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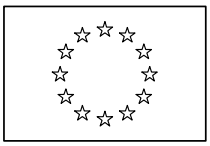

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Progress towards the Lisbon objectives in education and training

Indicators and benchmarks
2009

Preface

"Progress towards the Lisbon objectives in education and training" is the 6th annual report examining performance and progress under the Education and Training 2010 Work Programme.

The purpose of this report is to inform and provide strategic guidance for education policy co-operation at European level. The report sets out progress towards the objectives agreed by the Council. It provides an evidence-base of indicators, benchmarks and research results which supports *the Education and Training 2010 work programme* launched in 2001 and its follow-up, *the strategic framework for European cooperation in education and training* adopted by the Council in May 2009. The Progress Reports for 2004, 2005, 2006, 2007 and 2008 were able to give 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, 2008 and 2009 Reports have used this tool of core indicators.

Reflecting the strategic framework for European cooperation in education and training adopted by the Council in May 2009, the report is structured in four chapters in the line with the four strategic objectives of the framework, as follows:

1. Making lifelong learning and mobility a reality;
2. Improving the quality and efficiency of education and training;
3. Promoting equity, social cohesion and active citizenship;
4. Enhancing creativity and innovation, including entrepreneurship, at all levels of education and training.

The Report analyses performance and progress of education systems in EU member states (27), candidate countries (3) and associated countries (3) and how they contribute towards meeting Europe's Lisbon objectives.

World reference levels of performance are found within some areas of education and training in Europe. At the same time, many Member States are challenged in particular fields. The report demonstrates that good performance and progress can be found in member states throughout Europe. Hence it supports the exchange of information and experiences on good policy practice allowing member states to learn from each other. The analysis highlights the scope for completing the current European framework of indicators and benchmarks further enhancing the evidence base for policy making.

Content list

TEN MAIN MESSAGES OF THE REPORT (2009)

1. **Since 2000, educational performance has improved considerably in most areas identified by European Education ministers as central for achieving the Lisbon goal. However, the 2010 benchmarks for education and training set by the Council are not likely to be achieved, apart from the benchmark on increasing the number of math, science and technology graduates**.

2. **Young people stay still longer in education.** Expected time in education for young people is increasing in all countries. In Finland the average is now more than 20 years. The present economic crisis could reinforce this trend.

3. **The share of low achievers in reading literacy among pupils in secondary education in the EU is increasing.** From 2000 to 2006 the proportion of low performers in reading literacy aged 15 increased from 21.3% to 24.1%. This should be seen against a benchmark for 2010 which anticipates a significant reduction of 20%.

4. **Participation in lifelong learning is becoming a reality for the majority of people in a number of European countries** (DK, SE, IS, followed by FI, UK and NL) - and progress can be observed in almost all countries (4-64 years olds).

5. **Educational attainment levels of the adult population have improved considerably since 2000** – One out of four of the adult population in the EU have high educational attainment, but this is far behind the performance of both the US and Japan (40%). Only Finland and Norway have high education attainment rates above 35%. Moreover, the number of people with low educational attainment has fallen by approximately 1.5 million per year since 2000. Nevertheless, it still **accounts for 77 million adults or close to 30 %.**

6. **While there has been an increase in investment per student in higher education in almost all countries since 2000, the EU member states would need to invest on average over 10 000 euro more per student per year in higher education to reach the levels of the US (almost 200 billion euro more a year)**. The difference is mainly due to very high levels of private investment in higher education institutions in the US.

7. **More than half a million EU students study abroad,** an increase of about 50% since 2000. Three out of four of these study in another EU country.

8. **Professional development is a feature of the lives of the vast majority of teachers. Nine out of ten teachers take part in professional development and more than half demands more professional development than they received.** The areas for which teachers express greatest need for development are: “Teaching special learning needs students”, “ICT teaching skills” and “Student discipline and behaviour”. This should be seen in the context of an **ageing teaching profession where one third of the 6 million teachers in the EU are over 50. Women count for 70% of the teacher profession.**

9. **Early teaching of foreign language is advancing in Europe**. In lower secondary education, earlier teaching of English is becoming widespread. Moreover, the number of foreign languages taught per pupil in upper secondary school education has progressed since 2000 (from 1.2 to 1.6).

10. **The three Nordic countries (SE, FI, DK), Germany, and the UK are the highest innovation performers as measured by the European Innovation Scoreboard. A strong concentration of the “creative class” with high educational attainment in and around capital cities contributes to the performance**. A process of convergence of innovation performance in the EU can be observed between the low performers (RO, LV, BG, TR) and the high performing countries.

Introduction

1. Introduction

Education and training have an important place in the 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. This has been done through *the Education and Training 2010 work programme* launched in 2001 and its follow-up, *the strategic framework for European cooperation in education and training* (ET 2020) adopted by the Council in May 2009[1]. Member States are supported in achieving these objectives through the open method of coordination, which uses indicators and benchmarks to inform 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.

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 almost all these areas, new surveys are being prepared or presently carried out.

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.

In order to guide progress on achieving the objectives set for education and training systems of the EU, the Council adopted in May 2003 five benchmarks to be achieved by 2010[2] and in May 2009, five benchmarks for 2020[3] .

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.

Five EU benchmarks for 2020

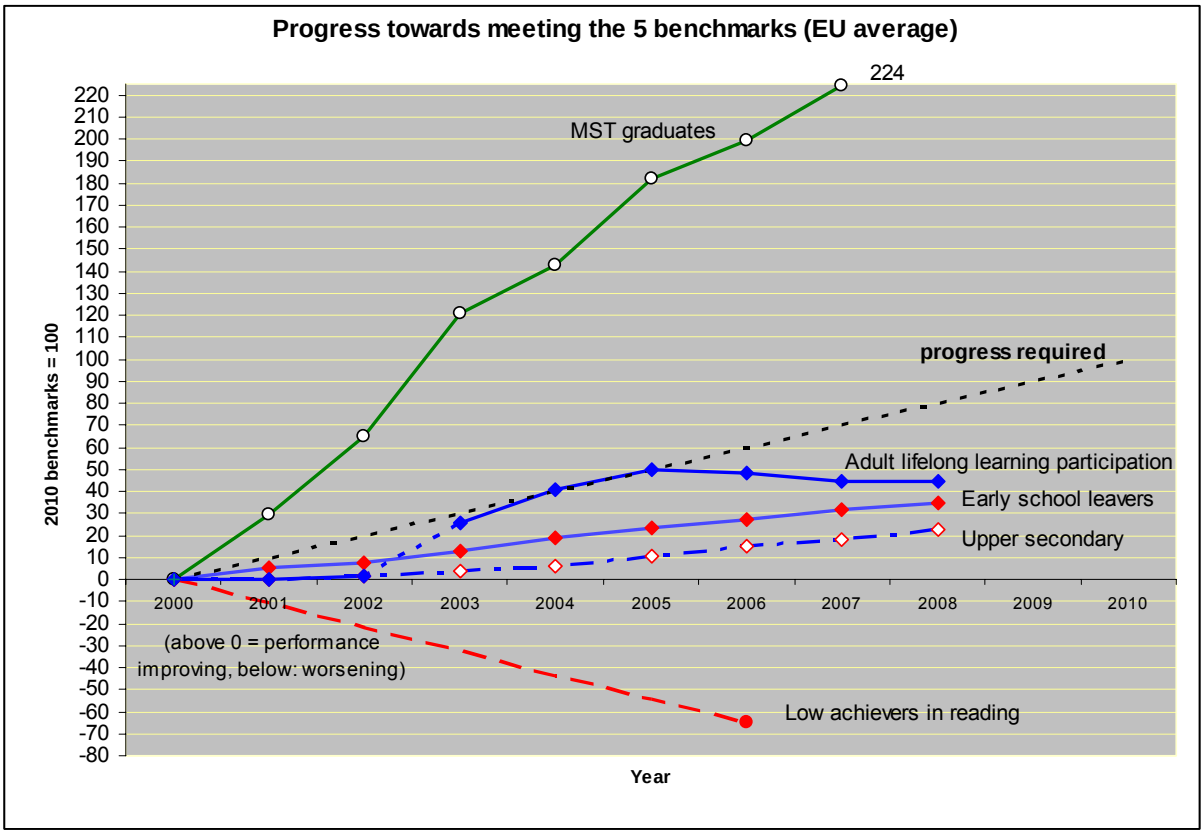
- at least 95% of children between 4 years old and the age for starting compulsory primary education should participate in early childhood education
- the share of early leavers from education and training should be less than 10%
- the share of low-achieving 15-years olds in reading, mathematics and science should be less than 15%.
- the share of 30-34 year olds with tertiary educational attainment should be at least 40%
- an average of at least 15 % of adults should participate in lifelong learning

2. Conclusions on progress towards the 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 before 2005. In the period 2000-2007 growth in the number of new maths, science and technology graduates was more than twice the level needed to meet the benchmark.

Although there was broad progress of performance, the benchmarks on early school leaving, completion of upper secondary education and lifelong learning are with the current trends not likely to be reached by 2010. Attaining these benchmarks will in many countries demand more effective national initiatives. In the period 2000-2006 performance even deteriorated for reading literacy of young people.

Chart Int.2.1: Progress towards meeting the five benchmarks for 2010 (2000-2008)



Source: European Commission DG Education and Culture

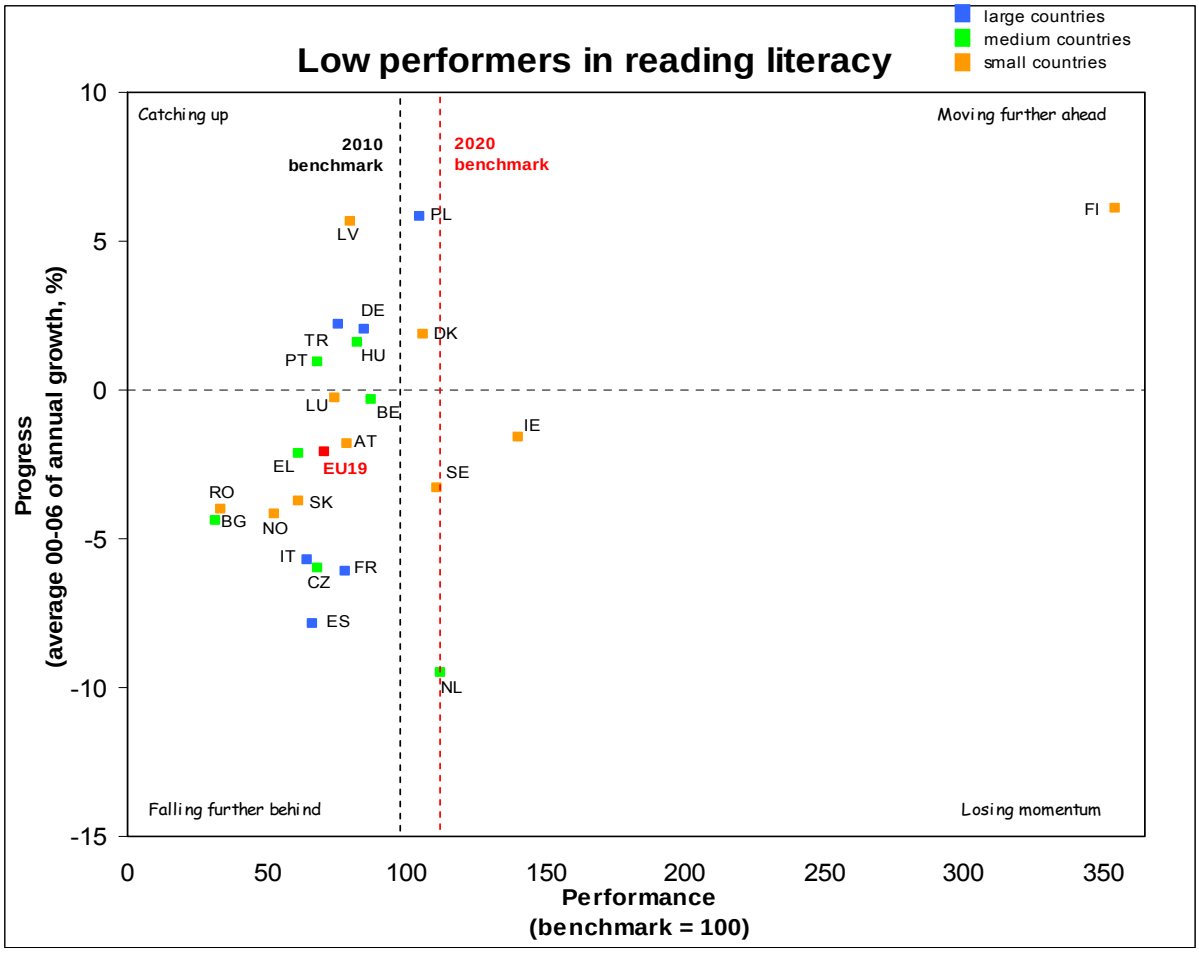
In this chart the starting point (in 2000) is set at zero and the 2020 benchmark at 100. The results achieved each year are measured against the 2020 benchmark (= 100). The diagonal line shows the progress required, i.e. an additional 1/20 (5%) of progress towards the benchmark has to be achieved each 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 extend the observed differences are indicative of longer-term trends

2.1. Country performance and progress in the areas of European benchmarks.

A more detailed analysis of the benchmark areas is provided in Charts Int.2.2 to 2.6 looking into the question on national performance and progress within each of the five benchmark areas for 2010. In the case of the benchmark on low performers in reading literacy (the rate to be reduced by at least 20% by 2010, Chart Int.2.2).), one observes that most countries are above that level, and have a higher rate of low achievers among young people than targeted This is however not the case of Ireland, and especially Finland which have a very high performance in the field. Poland, Denmark, Sweden and the Netherlands have performance levels near, but below, the 2010 benchmark. Sweden and especially the Netherlands have not progressed further between 2000 and 2006.

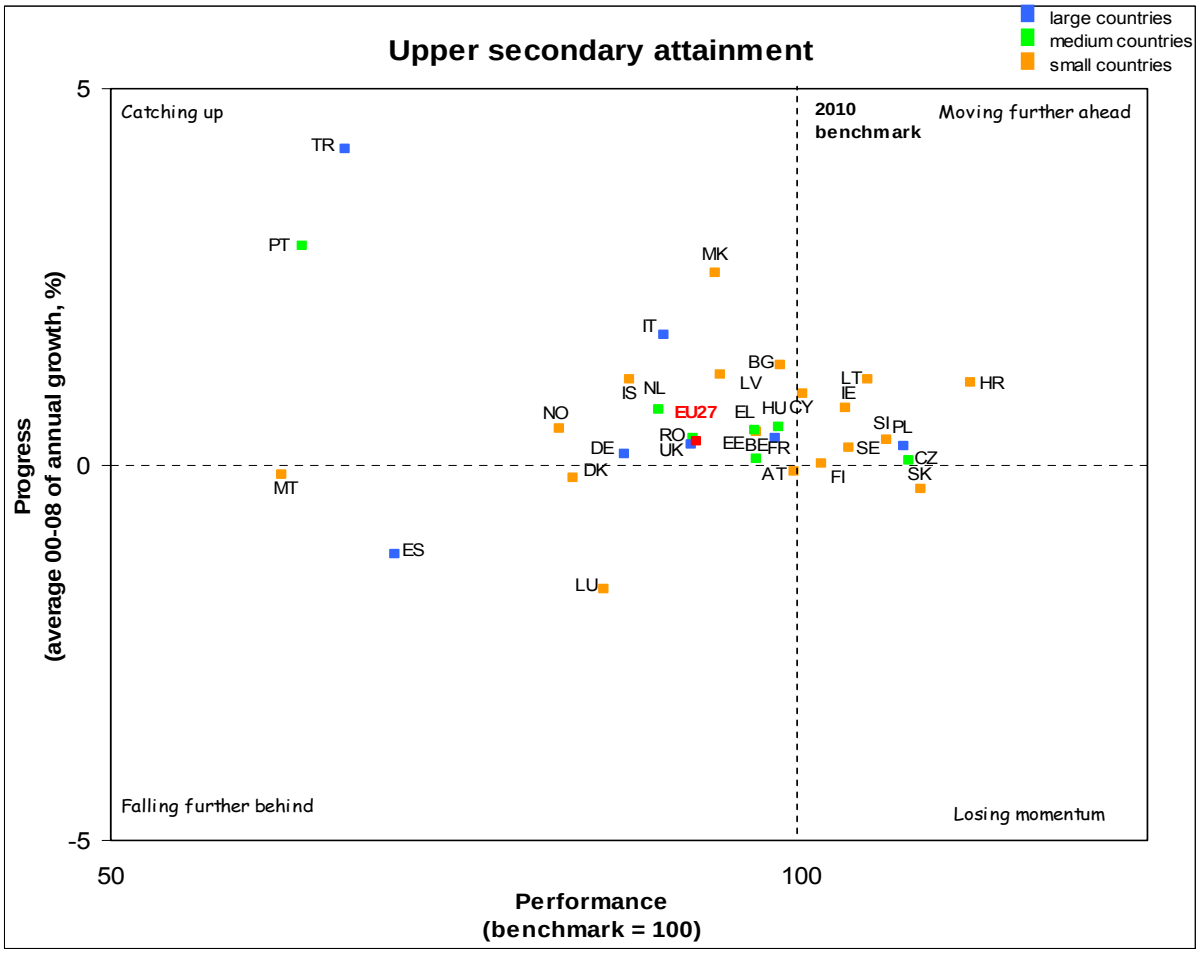
Chart Int. 2.2
Benchmark 2010: Low Performers in reading literacy (2000-2006)



Source: European Commission DG JRC/Crell

Looking at performance and progress on the Upper secondary attainment benchmark (85% of completion by 2010), (Chart Int.2.3) Luxembourg and Spain are losing momentum with decrease in performance while still relatively far from the benchmark level. Croatia is showing the strongest performance, while Turkey and Portugal are progressing notably, even though both are quite far from the benchmark level. Most large countries, with the exception of Poland, have low level of completion rates which has a significant impact on reaching the EU benchmark.

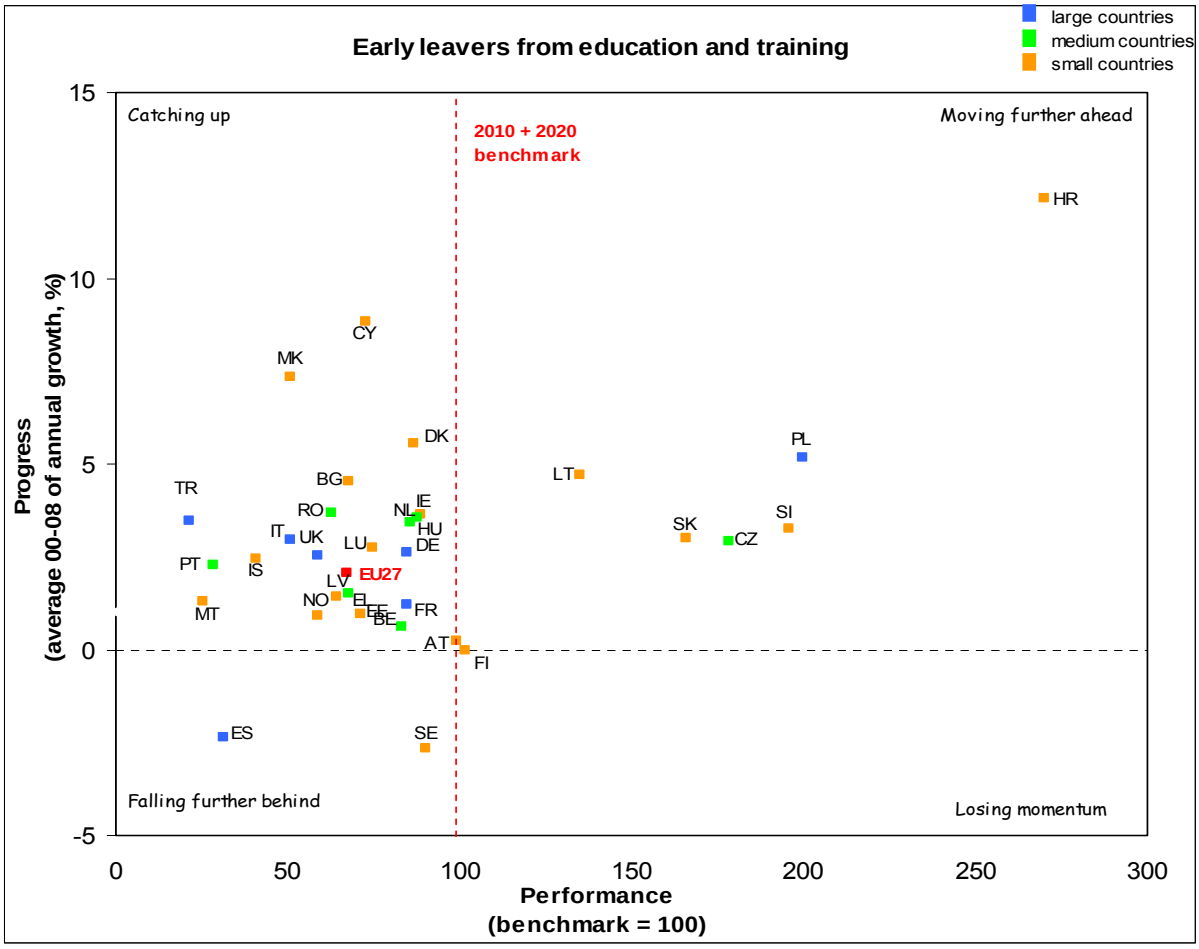
Chart Int. 2.3
Benchmark 2010: Upper Secondary Attainment (2000-2008)



Source: European Commission DG JRC/Crell

When it comes to the benchmark of Early leavers from education and training, of less than 10% of young people by 2010 (Chart Int. 2.4) one notices that significant progress has been made by many countries and especially by Croatia, Poland, Slovenia, the Czech Republic, Slovakia and Lithuania, all of which already perform below the benchmark level.

