEA) to monitor, on a regular basis and within an internationally agreed common framework, the outcomes of education systems in terms of student achievement for different school grades. **PISA** (Programme for International Student Assessment) is an international study conducted by the OECD to monitor, on a regular basis and within an internationally agreed common framework, the outcomes of education systems in terms of student achievement for students aged 15 years old.
- ¹⁰³ The indicator is available on a regular basis for some countries (see *Education at a Glance*, [Indicator A9](#))
- ¹⁰⁴ Data envelopment analysis (DEA) constructs an efficiency frontier which, by assumption, determines best practice based on country data. The potential efficiency gains for specific countries are measured by their position relative to this frontier.
- ¹⁰⁵ See Hanushek (2003) for an overview, Wößmann (2005) for cross-country evidence; and Gundlach *et al.* (2001) for evidence over time from European countries.
- ¹⁰⁶ Empirical evidences shows that pupils' socio-economic background could also be related to efficiency. Hanushek and Kimko (2000), Hanushek and Luque (2003), Afonso and St. Aubyn (2005), Haveman and Wolfe (2005) found that adult schooling attainment levels have a positive and significant effect on student performance. OECD (2007) and Wößmann (2005) shows that institutional settings influence the efficiency of

education spending while Wilson (2005) demonstrates that inefficiencies in transition economies might result from managerial ineptitudes or from other constraints outside the authorities' direct control.

¹⁰⁷ The boundaries between public and private sector at the national level could suggest a rather misleading picture for cross-country investigations; certain data about the private spending is not always available.

¹⁰⁸ [Commission Regulation \(EC\) No 102/2007](#) of 2 February 2007 adopting the specifications of the 2008 ad hoc module on the labour market situation of migrants and their immediate descendants, as provided for by Council Regulations (EC) No 577/98 and amending Regulation (EC) No 430/2005 (OJ No L 28/3) [Commission Regulation \(EC\) No 207/2008](#) of 5 March 2008 adopting the specifications of the 2009 ad hoc module on the entry of young people into the labour market provided for by Council Regulation (EC) No 577/98 (OJ No L 62/4)

¹⁰⁹ “SurveyLang” consortium is composed of the following partners: University of Cambridge ESOL Examinations – coordinator, Centre International d'Etudes Pédagogiques (CIEP), Goethe-Institut, Instituto Cervantes, National Institute for Educational Measurement (CITO), Gallup, Universidad de Salamanca and Università per Stranieri di Perugia.

¹¹⁰ Belgium, Czech Republic, Denmark, Estonia, Germany, France, Ireland, Italy, the Netherlands, Austria, Poland, Slovakia, Portugal, Finland, Sweden, the UK and Norway.