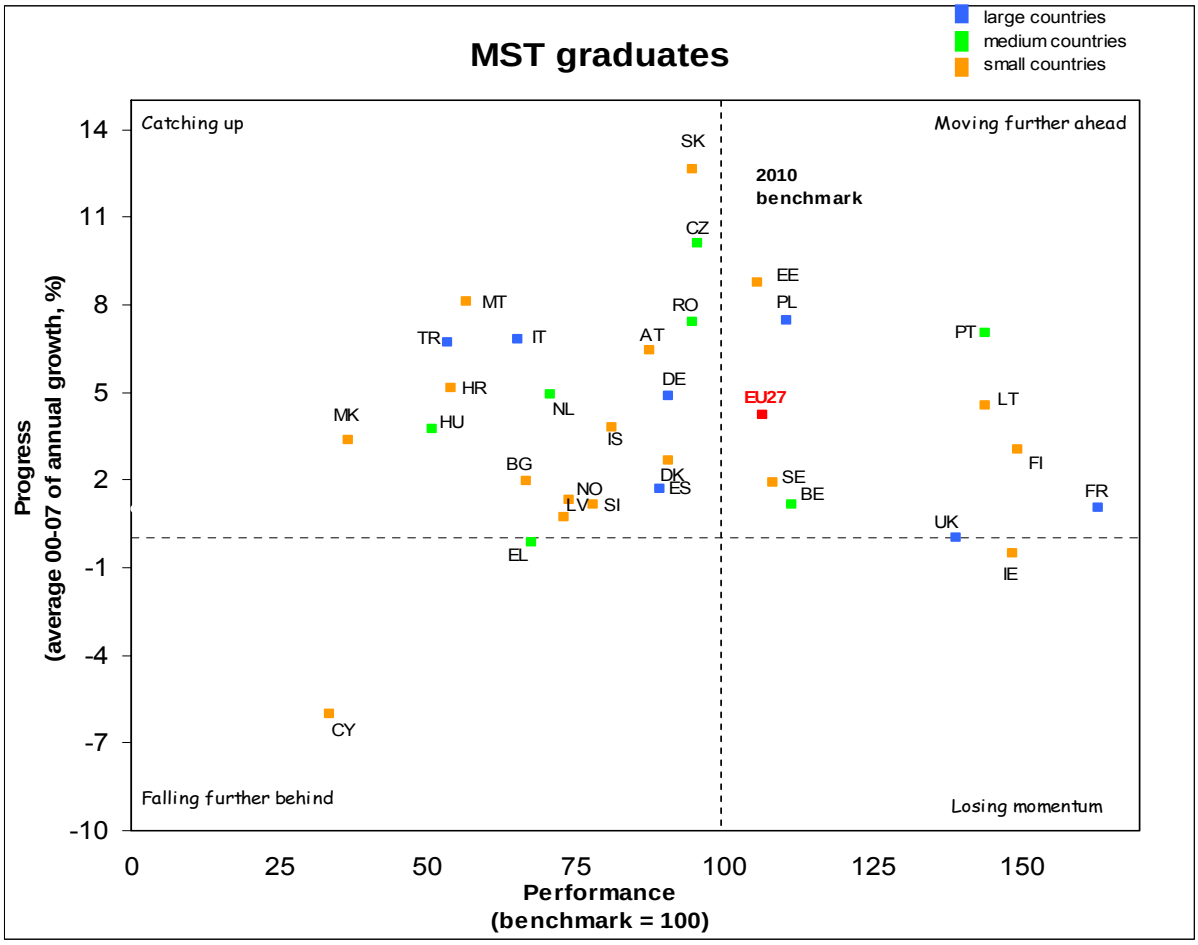
Chart Int. 2.4
Benchmark 2010: Early leavers from education and training (2000-2008)



Source: European Commission DG JRC/Crell

Considering the Mathematics, Science and Technology benchmark, (Chart Int. 2.5) many countries have already achieved or are very close to the benchmark level of 2010 (15% increase in the number of graduates as compared with 2000). Most of the countries which have not yet reached the benchmark level are catching up, with Slovakia and the Czech Republic having the highest rates of progress.

Chart Int.2.5
Benchmark 2010 : Mathematics, Science and Technology Graduates (2000-2007)

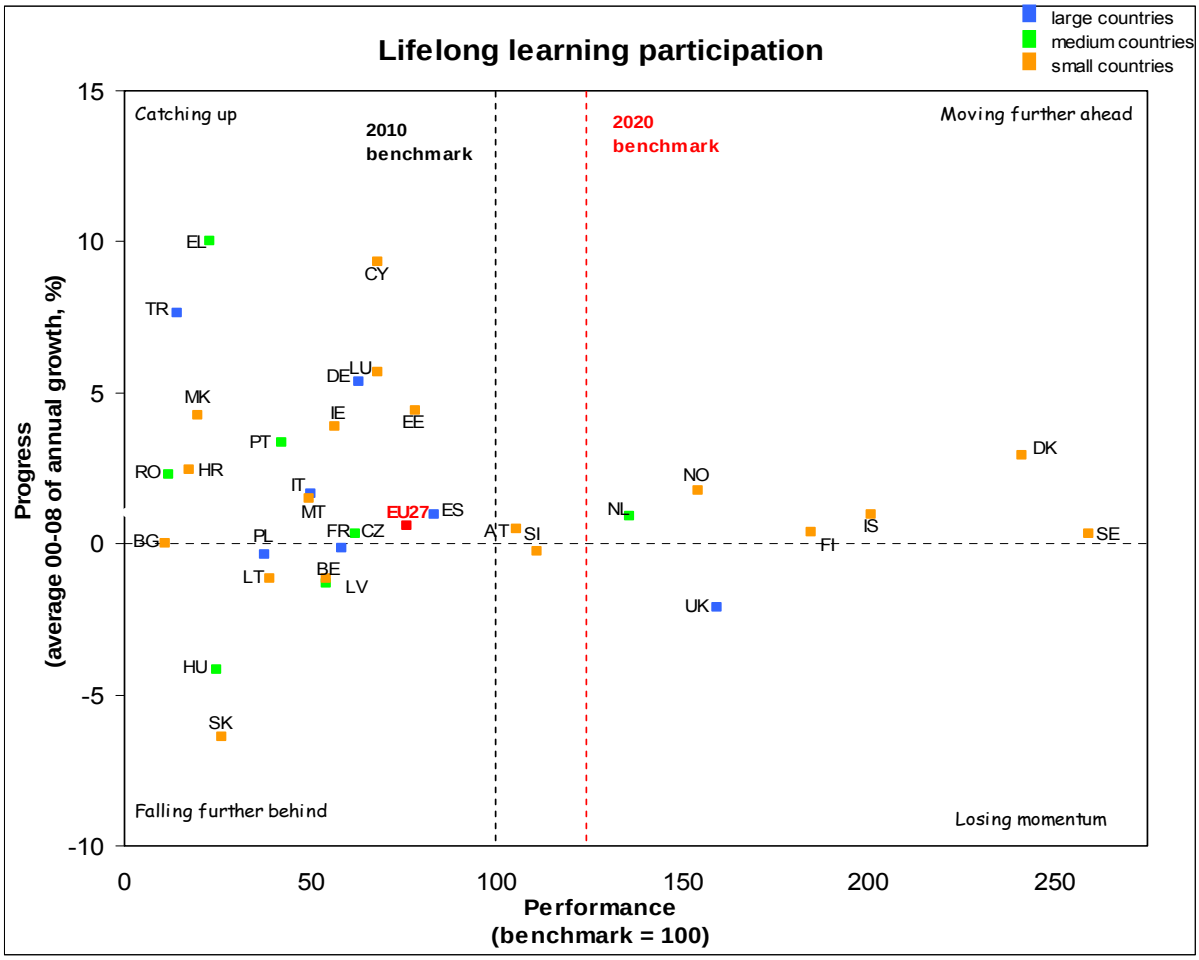


Source: European Commission DG JRC/Crell

Performance and progress on the Adult Lifelong Learning Participation benchmark (Chart Int. 2.6) shows many countries are catching up and increasing their performance, even though not yet at the 2010 benchmark level (12.5% of participation). Some, especially the Nordic countries (Denmark, Sweden, Finland and Norway and Iceland, together with the Netherlands and the UK), already perform above the 2020 benchmark level of 15% of adult participation in lifelong learning.

Hungary and especially Slovakia perform clearly below the benchmark level and show decreasing levels of progress.

Chart Int.2.6
Benchmark 2010: Adult Lifelong Learning participation



Source: European Commission DG JRC/Crell

The presentation of performance and progress above in the Charts Int. 2.2-2.6 clearly shows that all countries have strengths and weaknesses in the five benchmark areas and that no country is "falling behind" in all areas. It should be noticed 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 a similar level of performance and progress in three areas.

2.2. 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 analysis above by looking at the details in the benchmark areas and in other core indicator areas (See Tables Int.2.1 - Int.2.2).

This is why the Council asked for the three best performing countries in specific policy areas to be identified. Half the Member States are best performers in at least one benchmark area. There is therefore a relative big spread of good practice and expertise in the EU among member states.

Table Int. 2.1: Best performing countries on benchmark relating to school education

	Target for 2010/2020	Best performing countries in the EU			EU	USA	Japan
Participation in early childhood education (**4 years-start** of comp. primary), %	2020: 95%	2007					
		Sweden 100%	France 100%	Belgium 99.7%	90.7%	69.2	96.4
Low-achievers in reading **(15-year-olds, %)**	2010: At least 20% Decrease 2020: no more than 15%	Change in the percentage of low achievers in % (2000-2006)					
		Finland -31.4%	Poland -30.2%	Latvia -29.6%	+13.1%	-	+82.2%
		Share of low achievers, 2006					
		Finland 4.8%	Ireland 12.1%	Estonia 13.6%	24.1%	19.4% (2003)	18.4%
Early school leavers (**18-24, %**)	2010/2020: No more than 10%	2008					
		Poland 5.0%	Czech Republic. 5.6% [a]	Slovakia 6.0%	14.9%	-	-
Upper secondary attainment **(20-24, %).**	2010: At least 85%	2008					
		Slovakia 92.3%	Czech Republic 91.6%	Poland 91.3%	78.5%	-	-

Source: DG Education and Culture - *Data sources:* Eurostat UOE and LFS; OECD/Pisa

Table Int.2.2 : 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)**	2010: Increase of at least 15% graduates	Average annual increase 2000-2007					
		Portugal +14.9%	Slovakia +12.6%	Poland +12.2%	+4.2%	+2.0%	-1.0%
		MST Graduates per 1000 inhabitants (aged 20-29) in 2007					
		France 20.5	Finland 18.8	Ireland 18.7	13.4	10.1	14.4
		% of female graduates in 2007					
		Greece 44.2 %	Romania 40.0 %	Bulgaria 39.3 %	31.3 %	31.0%	14.4%
Higher education attainment **(age 30-34)**		Higher education attainment, 2008					
		Cyprus 47.1%	Denmark 46.3%	Finland 45.7%	31.1% Aged 25-34: 29%	Aged 25-34: 39%	Aged 25-34:54%
Adult Lifelong Learning participation **(25-64, %)**	2010: At least 12.5% 2020: at least 15%	2008					
		Sweden 32.4 (07)	Denmark 30.2%	Finland 23.1%	9.5%	-	-

[a]: 2006, p: provisional
Source: DG Education and Culture - *Data source:* Eurostat UOE and LFS

2.3 Performance of European educational systems in a worldwide perspective

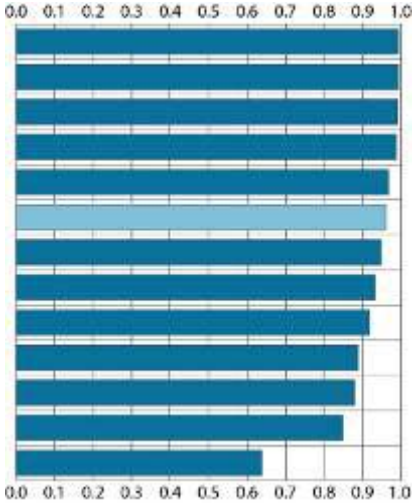
The European Council set the objective of "making European education and training systems in Europe a world quality reference by 2010". (Council, 2002c, paragraph 43).

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 EU performance compared to the rest of the World can be made by looking at the UN Education Index - one of the three dimensions of the UN Human Development Index (HDI). The index can give a statistical picture of a country's relative performances in school enrolment and basic literacy domains. It is constructed based on the adult literacy rate (with two-thirds weighting) and on the gross enrolment rate in the primary, secondary and tertiary levels of education combined (with one-third weighting).

The education index clearly places the EU as a whole among the world's best performers. Australia, New Zealand, Republic of Korea and the US perform slightly better whereas Japan, Brazil, Russian Federation, India and China show lower values of the index (see Chart Int.2.7)

Chart Int.2.7 : EU Education performance in a Worldwide perspective - UN education index*

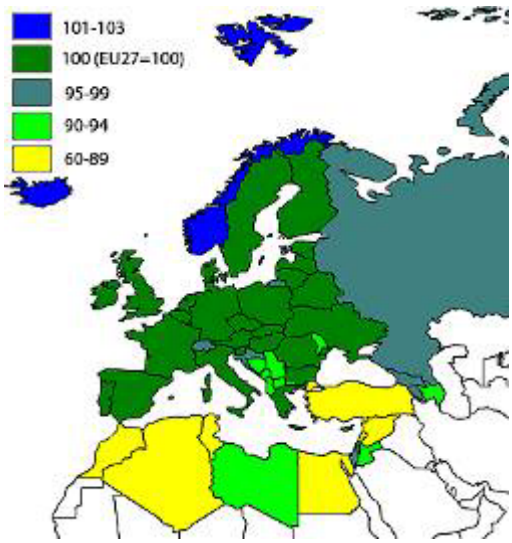
Australia	0.993
New Zealand	0.993
Canada	0.991
Korea (Republic of)	0.988
United States	0.968
European Union *	0.961
Japan	0.949
Russian Federation	0.933
Chile	0.918
Brazil	0.888
Mexico	0.879
China	0.849
India	0.638



Source: CRELL/Joint Research Centre (2009) *Data Source:* UNDP, Human Development Report (2008)
(*) EU aggregate is calculated as weighted average of index values for member states and the population data at 1 of January

The Index shows that while the north-eastern EU neighbours are mostly around an equivalent level of the EU average, its south eastern and southern neighbours are clearly some way behind (Israel and Croatia are exceptions).

Chart Int.2.8: EU Education average performance level in a neighbouring countries perspective UN Education Index* (EU27=100)



Source: CRELL/Joint Research Centre (2009); Data Source: UNDP, Human Development Report, 2008
(*)The index represents statistical values for the year 2006 – See Table Ann Int. 1

2.4. Trends towards the 2020 benchmarks

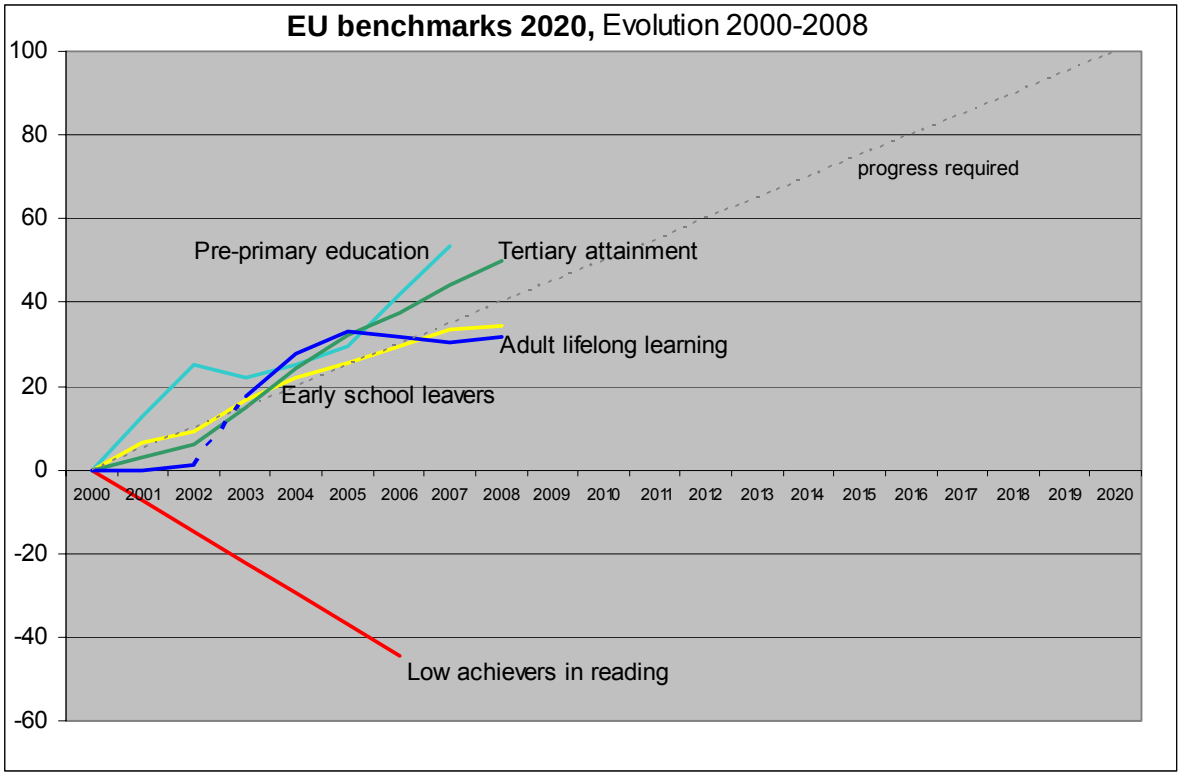
Progress towards achieving the new 2020 benchmarks can not yet be monitored, since the latest data refer to the time before these benchmarks have been adopted (See Chart Int.2.9). However, looking at progress in the period 2000-2008 can help to see if the current trajectory of progress would point towards reaching the EU benchmarks in the future. As regards the benchmarks on Pre-primary education and Tertiary education, progress since 2000 has been above the trend line needed to reach the 2020 benchmarks. However, saturation effects may come into play for both benchmarks at a later stage, slowing down progress after 2010.

As regards early school leavers, in the period 2000-2008, progress is on the trajectory to reach the 10% goal in 2020. However, progress has slowed down 2007-2008.

For low achievers (only low achievers in reading literacy is shown here, whereas the new benchmark for 2020 also includes maths and science) which has only be measured in 2000 and 2006 by the PISA surveys, performance has clearly deteriorated during the period. The results of the 2009 survey, which will be published at the end of 2010, will tell if a change of trend has been achieved. Without a clear change of trends within the coming years the ambitious 15% benchmark will become a very big challenge to reach by 2020.

As regards adult lifelong learning, performance is clearly improving but progress has stagnated since 2005 which could imply that further national efforts are needed to reach this benchmark. [4]

Chart Int.2.9
Trends towards the five benchmarks for 2020 (2000-2008)



Source: DG Education and Culture

3. Demographical trends in Europe[5]

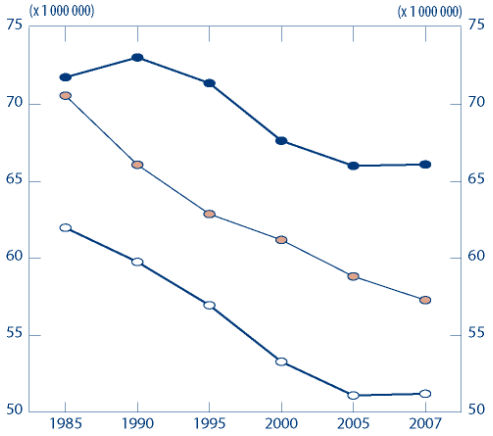
3.1 Current trends in the number of young people in the population

In 2007, young people under 30 years represent about 35% of the total population in the EU27. However, the number of young people in the European Union has declined steadily. Between 1985 and 2007, the population aged 0-9 years in the EU27 decreased by 17.4%, the population aged 10-19 by 18.8%, and the population aged 20-29 by 7.9% (Chart Int. 3.1).

These trends have a different impact on the different levels of education. While compulsory education (primary and lower secondary education) are directly impacted by smaller cohorts through a lower intake of pupils, increases in participation rates in upper secondary education and university are counteracting the demographic decline.

This overall trend conceals contrasting situations. For the 0-9 age group, although the EU-27 members have reported a stable situation during the 2005-2007 period, in countries such as Germany, Cyprus, Lithuania, Malta and Poland, the population has decreased at rates higher than 1.5 % per year. However, for the same age group and time period Ireland and Spain had significant growth rates above 2.5 % per year. In the 10-19 age group, several countries (Bulgaria, Estonia and Romania) experienced a population decrease over three times higher than the average rate for the EU-27.

Chart Int. 3.1: Variation of the population in the 0-9, 10-19 and 20-29 age groups in the EU-27 (1985-2007)



	0-9 age group	10-19 age group	20-29 age group
1985	61 981 774	70 560 146	71 747 526
1990	59 755 140	66 069 001	73 035 161
1995	56 945 603	62 870 813	71 366 222
2000	53 278 070	61 189 541	67 627 903
2005	51 094 592	58 820 580	66 001 798
2007	51 196 945	57 276 530	66 085 404

Source: Eurostat, population statistics (data extracted July 2008).

Additional notes
France: The data relates solely to the Metropolitan territory and does not include the overseas *départements*.
Cyprus: The data relates to territories under government control.

Explanatory note
a) National data are contained in the annexes available at http://www.eurydice.org.
The population is that of 1st January in the reference year. The population is based on data from the most recent census adjusted by the components of population change produced since the last census, or based on population registers.

3.2 Future pupil intake schools

Population projections of future pupil intakes in primary (ISCED 1, age 5-9) and lower secondary education (ISCED 2, age 10-14) enable future requirements in terms of infrastructure and personnel to be estimated. [6]

When it comes to changes in pupil intakes in primary and lower secondary education, two overall trends on the EU level emerge (Chart Ann. Int.2.1 and 2.2). From 2000-2010 future intakes in both primary (8.5%) and lower secondary education (12.9%) fall. From 2010 to 2020 these trends appear to reverse and intakes in both primary and lower secondary education are projected to increase by around 3%.

During the period 2000-2010 only Spain, France, Italy, Luxembourg, the Netherlands and Portugal projections show an increase in the intake of primary pupils. On the other hand countries such as Bulgaria, Estonia, Cyprus, Latvia, Lithuania, Poland and Slovakia experience projected declines of more than 25% of pupils in primary education. At lower secondary education only in Denmark, Luxembourg and the Netherlands the projections show growth in future intakes while Bulgaria, the Czech republic, Estonia, Latvia, Lithuania, Poland and Romania are projected to experience a decline in the intake of pupils of more than 30%.

During the period 2010-2020, the projections appear less dramatic. In primary education only Denmark, Germany, Italy, the Netherlands and Romania experience a projected fall in the future pupil intake while Estonia, Ireland, Spain and Cyprus experience a more than 15% growth in the projected intake. In Lower secondary education Germany, Lithuania, and

Malta experience a more than 10% decrease in projected pupil intakes while Bulgaria, the Czech Republic, Estonia, Ireland, Spain, Latvia and Sweden have projected increase of more than 10%.

3.3 Overall population trends

European populations are aging because of two major trends. First, total fertility rates have remained low for several decades i.e. below the rate of replacement which is at an average of 2.1 children per women. Second, people live longer and healthier lives.

Projections of demographic developments of specific age-groups towards 2060 (Table Int.3.1) shows that the population of the EU27 will rise gradually from 495.4 million in 2008, reaching 519.9 million in 2030 and gradually declining to reach 505.7 in 2060. The population is becoming older with the median age projected to rise from 40.4 years in 2008 to 47.9 years in 2060.

Table Int 3.1: EU population in millions

	2008	2030	2060
Total population (1 January)	495.4	519.9	505.7
Population aged 0-14 Share of total population	77.5 16%	75.5 14%	71.0 14%
Population aged 15-64 Share of total population	333.2 67%	321.9 62%	283.3 56%
Population aged 65+ Share of total population	84.6 17%	122.5 24%	151.5 30%
Old age dependency ratios	**25.9%**	**38.1%**	**53.5%**

Source: EUROSTAT population statistics

While the young population is decreasing slightly from 77.5 million (16% of the total population) to 71 million (14 % of the total population), the major changes take place in the age group 15-64 year olds and the population older than 65. The working age population (15-64 year olds) falls by about 50 millions while the population older than 65 increases by more than 60 million. In terms of share of the total population, the working age population is expected fall to 56% of the total population while the share of people older than 65 are expected to increase to 30% of the total population.

Consequently, the old age dependency ratio is expected to increase substantially from its current levels of 25.9% to 53.5% in 2060. Or put differently, in 2008 there are 4 persons of working age (15-64 years old) for every person aged 65 years or over. In 2060 the ratio is expected to be 2 to 1.

These overall population trends holds policy message also for education. The shrinking labour force (i.e. the population age 15-64) suggests that education becomes even more important in the future to ensure that people on the labour market have right levels of skills (chapter II on labour market outcomes analyse this relationship in more detail). The fast growing share of people over 65 year olds underlines the need for emphasising educational opportunities also for this group. Moreover, it suggests an increased demand for care and a need for educating more people to work in the care sector.

4. Investment in Education

Building on the Lisbon Council's call for increased and improved investment in human resources, 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, 2008).

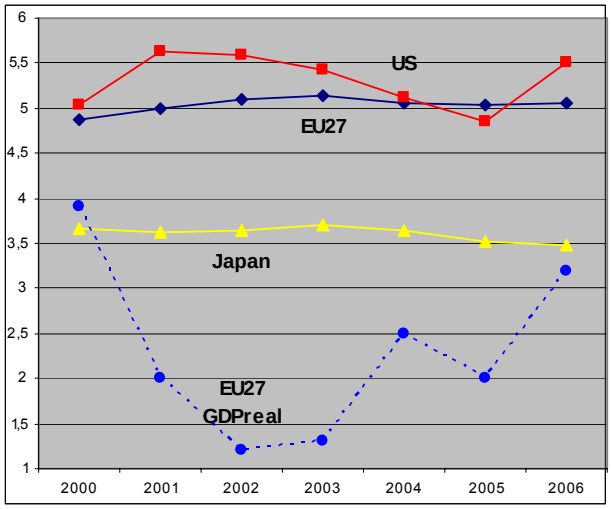
This section analyses the patterns of investment in education in the European countries.[7] Data on investment in Vocational Education and Training (VET) is not included here. However, it is covered in this report in section II.2 Vocational education and training. The overall level of educational investment in European countries is discussed in the first part of this section. The second part provides some insights into the variety of investment patterns by levels of education.

4.1. Levels of investment in education and training

In 2006 public investment in education in the EU accounted for 5.05 % of GDP There are large variations between European countries in their levels of total public investment on education as a percentage of GDP. In 2006 Denmark had the highest relative investment level in education among the Member States (8% of GDP), followed by Cyprus (7%), Sweden (6.85%) and Finland (6.14%). High level of public investment on education was recorded as well in Iceland (7.55%) and Norway (6.55%). In Slovakia, Turkey and Liechtenstein public investment in education in 2006 was close to or below 4% of GDP. As can be seen in Chart Int.4.1, in 2006 Japan (3.5%) trails the EU (5.05%) and the US (5.5%) on public investment. However, both the US and Japan have much higher levels of private investment in education than any EU member state.

Between 2000 and 2006, in nearly all European countries, the investment patterns followed the trend in enrolments - both in absolute level (i.e. investment in current prices) and in investment per student. Hence the decline in the investment on education as a percentage of GDP observed in most countries during the economic upturn (2005-2006) is due to increases in the GDP levels - following an economic recovery - and should not be seen as a decline in the absolute levels of the investment in education. This pattern suggests that most governments' have expanded spending in line with enrolment levels.

Chart Int.4.1 : Public investment on education as a percentage of GDP



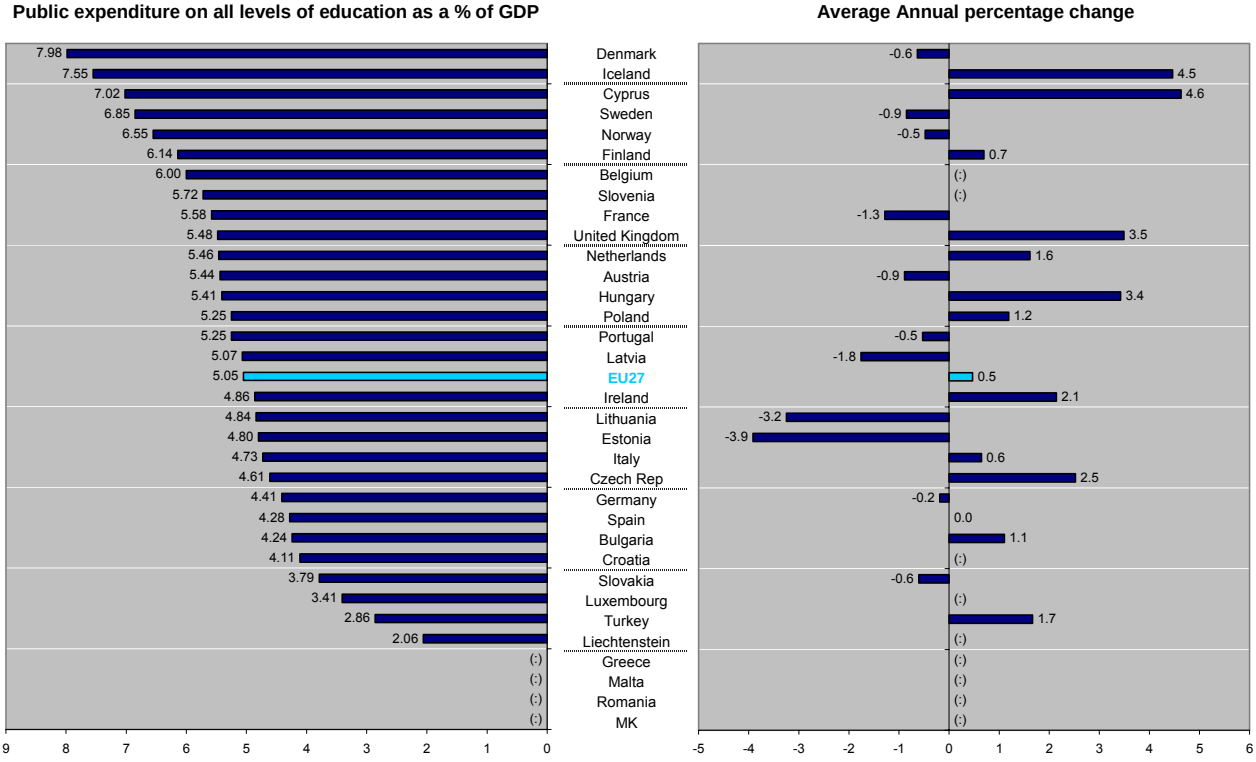
Data source: Eurostat (UOE) – Graphical display is based on October 2009 data

The average annual change in the public investment (chart Int. 4.2) on education as a proportion of GDP between 2000 and 2006 has been positive in ten member states; Cyprus (and Iceland among the EFTA-EEA countries) has recorded the highest annual percentage change (over 4.5%).

In 2006 almost 90% of investment on educational institutions (all levels combined) at European level was covered by public sources. Private sources represented around 10% of total investment on educational institutions. In some Nordic countries like Finland and Sweden, less than 3% is covered from private sources. For another group of countries (Czech Republic, Spain, Latvia, Austria and Slovenia) private sources of funding accounted for 10 to 15% of total investment on educational institutions. In six member states (the United Kingdom, Cyprus, the Netherlands, Bulgaria, Germany and Slovakia), educational institutions are funded from private sources in a proportion of 15 to 25%. This compared to 32% in the United States, 33% in Japan and 41% in Korea.

Between 2000 and 2006 in one-third of European countries for which comparable data are available, the private sources of funding for all combined levels of education have increased as a percentage of GDP (see table Ann. 3.3). However, in the large majority of the member states for which data are available this trend reversed between 2005 and 2006.

Chart Int. 4.2: Public investment on education as a percentage of GDP in European countries (2006p)

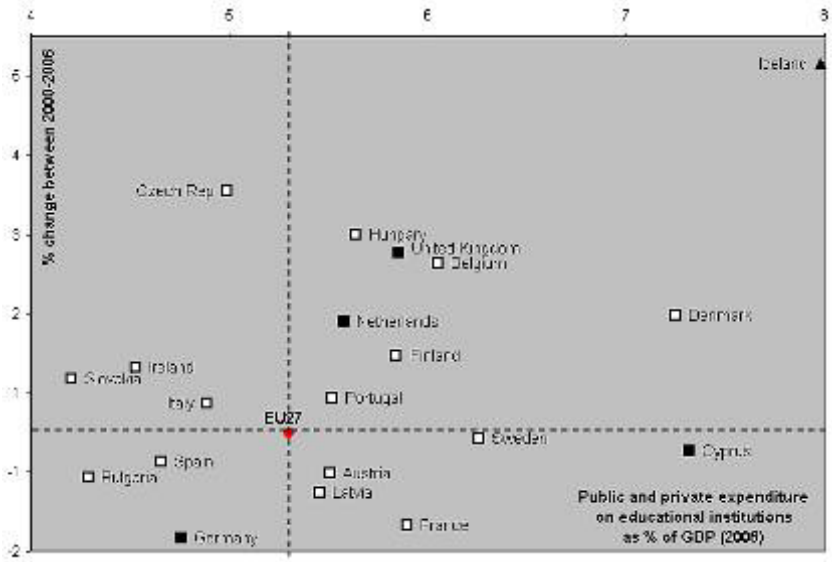


Data source: Eurostat (UOE) – Graphical display is based on October 2009 data
(:) Not available - Additional notes: see Table Ann.3.5

As concerns the trend in relative investment on educational institutions over the past six years, Bulgaria, Germany and Spain, are falling behind the EU average in public and private investments on educational institutions as a percentage of GDP (countries in the lower-left quadrant). Countries like Cyprus, Latvia, France, Sweden, Austria (lower-right quadrant) are presently above the EU average (Cyprus for both public and private investments) but are '*losing momentum*' in terms of investment on

educational institutions as a percentage of GDP. Only four countries with lower levels of GDP invested on educational institutions than the EU average, Slovakia, Czech Republic, Italy and Ireland are catching up (upper-left quadrant).

Chart Int.4.3: Changes in the public and private investments in education in European countries (2000-2006)



Source: CRELL; *Data source*: Eurostat (UOE) – Graphical display is based on October 2009 data
Legend: ■ EU member state with private investment as a % of GDP higher than the EU27 average
□ EU member state with private investment as a % of GDP lower than EU27 average
▲ European country with private investment as a % of GDP higher than EU27 average

Countries in the upper-right quadrant (Iceland, Hungary, United Kingdom, the Netherlands, Finland, Portugal, Belgium, Denmark) all perform above the EU average level (with IS, UK and NL for both public and private investments) and are moving further ahead (See Chart Int. 4.3.).

The upward trend noted between 2000 and 2006 in some countries with low levels of investment in education could be seen as a sign of giving priority to investment on education.

4.2. National priorities for investment in education

At the EU level, public investment in primary level of education amounted to 1.17%. Investment in the secondary level of education, accounts for the bulk of investment – some 2.24% of GDP whereas tertiary education accounts for close to 1.13% of GDP. As regards secondary education Cyprus and Denmark show the highest investment levels as a percentage of GDP (3% or close), while Bulgaria, Croatia and in particular Turkey show relatively lower levels. Slovenia is the only Member State with a higher level of investment in primary than in secondary education (see Table Ann. 3.4).

Investments per student follows a common pattern throughout European countries: it increases substantially with the level of education. On average, investments per student at the secondary level, is 15 percent higher than investments per primary student in Europe (see Table Ann.3.5). Differences in student-teaching staff ratios, staffing patterns, teachers' salaries, teaching materials and facilities, duration of studies, largely account for the cost differences between levels of education. In 2006 the European countries as a whole invested between 1700 (Bulgaria) and 7900 (Norway) PPS Euro per primary student, respectively between 1700 (Bulgaria) and 9500 (Norway) PPS Euro per secondary student. These investment levels mask a broad variance between levels of education.

Between 2001 and 2006, investments on educational institutions per student increased by 29 percentage points at primary level, respectively by 15 percentage points at the secondary level and 12 percentage points at tertiary level.[8] This pattern may indicate efforts to improve education through substantial investment. In many Central and Eastern European Member States, a decline in cohort size combined with rapid economic growth offered an opportunity to increase investments per pupil considerably in real terms.

Table Int.4.1: Public investment on tertiary education as a percentage of GDP

Country	Public		Of which direct public spending	Of which on R&D In % of direct spending
	2001	2006	2006	2006
EU-27	1.08	1.12	0.97	:
Belgium	1.34	1.32	1.14	32.5
Bulgaria	0.82	0.73	0.66	4.0
Czech Republic	0.79	1.23	1.18	18.4
Denmark	2.71	2.38 05	1.60	:
Germany	1.10	1.11	0.89	37.3
Estonia	1.03	0.93 05	0.77	:
Ireland	1.22	1.14	0.97	:
Greece	1.07	1.44 05	1.42 05	15.1 05
Spain	0.97	0.95	0.88	:
France	1.21	1.19	1.10	34.6
Italy	0.80	0.80	0.67	51.2
Cyprus	1.14	1.65	0.74	17.3
Latvia	0.89	0.91	0.84	27.1
Lithuania	1.33	1.00	0.84	26.7
Luxembourg	:	:	:	:
Hungary	1.08	1.04	0.88	21.8
Malta	0.88	1.06 b	0.46 05	15.4
Netherlands	1.36	1.50	1.06	41.3
Austria	1.37	1.48	1.11	36.0
Poland	1.04	1.19 05	0.95	18.2
Portugal	1.03	1.00	0.88	31.6
Romania	0.78	0.90	0.76 05	:
Slovenia	1.28	1.24	0.95	19.6
Slovakia	0.82	0.90	0.77	13.3
Finland	1.99	1.94	1.62	32.8
Sweden	2.00	1.84	1.36	44.4
UK	0.79	1.10	0.81	43.2
Croatia	:	0.88	0.85	5.7
MK*	:	:	:	:
Turkey	0.87	:	0.76	:
Iceland	1.07	1.36	1.03	:
Liechtenstein	:	0.19		13.4
Norway	1.84	2.07	1.21	30.6
United States	1.48	1.45	1.00	:
Japan	0.55	0.61	0.48	:

Source: Eurostat (UOE data collection). Spending on the tertiary level includes R&D spending at universities.
Additional notes: *MK= former Yugoslav Republic of Macedonia (cf. Annex 2)
http://epp.eurostat.ec.europa.eu/portal/page?_pageid=0,1136184,0_45572595&_dad=portal&_schema=PORTAL

The Commission has proposed the goal of investing 2% of GDP in higher education from public and private sources combined. The current level in the EU is 1.2% of which public investment accounts for about 1.13% of GDP. In Denmark, total public investments in higher education alone already surpasses 2% of GDP (from all sources); a large share of this, however (as in Finland and Sweden) is direct financial aid to students. Direct public investments on higher education institutions in these countries is hence considerably lower. On the other hand the share direct public investment is below 1% in 7 EU countries, including Italy, Spain and Romania.

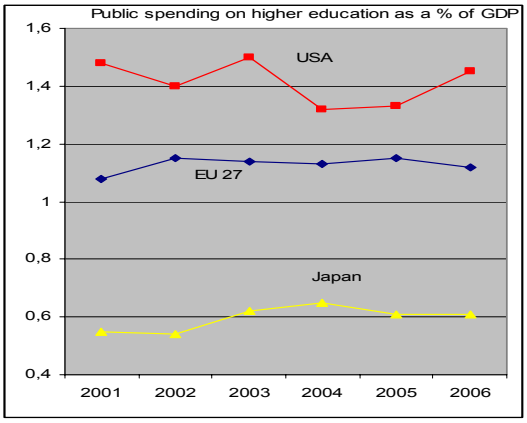
Table Int. 4.2: Private and total investment on tertiary education as a percentage of GDP

Country	Private pay-ments to educati-onal institu-tions	House hold pay-ments	Total private	Total private plus direct public
	2006	2006	2006	2006
EU-27	0.2	0.1	0.3	1.2
Belgium	0.1	0.2	0.3	1.3
Bulgaria	0.5	0.3	0.8	1.2
Czech Republic	0.2	0.0	0.3	1.4
Denmark	0.1	0.7	0.7	2.3
Germany	0.2	0.1	0.2	1.1
Estonia	0.3	:	0.3	1.1
Ireland	0.2	:	0.2	1.1
Greece	:	0.1 05	:	1.5 05
Spain	0.2	:	0.2	1.1
France	0.2	0.1	0.3	1.3
Italy	0.3	0.1	0.4	0.9
Cyprus	0.7	0.1	0.8	1.4
Latvia	0.5	0.3	0.9	1.4
Lithuania	0.4	0.1	0.5	1.3
Luxembourg	:	:	:	:
Hungary	0.3	:	0.3	1.1
Malta	0	:	:	1.1 05
Netherlands	0.4	0.1	0.5	1.4
Austria	0.2	:	0.2	1.3
Poland	0.4	0.1	0.5	1.3
Portugal	0.4	:	0.4	1.3
Romania	0.4	:	0.4	1.1 05
Slovenia	0.3	:	0.3	1.2
Slovakia	0.2	0.2	0.4	0.9
Finland	0.1	:	0.1	1.7
Sweden	0.2	:	0.2	1.5
UK	0.4	0.2	0.6	1.3
Croatia	0.3	:	0.3	1.2
MK*	:	:	:	0.4 03
Turkey	:	:	:	0.8
Iceland	0.1	:	0.1	1.1
Norway	0.0	:	:	1.2
United States	2.0	:	2.0	2.9
Japan	1.0	0.0	1.1	1.5

Source: Eurostat (UOE)
Additional notes:
*MK= former Yugoslav Republic of Macedonia
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.

While public investment in tertiary-level education in the EU is only slightly below the level in the USA, it is nearly twice as high as in Japan (Chart Int 4.4) 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 the EU (for all activities, including both education and research) was in 2006, 1.2% of GDP, far below the level in the USA (2.9%) and also lower than in Japan (1.5%) and Korea (2.3%, 2004), but higher than in Brazil (0.9%), Russia (0.7%), China (0.5%) and India (0.4%).

Chart Int.4.4: Public investment on tertiary education as a percentage of GDP



Data source: Eurostat (UOE) – Graphical display is based on September 2009 data

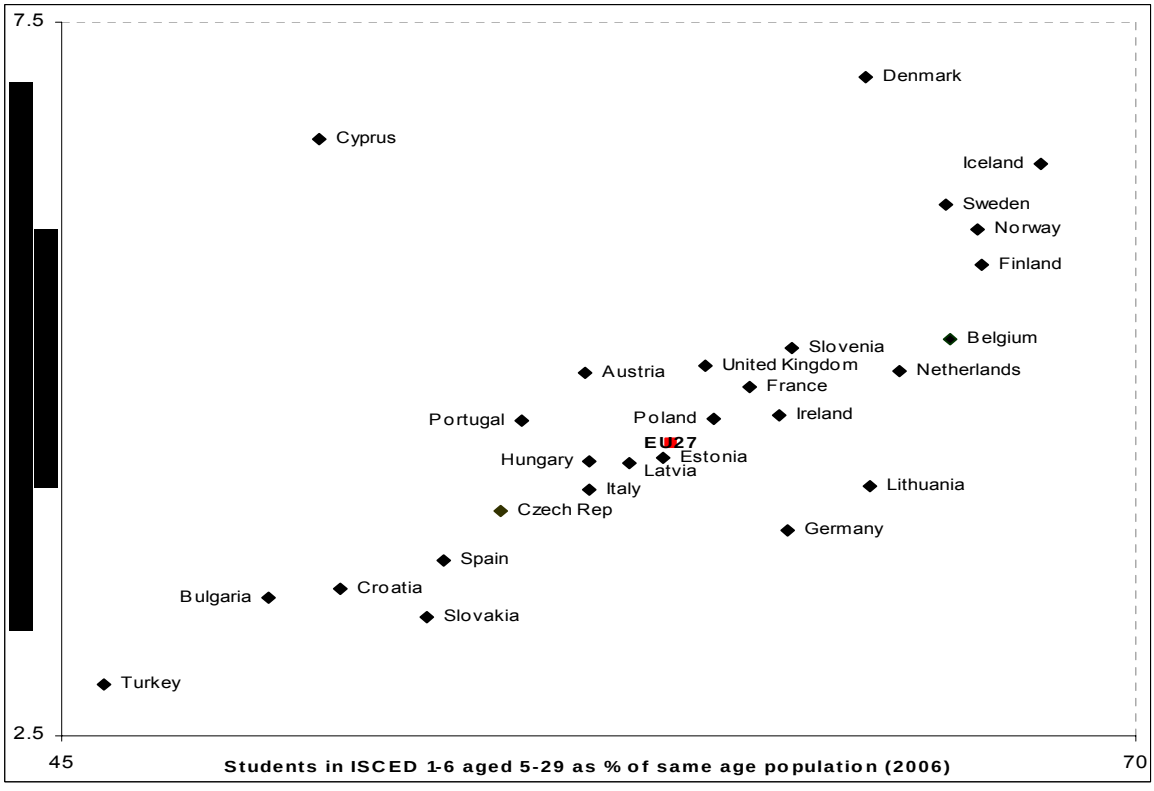
The higher education investment gap between the EU and the USA currently thus amounted in 2006 to about 1.7% of GDP (about 200 billion Euro) or over 10 000 Euro per student (per full time equivalent student the gap even amounted to nearly 13 000 Euro PPS, 21540 in the US and 8590 in the EU). As a result of limited progress in increasing investment in EU countries the gap has not closed in recent years. The impact of the financial crisis still has to be seen. The crisis has already considerably reduced the value of endowment funds of leading private US institutions.

Total public investment on higher education as a percentage of GDP in 2006 increased in 11 EU countries while decreasing in 8. The Czech Republic, Romania and Slovakia showed the biggest increases. Public investment accounts for more than 85% of the amount invested in 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.

The Member States are marked by great differences in the share of public investment on higher education going to research and development. Those Member States that have high overall levels of R&D spending have 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% (Table Int 4.1).

The proportion of the school-age population is only one determinant of the level of investment in education. Countries with similar proportions of the population in education may spend different shares of their GDP, according to the priority they give to different levels of education. Investments on higher education are more strongly affected by participation rates than compulsory education where all pupils of a cohort participate in education. Nevertheless adequate investment levels are especially important for countries that face low levels of participation in education and where current investment levels may not be adequate to increasing the proportion of population which participates in lifelong learning.

Chart Int.4.5: Public investment and participation in primary and secondary education (2006)



Source: CRELL, Joint Research Centre. Graphical display is based on June 2009 data.

As can be seen in Chart Int. 4.5 among the European countries there is a clear link between the public investment levels (measured by the proportion of public investment 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 spending) whereas countries like Turkey, Slovakia, Romania, Bulgaria or Croatia will have difficulties to increase their participation levels from the population if investment levels do not increase.

As a result of the current economic downturn many European countries will be increasingly limited in the amount of resources that they have at their disposal and in the ways in which they may use them. In some member states, infrastructure budgets will be at risk whereas in others, investment in education (school infrastructure, hiring new teachers, etc.) is part of the recovery plan; this investment will assist in the short-term re-launch of the economy and is expected to enhance the long-term economic perspectives.

Countries have to make difficult choices on investment levels in education due to the economic downturn. The higher education level is much more constrained during an economic downturn as a result of possible increases in student numbers (young people postpone their entry into the labour market) but also risking falling or stagnating investment levels[9] - some predictions show that public funding for higher education will be cut in seven Member States (by around 6-10%).[10] In addition, many universities fear that private investment will fall in the near future.

CHAPTER I

Making lifelong learning and mobility a reality

Main messages

MAIN MESSAGES
Lifelong Learning and Mobility

Lifelong learning

- **Lifelong learning from "cradle to grave" is becoming a reality for the majority of people in a number of European countries** (DK, SE, IS, followed by FI, UK and NL) - and progress can be observed in almost all**.** In Belgium, Germany, Spain, France, Austria, Slovenia, as well as in Norway, participation is above the European average. DK, FI, SI and UK-Scotland are also among the European countries that have developed coherent and overarching lifelong learning strategies.

- **Close to 10% of adults have participated in lifelong learning within a four weeks period**. There is, clear progress since 2000. However, this is not sufficient to achieve the benchmark of 12.5% by 2010 - or the 2020 benchmark of 15%. Increasing participation in lifelong learning for adults remains a main challenge in many European countries.

- **Almost 60% of young people (5-29 year-old) participate in education.** This is comparable to the US (2007)

  - Secondary enrolment rates are above 85% in nearly all member states and well above 90% in 8 countries (FR, LT, NL, CZ, SI, FI, SE and UK)

  - Higher education enrolment is over 50% in nearly all member states and above 80% in 4 countries (DK EL, FI, SI) reaching levels near or above the level of the US (82%). Some Central and Eastern European member states (HU, LT, RO and SI) saw their tertiary education enrolment rates increasing by over 25 percentage points since 2000.

- **Time spent by young Europeans in education and training is increasing in all countries**. In Finland 20.5 years, followed by Sweden, Iceland, Belgium and Denmark with expected durations of education between 19 and 20 years.

Learning mobility

- **About one in two students world-wide, enrolled outside the country of citizenship, is studying in the EU.** 1.7 million higher education students in the EU have foreign citizenship (2007). The number has doubled since 2000. This represents 9% of all tertiary students in the EU.

- **More than half a million EU students study abroad**, an increase of about 50% since 2000. Three out of four mobile students in the EU, study in another EU country.

- **About 2 million students have by mid 2009 participated in Erasmus mobility programmes** since these started in 1987. Growth in participation in Erasmus has, however, slowed down in recent years.

1. Participation in Lifelong learning

This chapter analyses participation patterns in lifelong learning in European countries. The benchmark on lifelong learning concerns the adults aged 25-64 and set the objective of 12.5% participation rate by 2010. A new benchmark has been adopted by the Council (Education) in May 2009: setting the objective of 15% participation of adults in lifelong learning, by 2020. However, because lifelong learning strategies address the full range of learning from "cradle to grave" - and not just adult education - other European benchmarks, such as participation' in preschool education, early leavers from education after compulsory schooling as well as higher education graduation, all support the aim of making lifelong learning a reality.

Participation in lifelong learning at various lifetime stages

Participation in pre-primary, school and higher education (5-29 year olds)

Nearly all children between 4 years-old and the starting age for compulsory schooling in France, Sweden, Belgium and Italy are enrolled in the early childhood education. The Netherlands, Malta, Spain and Hungary are close behind; they all exceed the new benchmark of 95% enrolment by 2020. Cyprus, Lithuania, Latvia, Romania and Finland have all achieved significant increases in enrolments since 2000 *(see also Chapter III).*

In the EU member states the number of years that pupils and students can expect to stay in education from pre-school to higher education, went up by 1.5 years since 2000; in Greece, Latvia, Lithuania, Romania, Finland the increase was 2 years (or more), as can be seen in Table Ann. I.1.[11]

EU enrolment in formal education institutions for the age-group 5-to-29 has increased to 59% in 2007 (from 56.8% in 2000). The EU average participation rate is comparable to that of the US and 17 percentage points higher than in Japan; only one third of the member states have higher participation rates than the US.

The net enrolment rate in primary education remained over 90% of the "typical age-group"[12] in nearly all European countries. Participation in secondary education (ISCED levels 2 and 3) continues to grow in the EU. In only 6 Member States did enrolment rates fail to increase since 2000 (LT, LU, NL, SI, RO, UK). In Greece, the increase was over 10 percentage points. Secondary enrolment rates were above 85% in all Member States except Luxembourg and Romania and well above 90% in 9 countries.[13] Enrolment in secondary education is particular high in Japan (98%), Ukraine and Israel. Only 7 Member States had lower enrolment rates than the US (89%).

Tertiary enrolment was in 2007 over 50% in nearly all member states except Bulgaria and Cyprus and above 80% in 4 countries. Only Greece, Slovenia and Finland had tertiary enrolment rates higher than the 82% of the US. Japan was at 58%, below the rate recorded in half of the EU member states. The increases in enrolment at tertiary level have been spectacular since 2000. Some Central and Eastern European member states (like Hungary, Lithuania, Romania and Slovenia) saw their rates increasing between 2000 and 2007 with more than 25 percentage points compared to 2000.

Participation in lifelong learning of adults

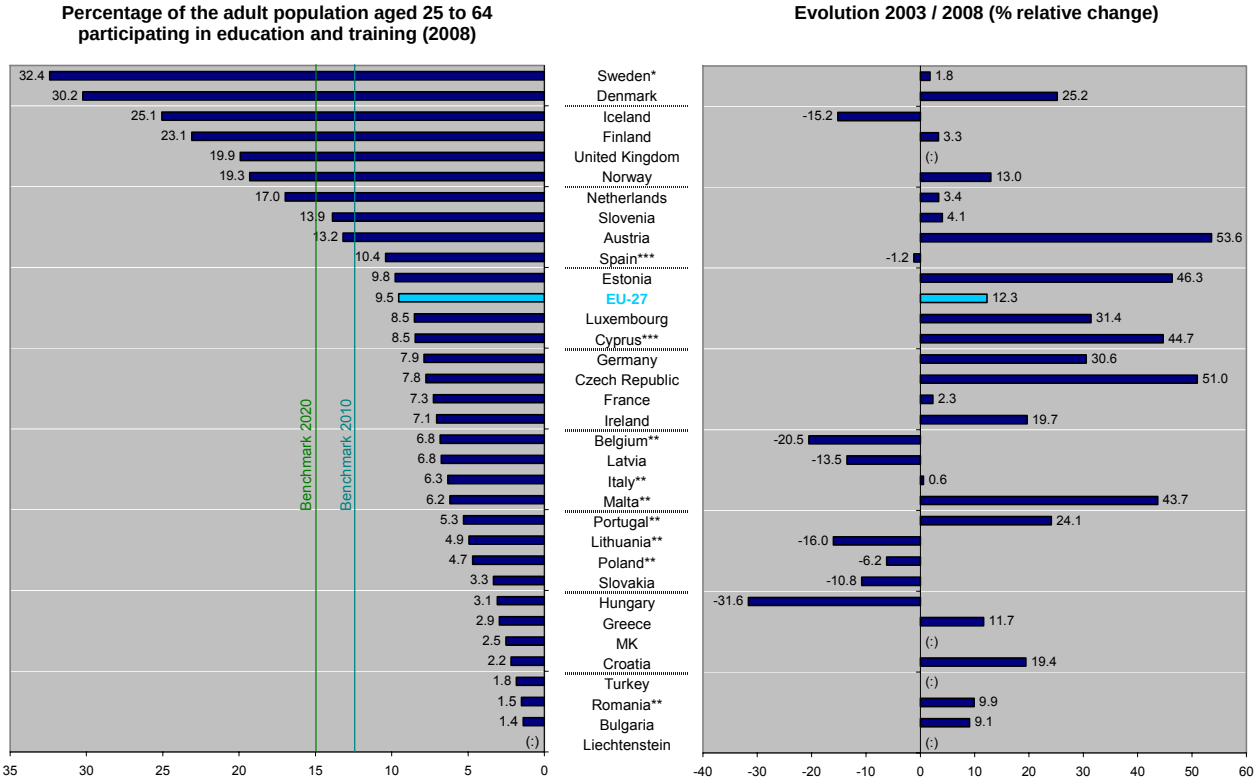
9.5% of 25-64 year olds participate in education and training in the four weeks preceding the survey.[14] Even if there has been slow but continuous progress, this is still some way short of the benchmark of 12.5% for 2010. Only 6 Member States exceeded the benchmark.[15]

There are large differences in participation between Member States; the Scandinavian countries and the UK, the best performers, achieve systematically high and increasing participation rates, reaching 20-30%. Data put the Netherlands, Slovenia, Austria, Spain and Ireland in the next group, with participation rates between 10-20% whereas Estonia, Cyprus, Luxembourg, Germany, Czech Republic and France are at 7-10% participation rate. Bulgaria, Greece and Romania as well as Croatia and Turkey have recorded little or no progress in improving their extremely low levels of participation.[16]

There are different patterns of adult participation in lifelong learning by age-group. Participation of adults aged 50-to-64 is considerably lower. Four member states: Denmark, Finland, United Kingdom, and Netherlands along with Iceland and Norway - which are the best performers in Europe for adult participation in lifelong learning overall - are also the best performers but with considerably lower participation rates as concerns this age-group.

Denmark remain the best European performer with one in four adults aged 50-to-64 taking part in lifelong learning, followed by Iceland, Finland, United Kingdom and Norway, each of these countries with participation rates over 10%. In Greece, Hungary or Turkey less than 1% of that age-group had participated in lifelong learning in the four weeks preceding the survey.

Chart I.1.1: Participation of adults in lifelong learning in European countries



Data source: Eurostat (LFS database), October 2009
* Evolution 2003-2007 ** Evolution 2004-2008 *** Evolution 2005-2008
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. For countries where data exists, the participation figures based on the Adult Education Survey (AES) results are in general higher than the LFS results due to differences in the reference period (one year in the AES as opposed to four weeks each quarter in the LFS) and in the coverage of lifelong learning activities in each survey.

1.1 An aggregate measure on participation in lifelong learning in Europe

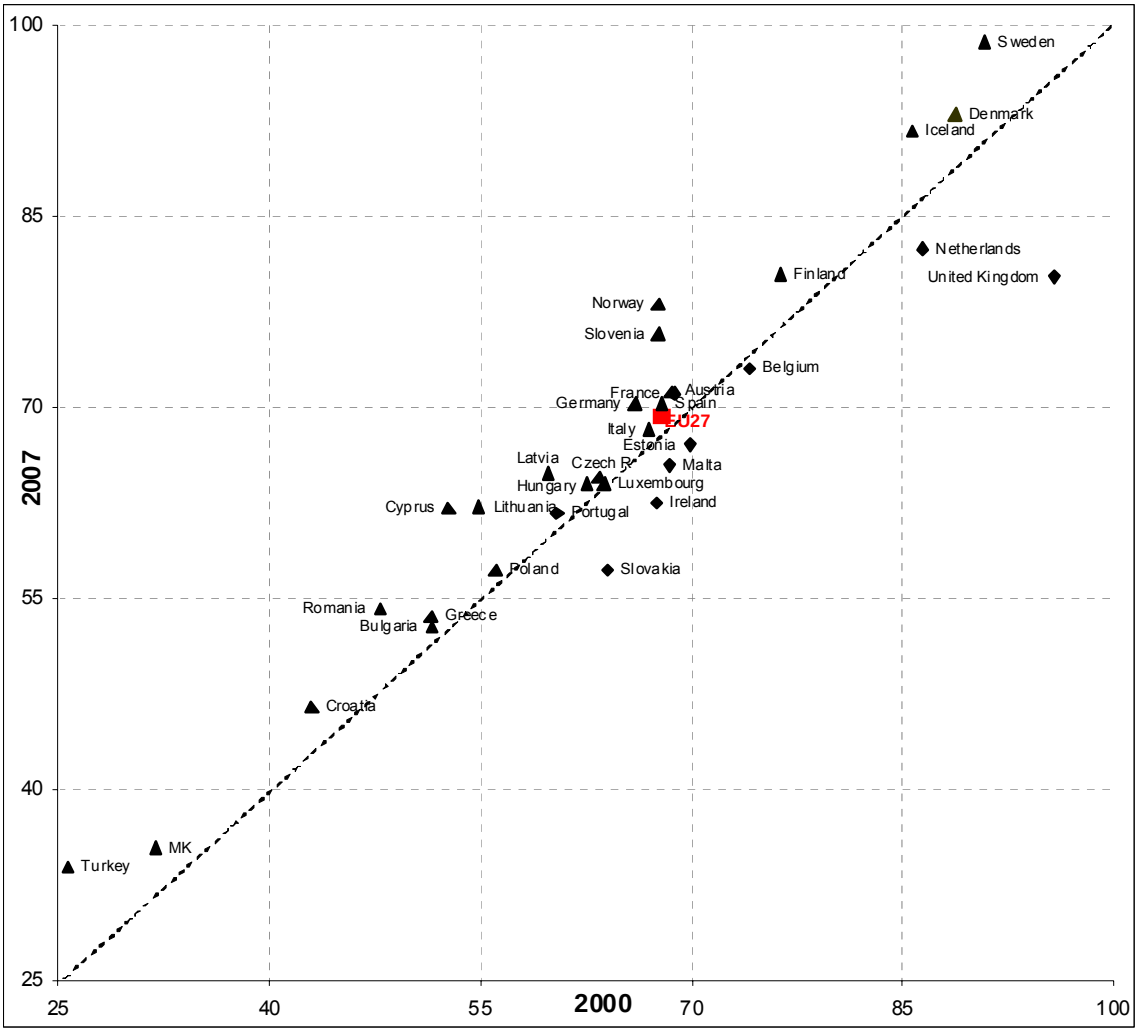
To capture the overall participation patterns in lifelong learning at various lifetime stages, an aggregate measure provides a picture of the very different participation patterns in lifelong learning across Europe by taking participation in formal and non-formal education and training in the best performing member states as a reference (See Chart I.1.2).

Participation in lifelong learning - as indicated by the index - is very high and is close to become a reality for a vast majority of people in Denmark, Sweden, and Iceland. The index participation in lifelong learning from "cradle to grave" shows very high values for all these countries (with an index value at or above 90). In these countries participation in pre-primary is above 90%, school participation rates are at 64-67% and participation of adults in lifelong learning (within a four weeks period) is between 21 and 33%.

The Netherlands, Finland and the United Kingdom follow closely this leading group of countries, whereas in Belgium, Germany, Spain, France, Austria, Slovenia and Norway, participation is also high - all these countries having performance above the European average.

The index shows that in 16 member states participation in lifelong learning is below the EU average (with index values between 50 and 70). Estonia, Italy and Malta show index values between 65 and 70 whereas for another group of countries (Czech Republic, Ireland, Cyprus, Latvia, Lithuania, Luxembourg, Hungary and Portugal) the index is between 60 and 65. All three candidate countries show much lower values (between 33 and 47) whereas in Bulgaria, Romania and Greece the index values are only slightly above 50.

Chart I.1.2 An aggregate measure of participation in lifelong learning in European countries



Source: European Commission DG JRC/Crell (2009)

Methodological details on the index: The 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 stage of lifelong learning: the first one measures the participation in early childhood education between 4-years-old and the starting age of compulsory primary education, the second shows the participation in primary, secondary and tertiary education of population aged 5 to 29 and the last one covers the participation in lifelong learning of 25-to-64 year-olds. These three indicators - each representing a lifetime stage of lifelong learning - are subsequently normalized using the distance to the best performer method and, the simple arithmetic mean is taken to arrive at the overall index values in the range 0 to 100. Each those components are assigned equal weight in the index in accordance with the principle of considering each stage of lifelong learning participation as being of equal importance. Thresholds are used to classify the index values as: very high (at or above 90), high (between 70 and 90), medium (between 50 and 70), low (between 30 and 50) and very low (below 30), respectively.

For more methodological details, please consult: '*Participation in lifelong learning in Europe: what can be measured and compared?'* , CRELL (2008)

The country specific values of the index can be found below in Table I.1.1.

Table I.1.1 An aggregate measure of participation in lifelong learning in European countries

2007	Lifelong learning			LLL index
	Child	Youth	Adults	
EU-27	90.6	59	9.5	**69.3**
Belgium	99.7	65	7.2	**72.9**
Bulgaria	79.8	49.9	1.3	**52.7**
Czech Republic	92.6	55.8	5.7	**64.5**
Denmark	92.7	64.4	29.2	**92.9**
Germany	94.5	61.8	7.8	**70.2**
Estonia	93.6	57.6	7	**67**
Ireland	72.1	61.6	7.6	**62.5**
Greece	68.2	57.5	2.1	**53.5**
Spain	98.1	54.1	10.4	**70.3**
France	100	60.6	7.4	**71.1**
Italy	99.3	57.9	6.2	**68.2**
Cyprus	84.7	50.7	8.4	**62.1**
Latvia	88.2	56.5	7.1	**64.8**
Lithuania	76.6	62.7	5.3	**62.1**
Luxembourg	93.9	51.2	7	**63.9**
Hungary	95.1	57.5	3.6	**64**
Malta	98.8	52.9	6	**65.4**
Netherlands	98.9	65.1	16.6	**82.4**
Austria	88.8	57.1	12.8	**71.1**
Poland	66.8	59.6	5.1	**57.1**
Portugal	86.7	56.8	4.4	**61.6**
Romania	81.8	51.3	1.3	**54.1**
Slovenia	89.2	61.9	14.8	**75.7**
Slovakia	79.4	53.8	3.9	**57.2**
Finland	69.8	66.5	23.4	**80.4**
Sweden	100	64.3	32.4	**98.6**
United Kingdom	90.7	59.1	20	**80.2**
Croatia	54.4	52	2.4	**46.4**
MK*	26.1	48	2.8	**35.4**
Turkey	26.7	47.1	1.5	**33.8**
Iceland	91.7	67.1	27	**91.7**
Norway	79	66.7	18	**78**

Source: CRELL, *Data source:* Eurostat (UOE and LFS)

*MK= former Yugoslav Republic of Macedonia

It is worth noting that Denmark, Finland, Slovenia and UK-Scotland are also among the European countries that have developed coherent and overarching lifelong learning strategies, covering all types and levels of education and training throughout life. Almost all other good performing countries have adopted a set of policies/sectoral strategies covering all key areas of lifelong learning or are at an advanced stage of developing an overarching strategy.

2. Mobility in Education

2.1 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 and it promotes the creation of a European Area of Education and Training.

This chapter will analyse mobility mainly 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*
- *Percentage of students (ISCED levels 5 and 6) from the country of origin enrolled abroad (in EU, EEA and Candidate countries)*;
- *Inward mobility of Erasmus students*
- *Outward mobility of Erasmus students.*

In addition it will look at mobility related to the Leonardo and the Comenius programme.

Foreign students in higher education

About 1.7 million students with foreign citizenship were enrolled in tertiary education in EU-27 countries in 2007 (the 2006/07 academic year) compared to 788.000 students in 2000[17]. The average annual increase over the period 2000-2007 was 11.7%. Growth in the number of foreign students was faster than the growth in overall student numbers.[18]

An increasing share of tertiary students in Europe comes from outside Europe. The number of students from India and from China grew six-fold from 2000 to 2007.

The number of students studying in the EU from other parts of the world varies greatly 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 in fact be resident in the country where they are studying. 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 I.2.1: Foreign tertiary students as % of all tertiary students (ISCED levels 5 and 6) enrolled in the country (2000-2007)

	Foreign tertiary students		Mobile tertiary students	Annual growth i number of foreign
	as % of all tertiary students			tertiary students
	2000	2007	2007	2000-2007
EU-27	5.0	8.9	:	:
Belgium	:	10.5	6.4	:
Bulgaria	3.1	3.6	:	2.0
Czech Rep.	2.2	6.8	5.6	23.2
Denmark	6.8	9.0	5.5	7.1
Germany	9.1	11.3	:	4.7
Estonia	1.6	3.2	1.4	14.3
Ireland	4.6	5.6 (03)	:	:
Greece	:	2.5 (06)	:	:
Spain	1.4	3.4	1.8	13.0
France	6.8	11.3	10.8 (05)	:
Italy	1.4	2.8	:	12.6
Cyprus	19.4	26.9	25.1	16.7
Latvia	6.6	1.1	1.1	-18.5
Lithuania	0.4	1.0	1.0	19.9
Luxembourg	:	42.2 (06)	:	:
Hungary	3.2	3.5	3.0	6.2
Malta	5.6	6.2	0.0	7.9
Netherlands	2.9	6.5	4.7	15.1
Austria	12.4	16.7	12.4	2.8
Poland	0.4	0.6	:	11.4
Portugal	3.0	4.9	:	7.0
Romania	2.8	1.3	:	-0.5
Slovenia	0.9	1.3	1.0	9.9
Slovakia	1.2	0.9	0.9	3.6
Finland	2.1	3.3	:	8.8
Sweden	7.4	10.3	5.4	7.6
UK	11.0	31.0	14.9	18.5
Croatia	:	0.7	2.5	:
FYR Maced.	0.7	1.5	1.5	20.3
Turkey	1.7	0.8	:	1.2
Iceland	4.2	4.9	:	10.0
Liechtenstein*	:	88.3	86.5	:
Norway	4.6	7.3	2.2	8.7
Japan	1.5	3.1	2.9	11.2
United States	3.6	3.4	3.4	:

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.
Mobile tertiary students: students with residence or prior education in a foreign country

Table I.2.2: Main countries of origin of non-national students in the EU

	Foreign students in EU-27 (in 1000)		
	2000	2006	2007
Total	787.9	1690.4	1709.8
Europe	383.8	566.3	599.6
- EU 27	315.8	449.5	479.2
-other Europe	68.0	116.6	120.4
- of which Russia	12.5	27.7	29.6
Africa	134.2	241.3	246.0
Morocco	38.2	47.9	46.3
Algeria	14.9	23.2	21.8
Nigeria	3.5	19.3	22.0
Asia	183.0	376.1	405.5
China	18.6	113.5	117.5
India	6.6	33.1	39.3
Japan	10.7	12.7	12.4
America	63.0	110.4	121.6
USA	22.7	29.8	32.2
Canada	5.8	10.1	10.8
Brazil	6.8	11.3	12.9
Oceania	2.9	7.4	7.7
Australia	2.1	5.3	5.6
Unknown nat.	20.9	388.9	329.4

Source: Eurostat (UOE collection)

Higher education students enrolled outside their country of origin

In 2007, world wide 3.0 million students (slightly more than 2% of all students) were enrolled outside their country of citizenship, of whom 2.5 million (84%) were studying in the OECD area. The United States received most foreign students (in absolute terms) with 19.7% of the total. However, the share of the United States in total foreign students reported to the OECD decreased by 5 percentage points between 2000 and 2007. The EU accounts for a combined total of about 43% (2007), of which: UK (11.6%), Germany (8.6%), France (8.2%), After the EU and the US, Australia is placed third with 7.0%, followed by Canada (4.4%) and Japan (4.2%) (OECD 2009).

For most EU countries, the majority of outgoing students are enrolled in another EU country. The only exception is the UK, where the majority of students studying abroad - which represent a relative low percentage of UK students - are studying outside the EU. In 2007 on average about 3.5% of EU students were studying abroad, with four out of five in other EU countries. Countries diverge greatly in terms of the proportion of students enrolled abroad. In general, the larger countries have a lower proportion of students studying abroad than the smaller countries.

One explanation for the difference of mobility levels between big and smaller countries could be 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 (at least in the

past) or lack of capacity of third- level institutions in the students' own country. By way of illustration: over 80% of Luxembourg's students are enrolled in other EU, EFTA-EEA or Candidate countries. Cyprus, Ireland and Slovakia follow with respectively 57%, 14% and 10% of students enrolled in other European countries. At the other end of the scale one finds Spain and the UK with less than 1.5% of their students enrolled abroad in the mentioned European countries.

Table I.2.3: Percentage of all tertiary students (ISCED levels 5 and 6) enrolled outside their country of origin

	Students (ISCED levels 5 and 6) studying in another EU-27, EEA or Candidate country - as % of all students		
	2000	2006	2007
EU-27	2.1	2.6	2.8
Belgium	2.4	2.5	2.6
Bulgaria	3.2	8.9	8.3
Czech Republic	1.3	2.0	2.1
Denmark	2.7	2.6	2.5
Germany	1.8	2.8	3.1
Estonia	2.5	4.1	4.5
Ireland	9.4	13.8	14.2
Greece	12.4	5.5	5.8
Spain	1.1	1.3	1.4
France	1.8	2.4	2.5
Italy	1.7	1.7	1.8
Cyprus	46.5	53.2	56.9
Latvia	1.3	2.2	2.5
Lithuania	1.8	3.0	3.3
Luxembourg	74.5	80.8	:
Hungary	1.7	1.7	1.8
Malta	8.2	10.0	9.9
Netherlands	1.9	2.1	2.1
Austria	3.8	4.6	4.7
Poland	0.9	1.6	1.8
Portugal	2.3	3.7	4.0
Romania	1.5	2.2	2.2
Slovenia	2.2	2.1	2.1
Slovakia	3	10.2	10.2
Finland	3.2	3.0	2.9
Sweden	2.7	2.7	3.0
United Kingdom	0.6	0.7	0.7
Croatia	:	6.4	6.2
MK*	6.2	11.9	10.5
Turkey	3.3	1.6	1.5
Iceland	16.9	17.4	17.8
Liechtenstein	:	73.6	51.0
Norway	4.7	4.9	5.0

Source: Eurostat (UOE) ***MK= Former Yugoslav Republic of Macedonia**

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

Flow of students

The EU-27 is a net receiver of students, since over 700 000 more students with non-EU citizenship are studying in the EU than EU citizens are studying outside the EU. In 2007, 72% of students with foreign citizenship in the EU were from countries outside the EU. This figure included 7% from other European countries, 2 % from the USA and 63% from other parts of the world. 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. In 2008 according to Open Doors 138 000 US students came to study in Europe. However, this figure includes short stays and summer courses. The US students studying one year or longer in the EU amount to only about 25 000.

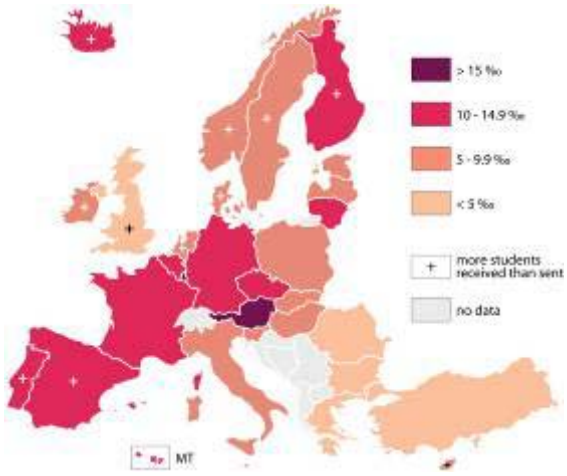
More than 20% of the outgoing students from the Czech Republic, Sweden and the UK study in the USA. As regards other parts of the world the number of incoming students in the EU exceeds by a factor of more than 10 the number of outgoing students.

2.2 European student mobility programmes

Higher education students - Erasmus mobility

A large proportion of overall mobility is supported through Community programmes such as Erasmus (see chart I.2.2 and table I.2.4).

Chart I.2.1: Outward mobility of Erasmus students, 2007/08 (students sent per 1000 students)

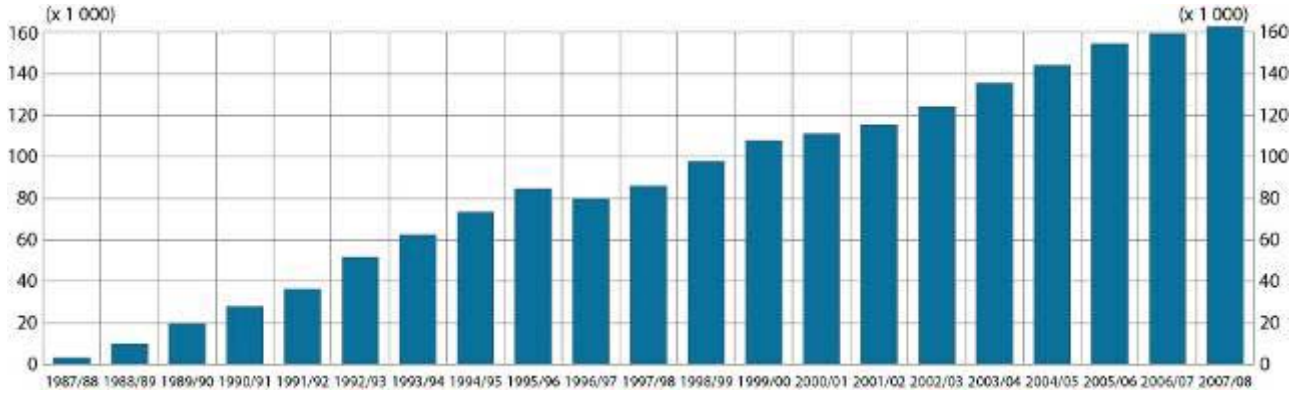


Source: DG Education and Culture (Erasmus programme)

The total number of Erasmus students increased by 2.0 % in 2007/08 (1.0 % in EU 27) 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 2007/08 Erasmus mobility amounted to 162 695 students, of which 155 078 from EU countries or 0.8% of the student population in EU countries (Table I.2.4 and chart I.2.2). In addition 20 002 (19 085 from the EU) students did a placement period in an enterprise abroad. Furthermore 27 157 people (25 232 from the EU) participated in teaching mobility and 4 883 (of which 4 288 from the EU) participated in Erasmus mobility for staff training.

Chart I.2.2.: Mobility of students in the Erasmus programme



	1987/88	1989/90	1994/95	1999/00	2000/01	2003/04	2004/05	2005/06	2006/07	2007/08	Total
EU-27			72 341	106 418	109 933	134 190	141 391	149 933	153 396	155078	1 659 029
Turkey	-	-	-	-	-	-	1142	2852	4438	6274	14706
Iceland, Liechtenstein and Norway	-	-	1066	1248	1159	1396	1504	1636	1490	1343	19494
Total (EU-27 + EEA + CC)	3 244	19 456	73 407	107 666	111 092	135 586	144 037	154 421	159 324	162695	1 846623

Source: DG Education and Culture

Table I.2.4: Mobility of Erasmus students, 2007/08

	Students sent	Students received	Per 1000 students 2006/07	
	2007/08	2007/08	Students sent	Students received
EU-27	155078	155 078	8,2	8,2
Belgium	4781	4960	12,1	12,6
Bulgaria	1078	328	4,2	1,3
Czech Rep.	5335	3116	14,7	8,6
Denmark	1674	4641	7,2	20,0
Germany	23553	16404	10,3	7,2
Estonia	595	506	8,7	7,4
Ireland	1514	3834	8,0	20,1
Greece	2308	1691	3,8	2,8
Spain	23107	27204	13,0	15,3
France	22556	19970	10,3	9,2
Italy	17562	14341	8,6	7,1
Cyprus	148	228	6,7	10,3
Latvia	968	316	7,5	2,4
Lithuania	2392	825	12,0	4,1
Luxembourg	367	45	136,3	16,7
Hungary	3292	1739	7,6	4,0
Malta	107	359	10,9	36,6
Netherlands	4699	6491	8,1	11,1
Austria	4133	3727	15,8	14,3
Poland	11879	3390	5,5	1,6
Portugal	4471	4978	12,2	13,6
Romania	2953	863	3,2	0,9
Slovenia	1018	772	8,8	6,7
Slovakia	1452	626	6,7	2,9
Finland	3265	5867	10,6	19,0
Sweden	2348	7463	5,7	18,0
UK	7523	15637	3,2	6,6
Turkey	6274	1799	2,6	0,7
Iceland	210	274	13,3	17,3
Liechtenstein	30	36	44,6	53,5
Norway	1103	2648	5,1	12,3

Source: DG Education and Culture

Post-graduate students - Marie Curie mobility

The mobility at doctoral level (ISCED level 6) is also supported by Marie Curie Actions- part of the Community Framework programmes for Researchers and Technological Development (FP). Within FP6, nearly 6000 young researchers at doctoral level have undertaken mobility both trans-national and inter-sectoral. Moreover, 16 000 young scientists have participated in international and interdisciplinary training events funded by Marie Curie Actions.

Between 2007 and 2013, just under 2 billion Euros will be spent via FP7 Marie Curie Initial Training Network in order to ensure that postgraduate researchers are able to move around Europe and the rest of the world and broaden their scientific and generic skills."

Vocational education and training students - Leonardo da Vinci mobility

Enhancing international mobility within vocational training is a specific challenge, especially as regards longer stays abroad and within apprenticeships. Currently mobility levels in VET are much lower than in higher education. Between 2006 and 2008, 12 pilot projects were financed by the Commission, which developed support mechanisms to facilitate the mobility of apprentices and young people engaged in practical training periods abroad. The Leonardo da Vinci programme also supports a moderate level of VET-mobility within the EU, amounting in 2008 to over 67 000 persons (See annex Table Ann. I.8). Young people participating in initial vocational training accounted for about 60% of total mobility (about 40 000 persons) within this programme. The mobility of people on the labour market accounted for a further 20% and the mobility of professionals in vocational education and training for the remaining 20%. In 2008 hence about 0.3% of students participating in initial vocational training participated in programme based international

mobility. While there has been a growth in the years before (participation doubled between 2000 and 2006), in 2008 for the first time participation in Leonardo -mobility declined - by nearly a quarter. This is mainly a result of the reattribution of placements (about 20 000 per year to the Erasmus programme).

School students - Comenius mobility

In the framework of Comenius school partnerships over 200 000 EU school students have profited from mobility since 2001 (See Annex Table Ann I.9). The annual figure has increased from 33 000 in 2001 to about 40 000 in 2006. The latter figure represents about 0.1 % of pupils in the corresponding age group. A similar number of staff has profited from Comenius enabled mobility – about 50 000 in EU 27 in 2006.

CHAPTER II

Improving the quality and efficiency of education and training

MAIN MESSAGES
Quality and Efficiency of Education and Training

School education

- **Progress since 2000 on increasing upper secondary attainment levels of young people (20-24) has been limited** (increase of less than two percentage points). Nevertheless, 9 EU countries already exceed the benchmark for 2010 of a 85% completion rate. In 2008, four of these (CZ, PL, SI ,SK) perform already beyond a 90% attainment rate.
- **The large majority (70%) of the 6 million teachers in the EU in primary and secondary schools are female**.
- **The teaching workforce is aging, one third of teachers in the EU are today over 50.**
- **15% of pupils in the EU attend schools where science teaching is hindered by a lack of qualified teachers (2006).**
- **Professional development is a feature of the lives of the vast majority of teachers.** Nine out of ten teachers take part in professional development activity within an 18 months period. Furthermore, more than half the teachers' wanted more professional development than they received.
- **Participation in teachers professional development varies between countries.** More than 90% have participated in for example ES, SI, AT, LT, MT, EE whereas the rate is 70-80% in SK, DK and IS.
- **The principal causes of unfulfilled demand, according to teachers, are the conflict with their work schedule and lack of suitable development opportunities.**
- **Across all countries, the areas for which teachers expressed greatest need for development are: "Teaching special learning needs students", "ICT teaching skills" and "Student discipline and behaviour".**

Vocational education and training

- **Member states experienced a decline in the participation, duration and investment in continuing vocational training.** (2000-2005)
- **The majority of upper secondary education students in the EU participate in vocational programmes**. There are large differences in the member states ranging from more than two-thirds to less than 30 per cent.

Higher education

- **Nearly 19 million students are enrolled in higher education in the EU (2007)**, some 19% more than in 2000. However, growth in the number of students has decelerated in the last years and might further slow down in the future as a result of smaller cohorts entering student age population.
- **Almost one out of three adults in the EU, aged 30-34 (31%), have higher education attainment – an increase of 9 percentage points between 2000 and 2008.** 9 EU countries already perform above the 2020 EU benchmark of 40% .
- **Over 190 universities from 18 EU Member States are among the 500 leading universities of the world** (2009), according to the Shanghai university ranking. The top end of the ranking, however, remains dominated by US institutions (17 US institutions are in the top 20 compared to 2 from the EU).

Labour market outcomes

- **The educational attainment of the adult population (25-64 year olds) has improved considerably since 2000**. The share of population with lower secondary education or lower is down by 7.2 percentage points and the share with tertiary education is up by 4.8% percentage points. Yet, almost 77 million, close to 30 % of the adult population, still has low educational attainment, below upper secondary level.
- **The share of 25-64 year-olds with high educational attainment in the EU, which stands at 24%, is far behind the 40% of both the US and Japan.**
- **Especially male workers with low educational attainment are confronted to a sharp increase of unemployment rates since the start of the economic downturn.**

1. School education

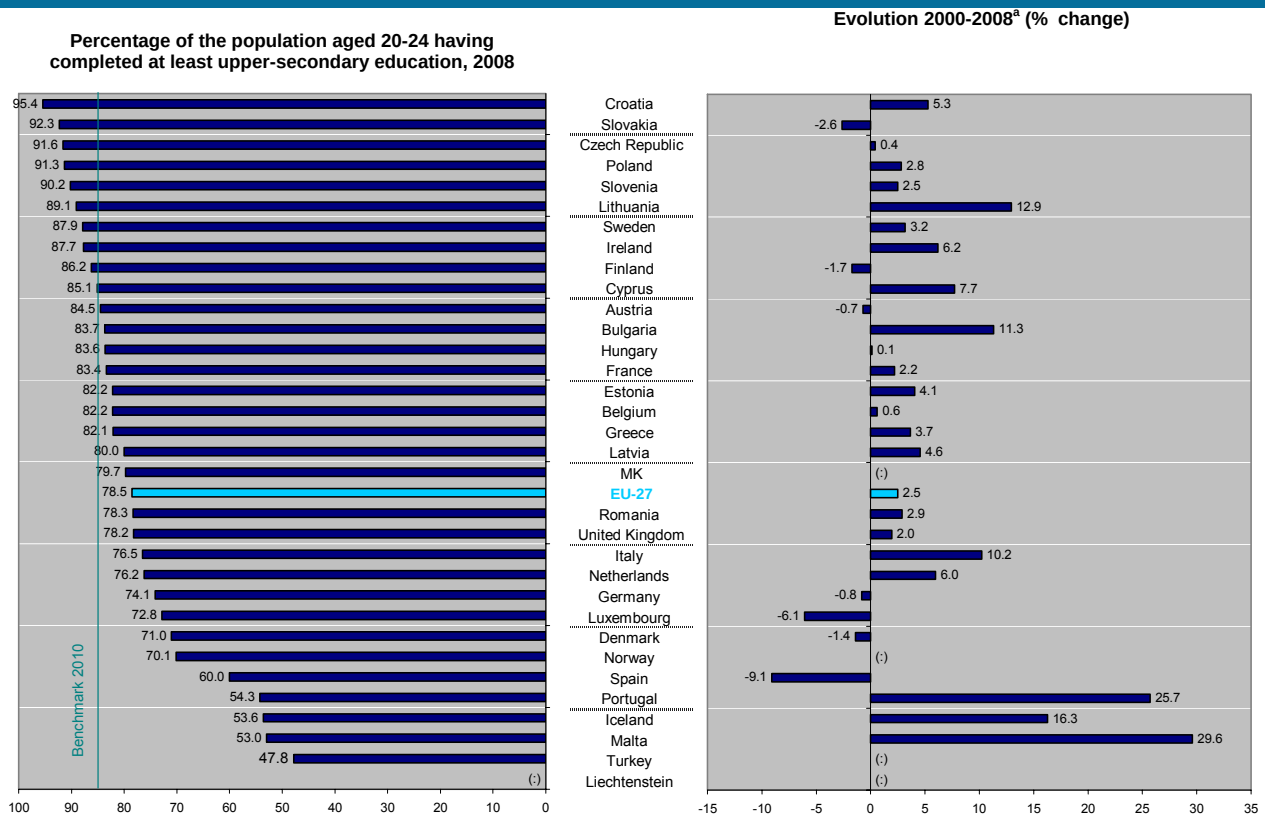
The development of school education is analysed in fields that have been defined by the Council as main strategic areas of change in view of improving quality of education: completion rates of at least upper secondary education and secondly teachers and their professional development.

Other crucial areas of improving school education such as combating early leaving of education and key competencies are analysed in the chapter on Equity (Chapter IV.1)

1.1 Completion of upper secondary education

Upper secondary attainment is a core indicator for measuring progress in the area of schools and related to the EU benchmark of achieving by 2010 a rate of 85% of young people (aged 20-24) having at least upper secondary attainment.

Chart II.1.1: Population aged 20-24 having completed at least upper-secondary education, 2000-2008

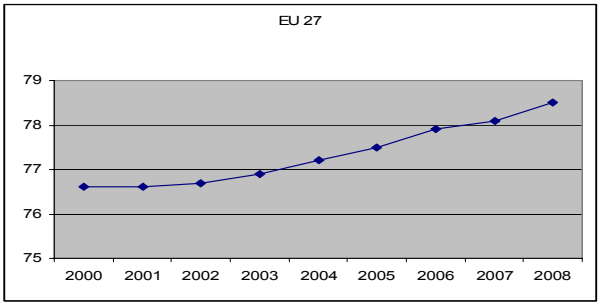


Source: Eurostat (LFS), HR: 2002 instead of 2000,
MK= former Yugoslav Republic of Macedonia
Breaks in time series in Bulgaria(2001), Denmark (2007), Germany (2005), France (2003), Latvia (2002), Lithuania (2002), Luxembourg (2003), Hungary (2003), Malta (2003), Norway (2006) affect growth rates 2000-2008.
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..

European benchmark
By 2010 at least 85% of 22-year- olds in the European Union should have completed upper secondary education.[19]

The European benchmark poses a significant challenge for the EU. The present (2008) EU average for the population aged 20-24 is 78.5% and has only slightly improved (by 2 percentage points) since 2000 (on a positive note, progress has slightly accelerated since 2003). Females outperform males by 5.7 percentage points and the large gender gap has been relatively stable since 2000.

Chart II.1.2: Percentage of young people aged 20-24 in EU 27 with at least upper secondary attainment, 2000-2008



In addition to the European benchmark several Member States have set national targets in this area.[20] Denmark, Greece, Latvia, Netherlands and Belgium (French Community) have set an 85% target. Lithuania and Poland have set a 90% goal for 2010, Ireland has set a 90% goal for 2013, the UK for 2015 and Denmark a 95% goal for 2015. Poland, Lithuania and Ireland already surpass the EU 2010 benchmark and have thus set more ambitious national goals.

Many of the central and eastern European States are already above the 2010 EU benchmark. 4 Member States (the Czech Republic, Poland, Slovenia and Slovakia) and Croatia, have already reached levels over 90% upper secondary attainment. (Chart II.1.1).

Portugal and Malta, with attainment rates below 55% and Spain with about 60%, have the lowest completion rates in the EU. However, both 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 rates in Denmark, Finland, Luxembourg, Slovakia and Spain - and to a lesser degree – in Germany and Austria has even fallen. This can partly be explained by strong net migration to these countries, with many young adults having been educated outside the national education system.

International data for upper secondary attainment of young people are only available for the age group 25-34. In 2006 about 76% of young people in the EU had upper secondary attainment. This compares to an OECD average of 78%, only 38% in Brazil, 87% in the US[21], 91% in Russia and 97% in Korea (South), which has the highest rate world wide, with almost all young people having participated in upper secondary education.

1.2 Teachers - Overview

The teaching profession in the EU counts some 6 million teachers, and 1 million pre-primary educators.

This represents 3% for the EU total active population. Some Member States have experienced a strong reduction of their teaching workforce since 2000: France (-13%), Slovakia (-12%), Romania and Bulgaria (-11%) - at the same time as other countries experienced even a strong increase: Lithuania (+22%), Greece (+19%) and Ireland (+16%).

Table II.1.1: Share of female teachers, 2007

Data for 2007	Females as a % of all teachers			
	ISCED 1-3	ISCED 1	ISCED 2	ISCED 3
EU-27 (2006)	69.1	83.2	65.7	57.3
Belgium	66.5	79.8	60.6	59.0
Bulgaria	81.5	93.3	80.4	75.9
Czech Republic	74.0	94.2	78.1	59.0
Denmark	:	67.6	:	:
Germany	65.0	84.0	61.2	48.2
Estonia	82.9	93.6	80.4	74.7
Ireland	72.9	84.0	:	62.2
Greece	60.8	65.3	67.4	48.2
Spain	63.0	72.0	59.0	53.7
France	65.9	82.1	63.8	53.9
Italy	77.9	95.3	75.8	61.2
Cyprus	69.6	82.1	68.0	56.3
Latvia	85.9	97.2	85.5	79.1
Lithuania	84.5	97.2	82.1	68.9
Luxembourg	58.5	71.9	:	47.1
Hungary	78.6	96.0	78.3	64.5
Malta	:	:	:	:
Netherlands	66.9	83.1	:	46.4
Austria	69.9	89.3	69.1	51.6
Poland	76.3	84.3	74.1	66.5
Portugal	74.0	81.8	70.4	66.6
Romania	72.1	86.7	68.1	65.2
Slovenia	78.9	97.6	78.8	65.2
Slovakia	76.6	84.6	77.6	70.3
Finland	69.0	77.0	72.9	57.5
Sweden	68.6	81.2	66.6	51.1
United Kingdom	68.5	81.3	61.6	62.8
Croatia	72.9	91.1	72.1	64.8
MK	58.7	72.2	51.9	56.3
Turkey	45.9	48.0	-	41.3
Iceland	72.4	79.9	:	54.0
Liechtenstein	62.4	77.1	51.9	35.6
Norway	66.5	73.3	73.3	48.3

***Source**:* EUROSTAT (UOE)

MK= former Yugoslav Republic of Macedonia
*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

Females represent a large majority of teachers

Women account for almost 70% of teachers in the EU and represent more than 60% in all Member States, except Luxembourg (see Table II.1.1). On average (EU-27) there are very clear differences between the different levels of schooling. The higher the educational level, the smaller the female dominance in the teacher profession. In primary education (ISCED level 1), more than 80% of teachers are female. At lower secondary education (ISCED 2) 66%, while less than 60% in upper secondary education (ISCED 3) of teachers are female.

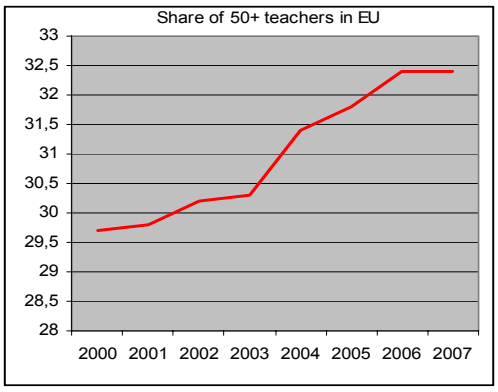
Table II.1.2: Age distribution of teachers, 2007

Teachers by age (%), by ISCED level	Less than 30 years old	Less than 30 years old	50 years and older	50 years and older
	ISCED 1	ISCED 2-3	ISCED 1	ISCED 2-3
Belgium	22.9	16.2	20.4	32.4
Bulgaria	4.5	8.3	21.1	33.2
Czech Republic	11.6	12.8	23.0	36.3
Denmark	9.7	:	39.7	:
Germany	5.2	2.9	52.8	50.4
Estonia	10.9	10.7	29.6	41.9
Ireland	26.2	13.4	28.0	32.2
Greece	14.4	5.4	14.1	29.3
Spain	16.7	10.0	29.5	24.5
France	16.4	9.9	20.4	35.4
Italy	1.4	1.1	46.0	55.0
Cyprus	37.0	15.0	3.0	20.9
Latvia	11.6	12.1	26.6	36.0
Lithuania	6.9	11.5	26.8	33.3
Luxembourg	28.4	20.8	24.4	29.3
Hungary	11.7	12.7	22.4	30.6
Malta	:	31.3	22.3	21.4
Netherlands	19.8	10.9	32.6	44.0
Austria	8.5	5.2	31.9	34.4
Poland	16.6	19.4	11.2	18.6
Portugal	13.8	11.5	28.2	20.8
Romania	22.2	22.3	28.8	33.5
Slovenia	12.4	9.5	14.3	25.6
Slovakia	17.1	16.3	25.5	35.9
Finland	12.9	7.7	25.3	37.7
Sweden	5.8	8.7	48.5	41.6
United Kingdom	27.7	19.9	25.8	29.1
Croatia	:	:	:	:
MK*	8.4	14.4	26.0	30.7
Turkey	:	:	:	:
Iceland	12.4	6.3	29.6	45.5
Liechtenstein	13.0	11.9	29.2	29.8
Norway	11.3	7.7	36.6	44.4

Source: EUROSTAT (UOE),
*MK= former Yugoslav Republic of Macedonia
Note: Data for MT refer to 2006
For country specific notes see: http://epp.eurostat.ec.europa.eu/portal/page?_pageid=0,1136184,0_45572595&_dad=portal&_schema=PORTAL

The teaching profession is aging.
Currently (2007) 32.4% of all secondary teachers in the EU are 50 years and older.

Chart II.1.3: Share of teachers (ISCED 1-3) 50 years and older, 2000-2007



There are big differences between Member States in the share of teachers over 50 (Table II.1.2) with more than 50% of secondary teachers being over 50 in Germany and Italy. Most of the other Member States have less than 40% of teachers of more than 50 years of age in secondary education. The share of secondary teachers under 30, on the other hand, was in 2007 less than 3% in Germany and Italy, but more than 20% in Luxembourg, Romania and Malta.

Table II.1.3: Ratio of pupils to teachers

Data for 2007	Ratio of pupils to teachers			
	ISCED 1-3	ISCED 1	ISCED 2	ISCED 3
EU-27	13.6	15.5	13.1	11.7
Belgium	10,8	12,6	9,2	10,2
Bulgaria	12.8	16.0	12,1	11,6
Czech Republic	13,8	18.7	12,3	12.3
Denmark	11.9	11.2	11.9	:
Germany	16.9	18,3	15,2	14.3
Estonia	12.7	14,4	11.4	12.2
Ireland	15.6	17.9	:	13.2
Greece	8.6	10,1	7.7	7.3
Spain	11.5	13.6	11.7	7,7
France	14.3	19.7	14.3	9.6
Italy	10,3	10,5	9.4	10.8
Cyprus	13.0	15.9	11,2	11.1
Latvia	10.6	11,4	9.9	11,2
Lithuania	8.4	10,0	7.9	9.4
Luxembourg	10.0	11.2	:	9.0
Hungary	10,8	10,2	10,2	12,1
Malta	10.6	12.1*	8.4	17.4
Netherlands	15,6	15,6	:	15,7
Austria	11,5	13,6	10,3	11,0
Poland	11.7	11,0	12,4	12,2
Portugal	9.6	11.8	7.9	8.4
Romania	14,5	16.9	12,2	15,3
Slovenia	12,7	15.2	9.5	13.7
Slovakia	14,9	17.9	13,9	14,1
Finland	13.8	15.0	9.9	15.9
Sweden	12,4	12,3	11,5	13,6
United Kingdom	15.2	19.4	16.7	11.2
Croatia	13,5	17,3	12,6	11,6
MK*	15.4	18.4	13.6	16.3
Turkey	23,0	26.2	:	16.2
Iceland	10,3	10,4	:	10,2
Liechtenstein	8.2	9.6	6.9	8.6
Norway	10.5	11.0	10.2	9.8

Source: Eurostat (UOE), *
*MK= former Yugoslav Republic of Macedonia
Note: Data for MT refer to 2006

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

Teachers teach, on average, more students in primary education than in secondary. The average student-teacher ratio in primary education is 16 students per teacher, while for upper secondary it is 12. The difference of student teacher ratio between educational levels varies greatly between countries. In the case of the UK there is a difference of more than 8 students in the ratio of primary and upper secondary (see Table II.1.3).

Table II.1.4 % of 15 year old 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
MK	:	:	:	:
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,
MK= former Yugoslav Republic of Macedonia
*The EU average is the weighted average of PISA EU participating countries.

Shortage of qualified teachers is a serious problem in almost all countries. Head teachers in the EU report on a lack of appropriate teaching staff hindering quality instruction.[22] 14% of all pupils are taught in schools where instruction was hindered by the lack of qualified teachers. Luxembourg, Belgium and Estonia are among those most affected by such a situation whereas head teachers in Portugal and Poland report almost not to be affected at all (Table II.1.4).

1.3 Teachers and their professional development

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.[23]

To support policies in this field the Council in May 2005 and May 2007 invited[24] the Commission to co-operate with the OECD on the development of the 'Teaching and Learning International Survey' (TALIS).

What is TALIS?

With a focus on lower secondary education in both the public and private sectors, TALIS examined important aspects of professional development; teacher beliefs, attitudes and practices; teacher appraisal and feedback; and school leadership in the 23 participating countries. TALIS looks at these factors through the eyes of teachers and school principals. This innovative approach was chosen in order to examine how the intended school and teacher policies of education systems are actually perceived and implemented in schools and classrooms.

Twenty four countries took part in TALIS, including 19 European Countries (EU:16) : Austria, Belgium, Bulgaria, Denmark, Estonia, Hungary, Iceland, Ireland, Italy, Lithuania, Malta, Netherlands, Norway, Poland, Portugal, Spain, Slovak Republic, Slovenia and Turkey. And 5 non-European Countries: Australia, Brazil, Republic of Korea, Malaysia and Mexico.

Based on OECD's initial report and the forthcoming joint EU/OECD thematic report on Teachers' Professional Development[25], key results are reported.[26]

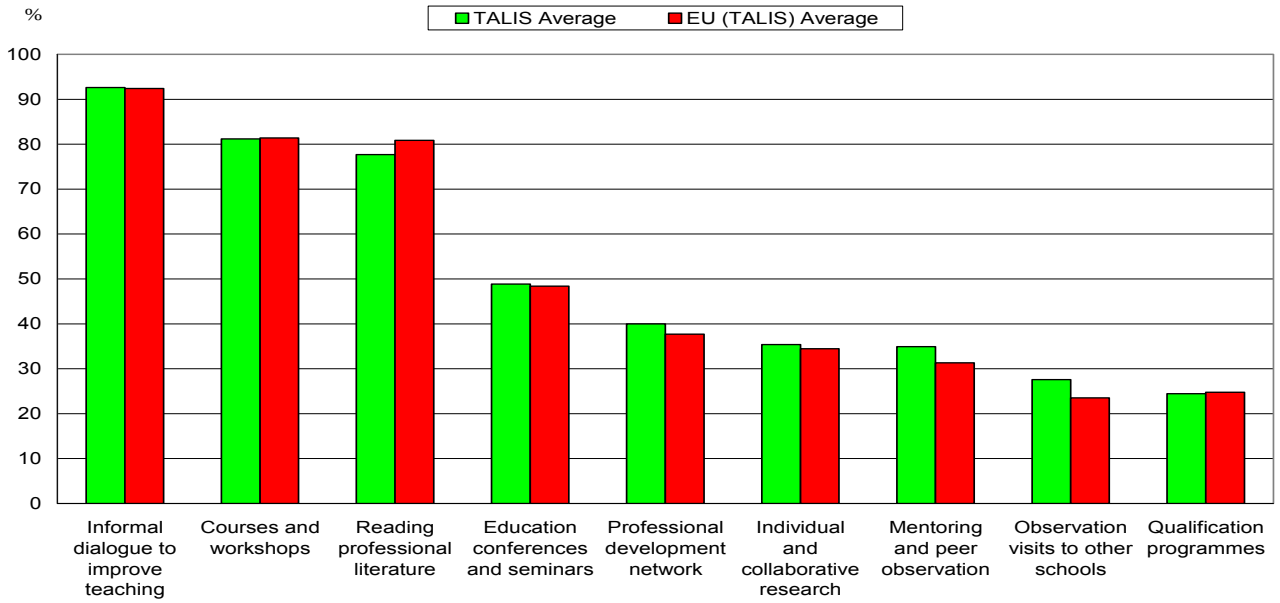
Types of professional development undertaken

Teachers were asked about a wide range of activities from more organised and structured to more informal and self-directed learning.

The most common type of professional development undertaken across countries was 'Informal dialogue to improve teaching', with on average 93% of teachers participating in teachers' professional development reporting to have engaged in this in the 18 months prior to the survey (figure 4.2). Indeed in all but two countries – Hungary (79%) and Mexico (89%) - it was the most frequently reported development activity by teachers, with more than 90% of teachers participating in each country. For Hungary, the highest reported participation was in 'Reading professional literature' (88%) and for Mexico it was attendance at 'Courses and workshops' (94%).

The next most frequently reported activity on average across the 23 countries, was attending 'Courses and workshops'(81%) and 'Reading professional literature' (78%), while the least common types of professional development that teachers took part in were 'Qualification programmes'(25%) and 'Observation visits to other schools' (28%).

Chart II.1.4: Participation rates for type of professional development activity (2007-08)

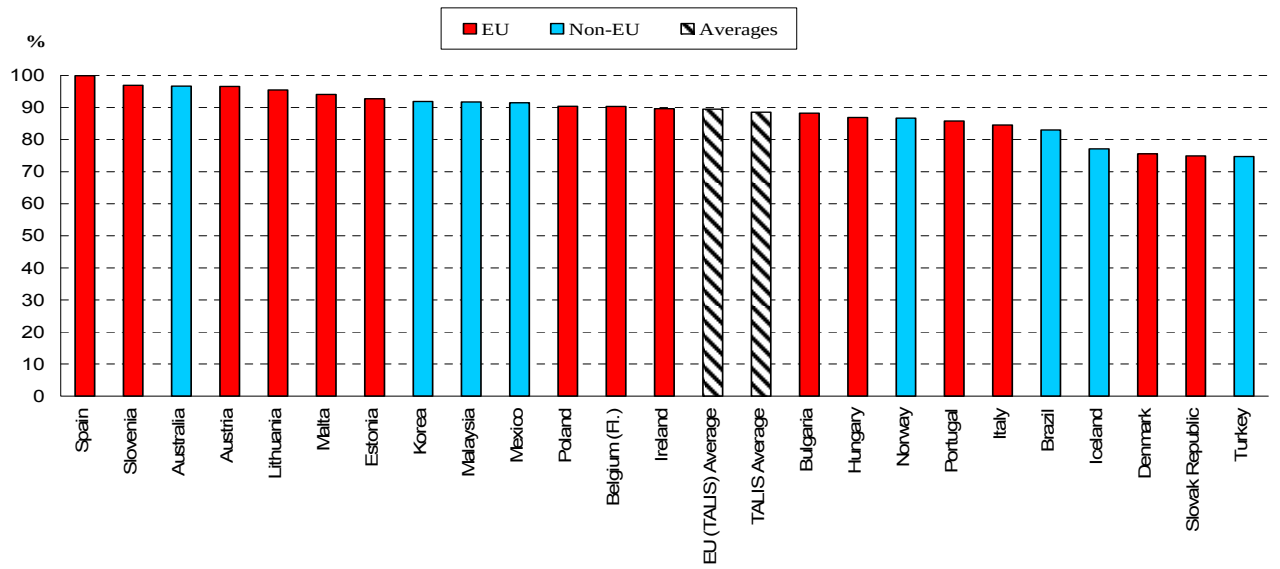


Teachers' participation in professional development

Chart II.1.5 shows the comparative country level participation rates in professional development in the 18 months prior to the survey. On average across the 23 participating countries, 89% of teachers reported that they undertook some professional development over the period. This is a very high figure and provides a positive sign that on average, engagement in professional development activities is a feature of the lives of the vast majority of teachers across the participating countries. However, the fact that 11% of lower secondary teachers did not take part in any development activities in the period prior to the survey provides some cause for concern.

When participation rates are compared across countries, there are some notable differences. In Australia, Austria, Lithuania and Slovenia, participation is virtually universal with less than 5% of lower secondary teachers not having participated in development activities in the previous 18 months and in Spain all teachers reported having participated in some development.[27] This contrasts with the situation in Denmark, Iceland, the Slovak Republic and Turkey, where around one quarter of teachers reported that they had not participated in professional development during this period.

Chart II.1.5: Percentage of teachers who undertook some professional development in the previous 18 months (2007-08)



Countries are ranked in descending order of percentage of teachers having had some professional development in the 18 months prior to the survey

Intensity of participation in professional development

TALIS measures the intensity of participation in terms of the number of days of professional development that teachers reported to have taken in the 18 months prior to the survey.

On average among all lower secondary teachers in the participating countries, teachers undertook 15.3 days of professional development over the period – in other words an average of just over one day per month. For the EU countries this average was 14.6. But there is significant variation between countries. The highest average number of days for the EU countries, reported by lower secondary teachers was in Bulgaria, Italy, Poland and Spain (all 26 to 27 days) and the lowest number was reported by teachers in Ireland (5.6 days), Slovakia (7.2 days), Malta (7.3 days), Belgium (Fl.) (8.0 days) and Slovenia (8.3 days). Within the EU, therefore, there is a five-fold difference between the highest and lowest intensity of participation.

Unsatisfied demand and development needs

Teachers were also asked whether, in the 18 months prior to the survey, they had wanted to participate in more professional development than they had done. The first column of Table Ann II.1b in the Annex summarises teachers' responses to this question. More than half of the teachers surveyed reported that they wanted more professional development than they actually received. The extent of unmet demand is sizeable in every country ranging from 30% in Belgium (Fl.) to 76 % in Portugal.

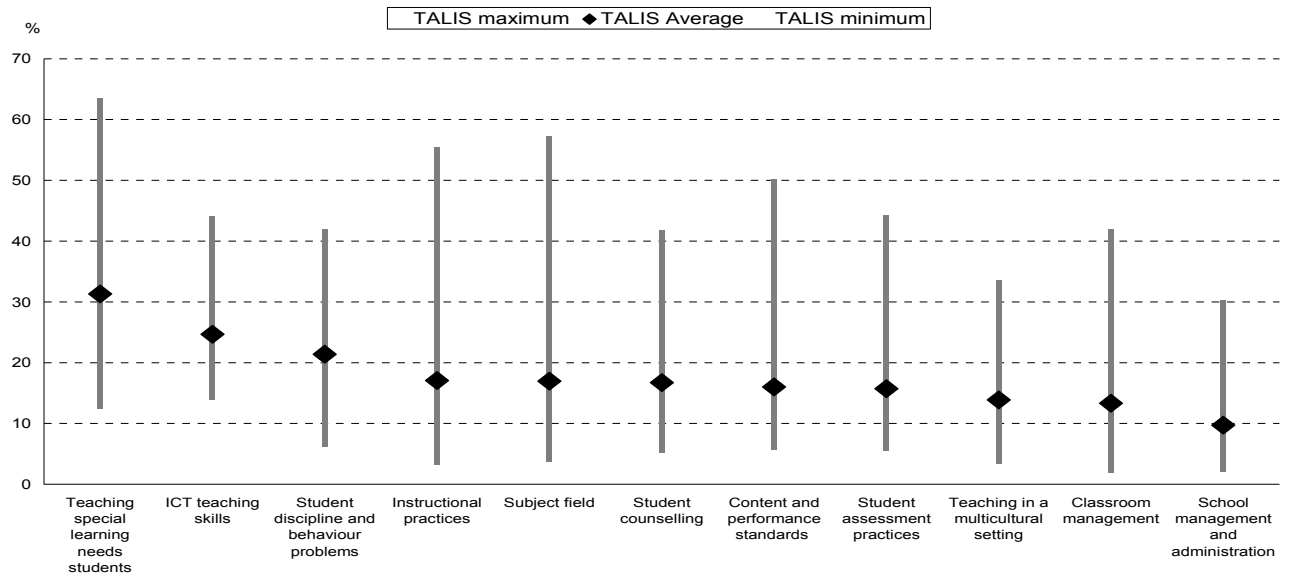
Table Ann II.1b also shows the extent of unsatisfied demand according to a range of teacher and school characteristics. In almost all countries female teachers were more likely than male teachers to report wanting more development than they received, though in most cases the differences are not large. There is a similarly consistent pattern for teachers less than 40 years of age; in most countries they were more likely than older teachers to report a desire for more participation.

There is no consistent cross-country pattern in terms of teachers' qualifications. Although in several countries (and particularly in Austria, Denmark, Spain and Turkey, where significant differences are evident), more highly qualified teachers are more likely to have reported unsatisfied demand, most countries show no definite pattern.

What are the areas of greatest development need?

Teachers were asked to rate on a four point scale the degree of development need they had in various aspects of their work (Chart II.1.6).

Chart II.1.6 : Areas of greatest development need of teachers (2007-08)
TALIS-Average and range of percentage of teachers reporting a high level of need



The aspect of teachers' work that was the most frequently rated by teachers as an area of high development need, was 'Teaching special learning needs students'. Almost one third of teachers rated their development need in this area as high.

Given that the TALIS target population excludes teachers who only teach special learning needs students, this high development need reported in TALIS is quite significant. It is probably a refection of two current trends in educational policy. The first one is the integration of special learning needs in mainstream schools (inclusive education) and the second the growing emphasis on equity. In contrast, the aspect of teachers' work that, on average, was least frequently reported as a high development need, was 'school management and administration'.

Impact of professional development

It is striking how positively teachers view the impact of these development activities and how consistent this is across all types of development activities. (See Annex Table Ann II.1c which shows the percentage of teachers who reported a moderate or high impact for the types of development they had undertaken during the survey period). On average across participating countries, teachers reported that the most effective forms of development were "Individual and collaborative research", "Informal dialogue to improve teaching" and "Qualification programmes", all with close to 90% of teachers reporting a moderate or large impact on their development as a teacher. The development activities that were reported to be relatively less effective were attendance at "Education conferences and seminars" and taking part in "Observation visits to other schools", though even for these activities almost 75% of teachers reported a moderate or high impact.

2. Vocational education and training

Vocational Education and Training (VET) plays an important role in providing the skills, knowledge and competences needed in the labour market.

The Bordeaux communiqué underlined that the cooperation process launched in Copenhagen in 2002 has contributed to create a more positive and more dynamic image of VET, while preserving the wealth of the diversity of systems (European Commission, 2008). It states further that it is imperative to continue to work on improving the scope, comparability and reliability of VET statistics and the development of a more explicit VET component within the coherent framework of indicators and benchmarks.

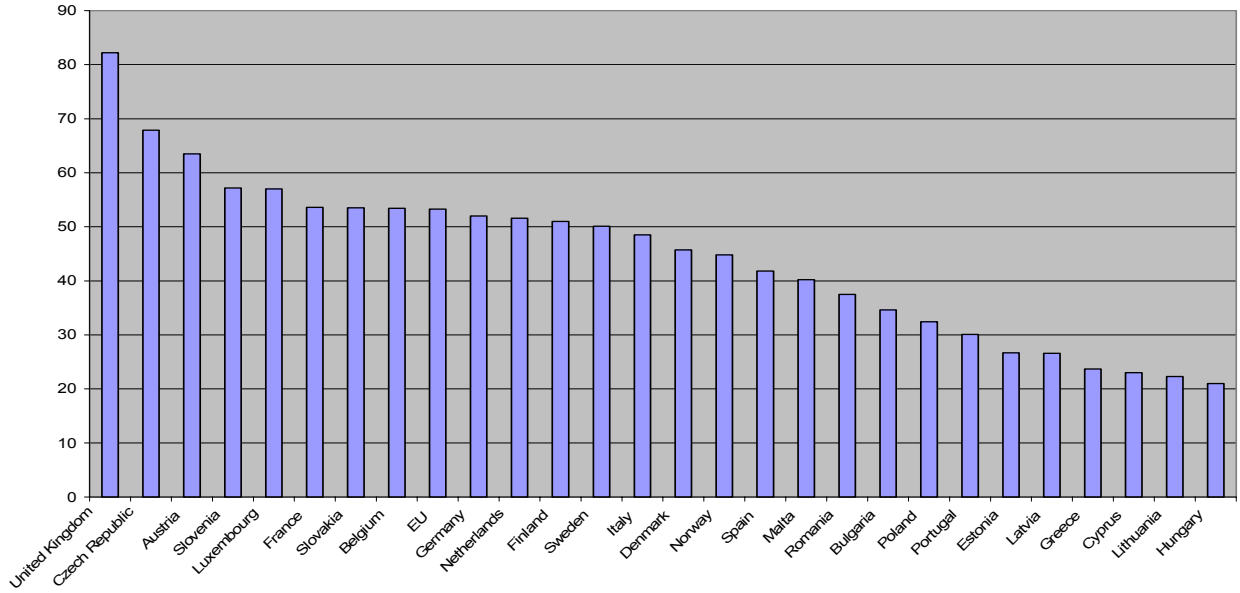
This part will concentrate on the participation patterns in initial VET and further look into the participation, duration and cost of continuing vocational training (CVT), based on the results of the third Continuing Vocational Training Survey (CVTS 3). Evidence from the Adult Education Survey (AES) will be used for the relevant questions covering the participation in the job-related activities area. Furthermore, international comparisons as well as some outcomes of VET will be described.

2.1 Participation in vocational education and training

It is difficult to develop a precise measurement of participation in VET using simple statistics. To better capture the participation patterns, CRELL has developed an aggregate measure of participation in VET using different statistics. The index is based on three indicators: students enrolled in vocational programmes at the upper secondary (ISCED 3) level (IVTS), participants in initial vocational training in enterprises (IVTE) and participants in continuing vocational training in enterprises (CVTE). The index score is computed as the arithmetic average of the three normalized indicators.[28]

The participation index shows that three countries (United Kingdom, Czech Republic and Austria) have high overall participation in VET. In Slovenia, Luxembourg and France participation is above the European average and in twelve Member States the index score is above 50% (see Ann Table II.2).

Chart II.2.1 An aggregate measure of participation in vocational education and training in European countries (2005)



Source: Centre for Research on Lifelong Learning (CRELL)
Note: Data for the UK (low response rate) and Norway (use of local units and not Enterprise units as in the other countries) should be treated with care.

Participation in Initial vocational education and training

In the school year 2007/2008 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 by 6% to 51.5% (down from 55% in 2000/2001). Among the Member States the proportion of students who were enrolled in vocational programmes at this level ranged from 13% in Cyprus to more than 77% in Austria (see chart II.2.2). High proportions of students (over two thirds) following a vocational programme are registered in Austria, the Czech Republic, Croatia, Belgium, the Netherlands, Slovakia and Finland.

The share of students enrolled in VET programmes at ISCED level 3 increased in 11 countries between 2000 and 2007. Italy, Malta, Spain, Hungary, Finland and Sweden witnessed a considerable increase and in Portugal the share increased to almost one third of the students from a very low level. As a result of an increase of the proportion of students following general and academic education, in some countries the enrolment in VET has decreased. Lithuania and Poland for example decreased its share by more than 30%. France and Turkey also reduced the enrolment in VET with more than 20%.

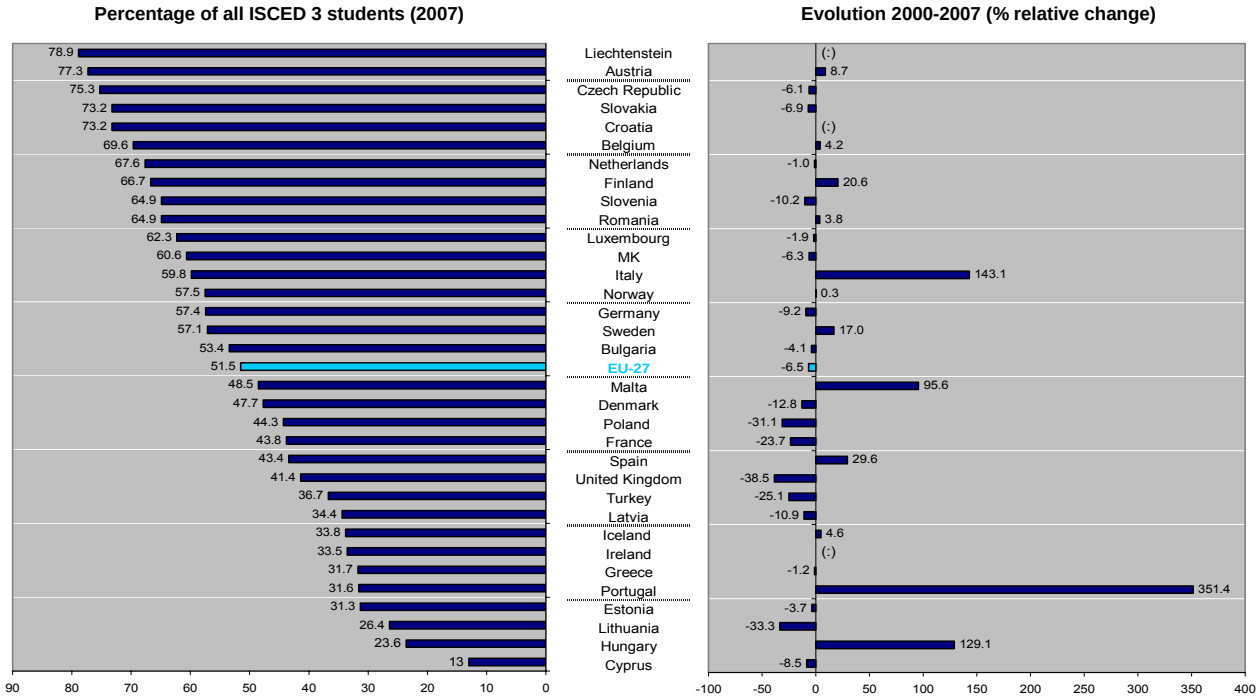
The share of students in pre vocational and vocational programmes at lower secondary level (ISCED 2) is low or non-existing in most Member States, except in Belgium and the Netherlands, where more than one in four students is enrolled in vocational programmes.

Vocational programmes are predominant at post secondary non-tertiary level (ISCED level 4) where over 90% of the full-time equivalent students follow vocational programmes.

The demographic changes will have an impact on education and training systems in the European countries (see introduction). In some European countries the population aged 15-to-19 will fall by 30% between 2005 and 2015. The number of VET students at upper secondary level is expected to decrease by more than 2 million from 11.5 million in 2005 to 9.6 million in 2030 (CEDEFOP) if the current enrolments patterns will remain stable.

One way to grasp the image and attractiveness of initial VET is to look at the student's 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.

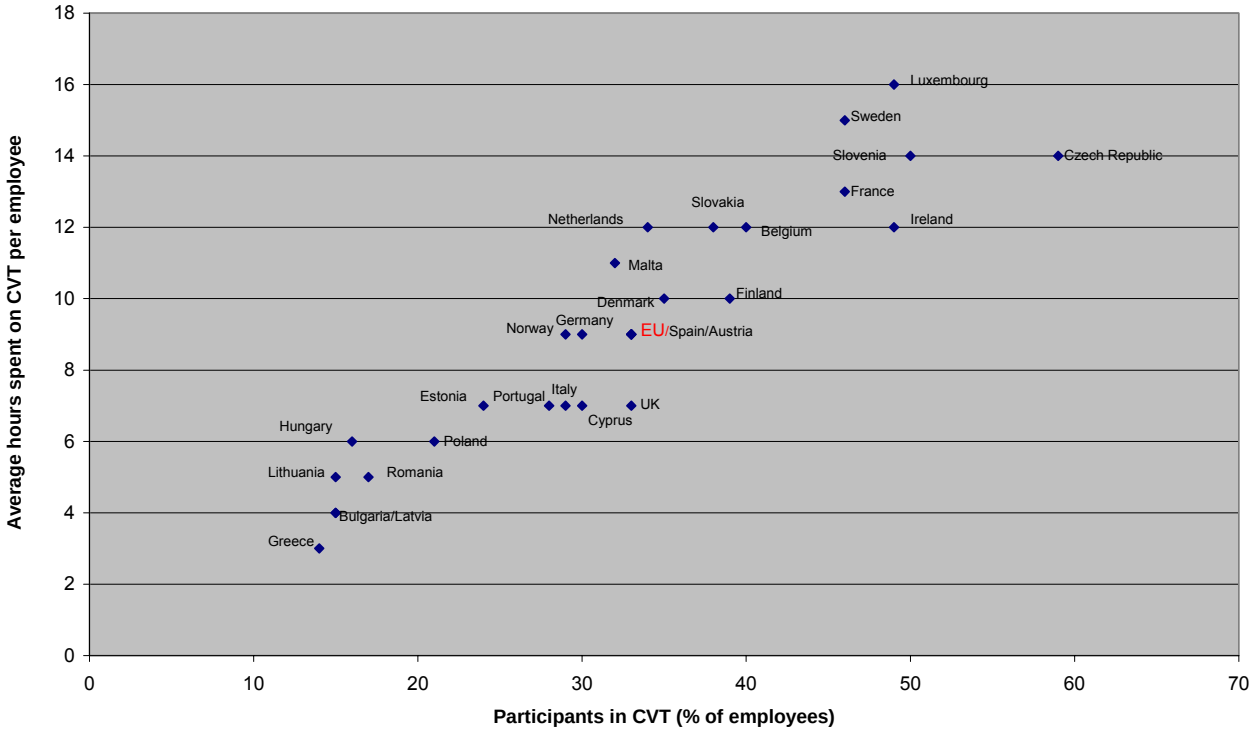
Chart II.2.2: Participation patterns in initial VET in EU countries
Students in vocational programmes at ISCED level 3 as percentage of all ISCED 3 students



Source: DG Education and Culture - *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. Changes in UK and France due to methodological changes and these changes will also affect the change in the figure for the EU average.
For additional notes see: http://epp.eurostat.ec.europa.eu/portal/page?_pageid=0,1136184,0_45572595&_dad=portal&_schema=PORTAL

Chart II.2.3: Participation in continuing vocational training and average hours spent on CVT per employee in EU countries. 2005

Participants in continuing vocational training courses as percentage of employees in all enterprises



Data source: Eurostat (CVTS),
Additional notes: 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.

Participation in continuing vocational training

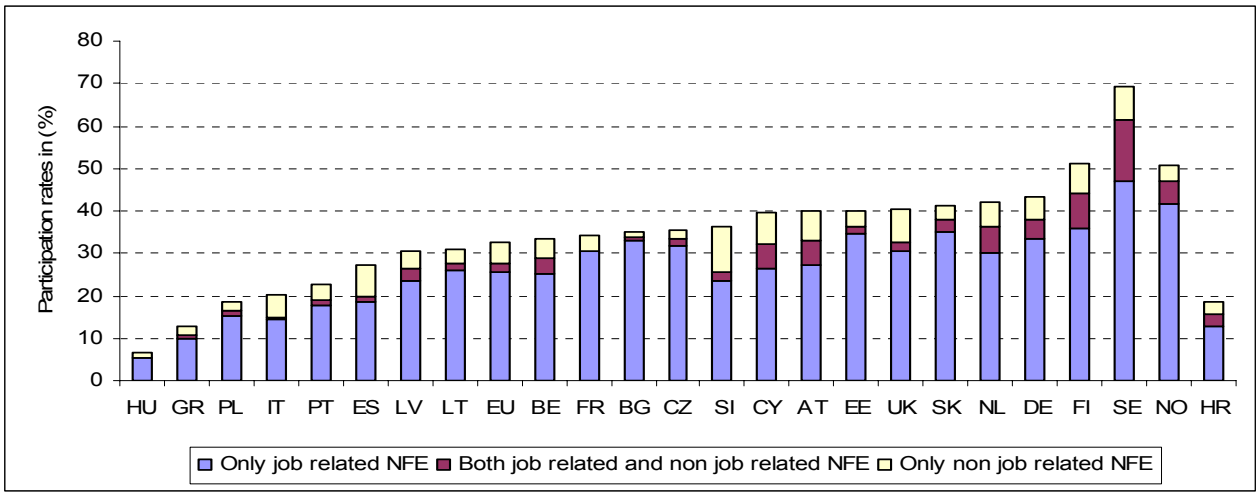
Monitoring the provision of CVT is here mainly done with reference to participation rate (calculated as a proportion of employees receiving training in a given period) and training hours per employee.

In 2005 the participation rate in CVT courses was on average 33% (down from 40% in 1999) in the participating EU countries. Participation varied from 14% in Greece and 15% in Bulgaria, Latvia and Lithuania to 59% in the Czech Republic. Most eastern Member States and Portugal and Spain showed considerable increases in participation during the reference period.

In 2005 the average annual hours spent in CVT courses per employee varied between 3 in Greece and 16 in Luxembourg. The training duration has followed the same pattern as the participation and increased in nearly all the eastern Member States for which data exists. 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 Latvia, Bulgaria, Lithuania, Hungary, Romania and Greece. (see Annex Table Ann II.3)

One additional source of information which could be used to analyse adult participation in job-related education and training is the Adult Education Survey (See chapter III.5). A common trend among all participating countries is that the large majority of training is in job-related activities. There are large country differences in the participation in job-related education of adults (see chart II.2.4). The Nordic Countries together with Germany, the Netherlands, United Kingdom, Slovakia and Estonia have more than 40% participation rates in education and training. Sweden has the highest share of job-related activities with 60% of adults participating in at least one job-related activity. AES data also show that participants highlight "*to do a better job and improve career prospects*" as the most important reason to participate in non-formal education and training. The AES survey indicates that it is employers that are the leading providers of non formal education and training. (see chapter III.1)

Chart II.2.4: Participation in job-related/non job-related education and training (%), age 25-64, 2007



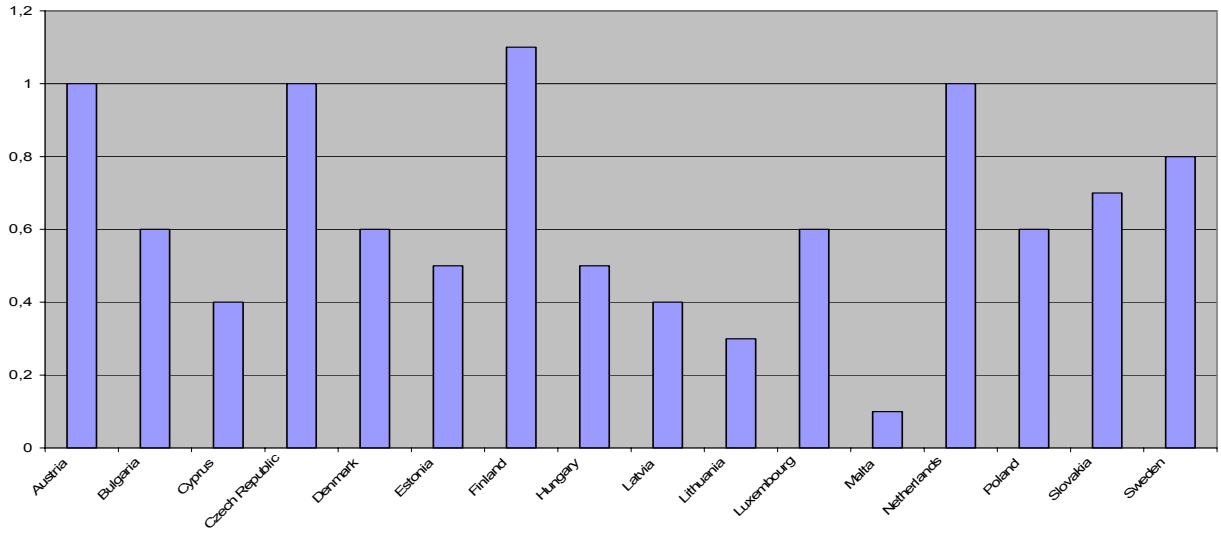
Data source: Eurostat (AES),
NFE: Non-formal education,

2.2 Investment in VET

Investment in initial VET

Data on educational expenditures on vocational programmes from the UOE data collection are only available for 16 European countries for 2005. Data show wide variations between European countries in their levels of total public expenditure on secondary-level VET programmes as a percentage of GDP ranging from 0.3% to 1.1%. Finland had the highest relative spending at 1.1% of GDP, followed by Austria, the Czech Republic, and the Netherlands, all of which allocated 1% of their GDP to VET.

Chart II.2.5 Total public spending on secondary education – pre-/ vocational/vocational programs in % of GDP, 2005



Source: Eurostat, UOE

Investment of enterprises in continuing vocational training

The investments in vocational training of European employers are between 60 Euro per employee in Latvia and 993 in Denmark (in Purchasing Power Standards). The average figure dropped by nearly 30% from 633 Euro in 1999 to 461 Euro in 2005. However some countries have witnessed a sizeable change for example Slovenia, Romania, Hungary, Lithuania and Poland increased their investments substantially in the period although from very low levels. Country rankings by cost of CVT courses follow closely those by participation and training duration. With the exception of Slovenia, the cost of vocational training per employee is much lower in the eastern Member States (see Table Ann II.4).

A similar pattern can be observed for the cost of vocational training as a proportion of total labour costs: it follows closely the participation figures. The share of enterprises' investment in vocational training as a

share of total labour costs also decreased from 1999 to 2005. For the average of the EU, the share decreased from 2.3% in 1999 to 1.6% in 2005. In more than half of the countries participating in CVTS this share dropped and only one third of countries experienced an increase. In 2005 the share varied from 0.6% in Greece to 2.7% in Denmark.

Under the current economic downturn, a typical firm that is hit by the recession could find it harder to finance training on the job. As shown by the CVTS 3 results, a decrease in employers' investment in training would be all the more worrying as expenditures on continuous vocational training courses by enterprises had already fallen before the crisis. Evidence from past downturns suggests that training is more likely to hold up within firms having clear training plans and budgets and firms operating in markets subject to rapid technological change. Training is also strongest in sectors and occupations where training was partly dictated by government and professional regulations of different kinds and/or quality assurance.[29]

2.3 Third country comparisons

Cedefop [30] has compared some of the European priorities in the Copenhagen process (such as rising the attractiveness of VET and the responsiveness to labour market needs) with examples of VET policies in advanced economies (Australia, Canada, Japan and the United States) and in emerging economies (China, India, Russia and South Korea).

According to Cedefop, in the advanced economies there is a negative image of VET which continues to have a low status and is seen as a second-best option for students and for low achievers. Consequently, the proportion of graduates from VET is lower than the average of 50% in the EU. In Australia students can switch from general education to VET and vice-versa. More students than before are using VET as a bridge to access higher education in Australia. Canada, Japan and Australia have experienced an increase in higher education graduates that attend VET courses to improve their job prospects. Statistics in the emerging economies indicate that enrolment in VET at secondary level in the four countries ranges from 30% to 40%. To attract more students, setting up more vocational schools and opening access to higher education through VET studies are implemented.

2.4 Individual outcomes of vocational education and training

Currently there is a lack of robust evidence on the individual outcomes of VET. Some research (Cooke, L.P, 2003) found that vocational certification predicted 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, it appears that vocational training results in higher initial wages while apprenticeship leads to higher wages over time.

Avoiding early labour market difficulties is particularly important for youth since they may have persistent effects on employment and wages later in life. Recent evidence from CRELL based on EU-SILC data show that students who fail to attain upper secondary education are strongly penalized in terms of wages in countries with a prevalence of vocational programmes at the upper secondary level. Countries like the Czech Republic, Slovakia, and Slovenia, but also Austria, Germany and Luxembourg, where over 60% of the upper secondary students follow a vocational program, also show the highest wage penalties for lower-educated individuals. These can range between 26% and 31%. In all these countries the wage penalties for not completing upper secondary education is likely to be related to the structure of the educational system. These findings concur somehow to the idea that vocational programs offer better integration in the labour market and higher salaries.

Recent empirical findings also provide further support for the idea that apprenticeships have a positive effect on avoiding early career unemployment. The dual systems 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). 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) found that apprenticeships perform rather favourably both compared to school-based education at the same level of training and across different qualification levels. 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.

These studies show that the impact of apprenticeships on labour market success over the whole life cycle needs further study.

3. Higher education

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, while at the same time reducing the gender imbalance (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 (Council, 2006c).*
- *The benchmark of a tertiary attainment rate of 40% of 30-34 year olds by 2020 (Council, 2009).*

An overarching benchmark on learning mobility of young people (incl. in higher education) will furthermore be developed by the end of 2010. The Barcelona objective of spending 3% of GDP on research and development by 2010, also has implications for higher education, since about 22% of R&D spending in Europe goes into university-based research. Taking the policy developments and goals outlined above into account, the first section of this sub-chapter on higher education looks at the Bologna process and progress achieved in it, followed by a section on quality at institutional level. The remaining sections look at progress in participation in higher education by analysing growth in the number of students and graduates.

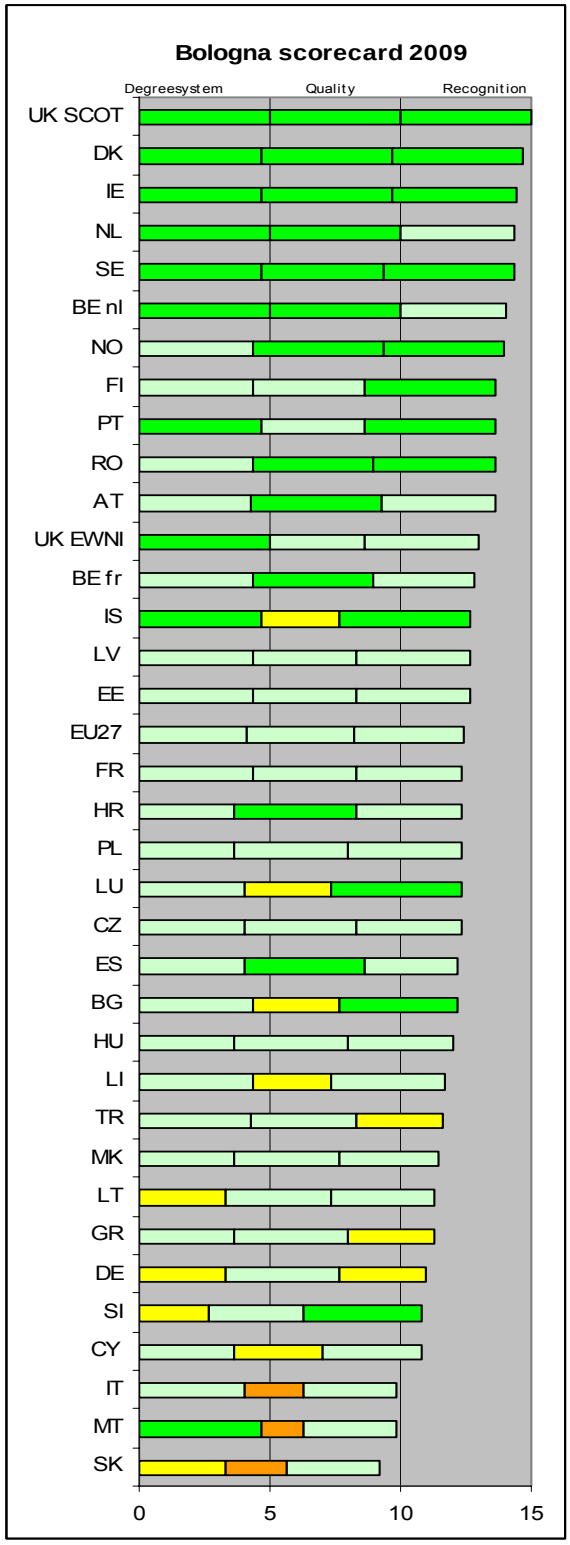
3.1 The Bologna Process in Higher Education

Currently 46 European countries are participating in the Bologna process, which started with the signing of the Bologna Declaration in 1999. Bologna aims at establishing a European area of higher education. On 28-29 April 2009 Ministers responsible for higher education met in Leuven/Louvain-la-Neuve to establish the priorities for European Higher Education until 2020. The importance of lifelong learning, widening access and mobility were underlined. The goal was set that by 2020 at least 20% of those graduating in the European Higher Education Area should have had a study or training period abroad.

A *Bologna Process Stocktaking Report 2009* was presented at the ministerial meeting in April 2009 . For each Bologna country the report has a scorecard showing performance in 10 indicators on a scale from dark green (best performance) to red (see Chart II.3.1). EU Member States in general perform well as regards the implementation of the 2 cycles (Bachelor, Master), except for Germany and Slovenia.

Implementation of the access to the next cycle is very good, while many countries still lag behind when it comes to the implementation of a national qualifications framework

Chart II.3.1: Bologna scorecards 2009, Cumulative scores for degree system, quality , recognition



The chart shows performance according to scorecards. An average score is indicated (dark green=5 score points, light green =4, yellow = 3, orange = 2, red = 1).

As regards quality assurance, progress is on average good. 6 countries have the highest scores possible (Belgium[nl] Denmark, Ireland, Netherlands, Austria, UK-Scotland), while Malta, Italy and Slovakia still lag behind. When it comes to recognition of qualifications, EU countries score high

on average, although in five countries there is slow progress in the implementation of the principles of the Lisbon Recognition Convention and another 5 EU Member States have made slow progress in the recognition of prior learning.

Overall best performers in the 10 scorecard indicators are the UK-Scotland (5.0 on average), Denmark (4.9), Ireland (4.8), the Netherlands (4.7) and Belgium (Flemish Community, 4.6). The lowest performer in the EU is Slovakia (2.9), followed by Malta (3.3) and Italy (3.3).

The assessment showed that in 2009 not all Bologna goals had yet been reached by all participating countries. In the Leuven/Louvain-la-Neuve Communiqué of April 2009 the ministers responsible for higher education therefore declared that the objectives set out by the Bologna Declaration were still valid today and that the full and proper implementation of the objectives at European, national and institutional level would require increased momentum and commitment beyond 2010 (Leuven Communiqué, April 2009, page 2).

3.2 Current International University Rankings

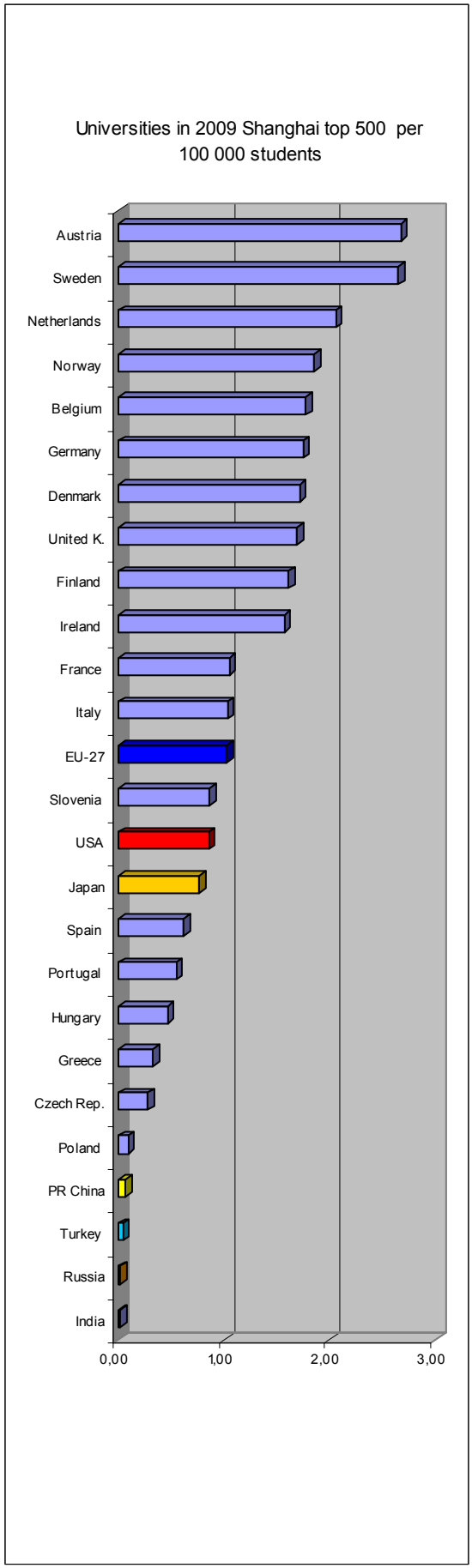
There are currently two worldwide university rankings initiatives regularly published and subject to much public debate: the Academic Ranking of World Universities (ARWU) from Shanghai's Jiao Tong University, and the World University Ranking from the Times Higher Education (THE).

In the "Shanghai" ranking institutions are ranked according to six criteria mainly related to the scientific production of the institutions. [31] The "THE" ranking on the other hand applies criteria covering the international dimension of staff and students, teachers to student ratios and peer reviews.[32]

In 2009, according to the "Shanghai" ranking, the EU-27 counted 194 institutions among the top 500 universities included in the survey, while the United States counted 152 and Japan 31. Germany and the United Kingdom had the highest number of top institutions in Europe (40 each). Out of the Central and Eastern European Member States only Poland, Hungary, the Czech Republic and Slovenia had universities in the top 500.

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, 55 are located in the United States and only 27 in the EU. The USA leads especially in terms of institutions at the very top: it has 17 of the "Shanghai" top 20 universities. The EU has only two institutions in the top 20: Cambridge ranked fourth, and Oxford, ranked tenth; Japan has one: Tokyo University, that ranked 19th).[33]

Chart II.3.2: Universities in Shanghai Top 500 list (2009) per 100 000 tertiary students



Considering the number of national institutions represented, the Netherlands, has 12 of its 13 comprehensive universities on the list of the worlds top 500 universities. Also Sweden (11 out of 17) and Denmark (4 out of 9) perform relatively 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 universities[34]) in the top 500 than the USA with its almost 4 350 higher education institutions. In Europe one out of 21 higher education institutions is represented in the list. For the US the ratio is about 1 out of 35 higher education institutions.

This picture is confirmed if the number of universities in the top 500 is related to the number of tertiary students (See Chart II.3.2.).

In the EU in 2008 there were 1.0 higher education institutions per 100 000 students in the top 500 World list of the Shanghai ranking.

The figure for the US is 0.9. This implies that on average, higher education students in the EU profit from a better presence of good quality institutions (not withstanding any difference in average size of institutions between the EU and US). 11 Member States have higher ratios in this respect compared to the US average and in the case of the Netherlands, Austria, Finland and Sweden the mentioned ratio is more than two times higher than the US (more than 2.0 higher education institutions in the top 500, per 100.000 students).

One question central to the use of international rankings of universities is of course to which degree the results are dependent on the indicators used and the weight given to indicators. A recent study by the CRELL research centre (JRC, Ispra) [35] examined the robustness of the ranking in both the Shanghai and THE rankings. The analysis concludes that these two rankings are stable and reliable when it comes to the very top and bottom of the rankings. Stanford, Harvard, Berkeley, MIT and Cambridge universities come out at the top of the list whatever indicators are used and whatever weighting is attributed. However, when it comes to the middle range of the list, the ranking becomes extremely sensitive to criteria and weightings. This is noteworthy because it provides insight into the average profile and performance of top US and European universities within the frame of the indicators that are used in the rankings.

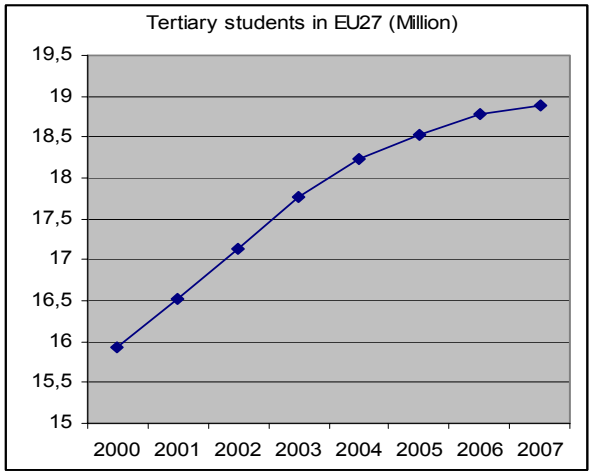
Ranking activities should consider that there is a variety of types of higher education institutions. The European Commission currently runs a research project on the typology of higher education institutions. The Commission has furthermore launched in May 2009 a feasibility study to develop a global multi-dimensional university ranking. By the end of 2009 the project consortium will design a ranking system for higher education institutions in consultation with stakeholders and from January 2010 to the end of May 2011 the project will test its feasibility on a representative sample, focusing on engineering and business studies. The final report will include recommendations on how this ranking system could be implemented on a European and global level.

3.3 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 relatively high wage levels and low 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.
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. 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. With Bologna counting of graduates will be more systematic and statistics become more comparable.

General student population trends

Chart II.3.3: Tertiary students (2000-2007)



In 2007 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. The student-age population has declined slightly in the recent past (-1.8% between 2000 and 2007), with large differences in trends between Member States. 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 a growth of 18.5% (chart II.3.3) in the number of tertiary students in the EU over the period 2000-2007 or, on average, 2.5% per year (Table II.3.2). In 2007 the number of students increased by 0.5%, less than in previous years, to 18.9 million (of whom 55% were female).

Table II.3.2: Tertiary students (2000-2007)

	Number of tertiary students (in 1000)			Growth per year
	2000	2006	2007	2000-07
EU-27	**15920**	**18783**	18879	2,5
Belgium	356	394	394	1,5
Bulgaria	261	244	259	-0,1
Czech Republic	254	337	363	5,2
Denmark	189	229	232	3,0
Germany	2055	2290	2279	1,5
Estonia	53.6	68,3	68,8	3,6
Ireland	161	186	190	2,5
Greece	422	653	603	5,2
Spain	1829	1789	1778	-0,4
France	2015	2201	2180	1,1
Italy	1770	2029	2034	2,0
Cyprus	10.4	20,6	22	11,4
Latvia	91	131	130	15,9
Lithuania	122	199	200	7,3
Luxembourg	2.4	2.7	2.7	1,7
Hungary	307	439	432	5,0
Malta	6.3	8.9	9,8	6,5
Netherlands	488	580	583	2,6
Austria	261	253	261	0,0
Poland	1580	2146	2147	4,5
Portugal	374	367	367	-0,3
Romania	453	835	928	10,8
Slovenia	84	115	116	4,7
Slovakia	136	198	218	7,0
Finland	270	309	309	1,9
Sweden	347	423	414	2,5
United Kingdom	2024	2336	2363	2,2
Croatia	:	137	140	:
MK*	36.9	48,4	58,2	6.7
Turkey	1015	2343	2454	13.4
Iceland	9.7	15,7	15,8	7.2
Liechtenstein	0.5	0,6	0,7	4.9
Norway	191	215	215	1.7

Source: Eurostat (UOE),

*MK= Former Yugoslav Republic of Macedonia
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

Higher education graduates

The total number of tertiary graduates has increased in the EU 27 since 2000 by 35% or 4.3% per year and hence nearly twice as fast as the general student population.

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 5A) has more than doubled since 2000 to reach about 154 000 in 2007, while the number of first degrees in this period grew only by 23%.

Table II.3.3: Tertiary graduates (2000-2007)

	Number of tertiary graduates (in 1000)			Growth per year
	2000	2006	2007	2000-07
EU-27	**2873**	**3820**	**3865**	**4.3**
Belgium	68.2	81.5	104.0	6.2
Bulgaria	46.7	45.4	49.2	0.7
Czech Republic	38.4	69.3	77.6	10.6
Denmark	39.0	47.5	50.8	3.9
Germany	302.1	358.7	376.9	3.2
Estonia	7.7	11.5	12.6	7.3
Ireland	42.0	59.2	59.0	5.9
Greece	:	:	60.5	:
Spain	260.2	286.0	279.4	1.0
France	508.2	643.6	622.9	3.0
Italy	202.3	279.5	256.4	3.4
Cyprus	2.8	3.9	4.4	6.8
Latvia	15.3	26.4	26.8	8.3
Lithuania	25.2	43.3	43.2	8.0
Luxembourg	:	:		:
Hungary	59.9	69.8	67.2	1.7
Malta	2.0	2.7	2.7	4.5
Netherlands	76.9	117.4	96.0	2.7
Austria	25.0	34.8	36.4	5.5
Poland	350.0	504.1	532.8	6.2
Portugal	54.3	71.8	83.3	6.3
Romania	67.9	174.8	206.0	17.2
Slovenia	11.5	17.1	16.7	5.5
Slovakia	22.7	40.2	46.4	10.7
Finland	36.1	40.6	42.3	2.3
Sweden	42.4	60.8	60.2	5.1
United Kingdom	504.1	640.2	651.1	3.7
Croatia	:	20.7	22.2	:
MK*	3.9	6.5	8.7	12.2
Turkey	190.1	373.4	416.3	11.9
Iceland	1.8	3.4	3.5	10.2
Liechtenstein	:	0.13	0.15	:
Norway	29.9	33.5	35.4	2.4

Source: Eurostat (UOE),

*MK= Former Yugoslav Republic of Macedonia

As regards the overall number of graduates growth was particularly strong (more than 10% per year) in Romania, the Czech Republic and Slovakia, where the number of students expanded strongly around 2000.

The number of tertiary graduates per 1000 young people aged 20-29 has increased in the EU by about 37% (because of shrinking cohort size hence faster than growth in absolute numbers) in the period 2000-2007 to reach about 59 today.

However, in 2007 growth in the number of tertiary graduates decelerated. In some countries there was even a slight decline in the number of graduates compared to the year before. The number of graduates declined in several large Member States including Italy, France and Spain.

The comparison with other countries shows a strong 2000-2007 growth in graduates in emerging economies like Russia, China and Brazil. This is a result of a strong growth in the tertiary student population and of growing participation rates.

Table II.3.4: Tertiary graduates in Third countries

	Students (1000)		Graduates (1000)		Growth per year, %
	2000	2007	2000	2007	2000-07
Belarus	460	557	77.6	108.3	4.9
Moldova	:	148	16.9	21.6	3.6
Russia	8020	9 370	1190.6	1991.5	7.6
Ukraine	2130	2 819	424.6	558.8	4.0
Armenia	:	107	11.4	16.0	5.0
Azerbaijan	:	135	24.8	29.1	2.3
Georgia	:	141	21.4	34.7	7.1
Algeria	:	902	:	120.2	:
Morocco	276	369	27.3	88.1	18.2
Tunisia	180	326	19.6	56.6	16.4
Libya	290	375 05	:	:	:
Egypt	:	2 495 05	342.3	:	:
Lebanon	:	187	14.4	32.2	12.2
Palest.	:	169	11.6	21.9	9.5
Israel	256	327	62.4	76.7	3.0
Australia	845	1 084	168.9	282.9	7.6
Canada	1 221	1 327 05	225.1	:	:
Korea	2 838	3 209	493.0	604.9	3.0
India	9 404	12 853	:	:	:
China	7 364	25 346	1776	5872.8	18.6
Mexico	1 963	2 529	299.1	422.3	5.1
Brazil	2 781	5 273	348.0	820.5	13.0
USA	13202	17759	2151.0	2704.1	3.3
Japan	3982	4033	1081.4	1062.4	-0.3
EU-27	15 920	18 530	2873.4	3864.8	4.3
World (Mio)	103	150	:	:	:

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 world tertiary student population has grown by a third since 2000 to reach about 150 million in 2007. 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 25.3 million in 2007. China now has more students than the EU or North America. The four BRIC countries (Brazil, Russia, China, India) have more tertiary students than the EU, North America and Japan combined. Today developing and emerging countries represent the majority of tertiary students worldwide.

As a result of strong growth in student numbers China has in 2006 overtaken the EU to become the world's leading producer of tertiary graduates. However, the EU in 2007 still had over 1 million more tertiary graduates than the US. Russia, Japan and probably also India are other countries that produce more than 1 million graduates per year (Table II.3.4).

Countries that produce a high number of graduates per 1000 young people (> 80) include Denmark, Lithuania and the UK, while at the same time Germany, Italy, Cyprus and Austria produce relatively few each year (< 40/ 1000 young people). 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

Table II.3.5: Tertiary graduates by ISCED level, 2000-2007

	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	2007	2000	2007
EU-27	**43e**	**59**	**1.1**	**1.3**
Belgium	51.4	78.7	0.8	1,3
Bulgaria	38.1	45.0	0.3	0,6
Czech Republic	22.4	51.2	0.6	1,5
Denmark	54.0	81.8	1.0	1,6
Germany	31.0	38.5	2.1	2,4
Estonia	34.0	62.4	0.6	0,8
Ireland	70.4	78.9	0.9	1,4
Greece	:	40.0	:	1,6
Spain	39.5	43.2	0.9	1,1
France	64.3	76.7	1.2	1,3
Italy	24.8	38.0	0.4	1,5
Cyprus	28.6	33.9	0.1	0,1
Latvia	46.7	77.3	0.1	0,4
Lithuania	51.8	86.5	0.9	0,7
Luxembourg	12.1	:	:	:
Hungary	37.5	47.0	0.5	0,7
Malta	36.9	45.7	0.1	0,2
Netherlands	36.1	48.9	1.0	1,6
Austria	24.1	34.4	1.4	2,0
Poland	58.1	83.4	:	1,0
Portugal	30.5	57.4	1.6	4,2
Romania	19.4	60.8	:	0,9
Slovenia	39.0	57.6	1.0	1,4
Slovakia	25.4	51.2	0.6	1,5
Finland	56.3	63.8	2.7	2,9
Sweden	38.0	54.7	2.5	3,5
United Kingdom	66.4	80.0	1.3	2,2
Croatia	:	36.4	:	0.8
MK*	12.2	26.8	0.1	0.3
Turkey	14.7	:	0.2	0.3
Iceland	42.7	77.1	0.0	0.2
Liechtenstein	:	33.2	:	0.9
Norway	48.9	61.7	1.0	1.7

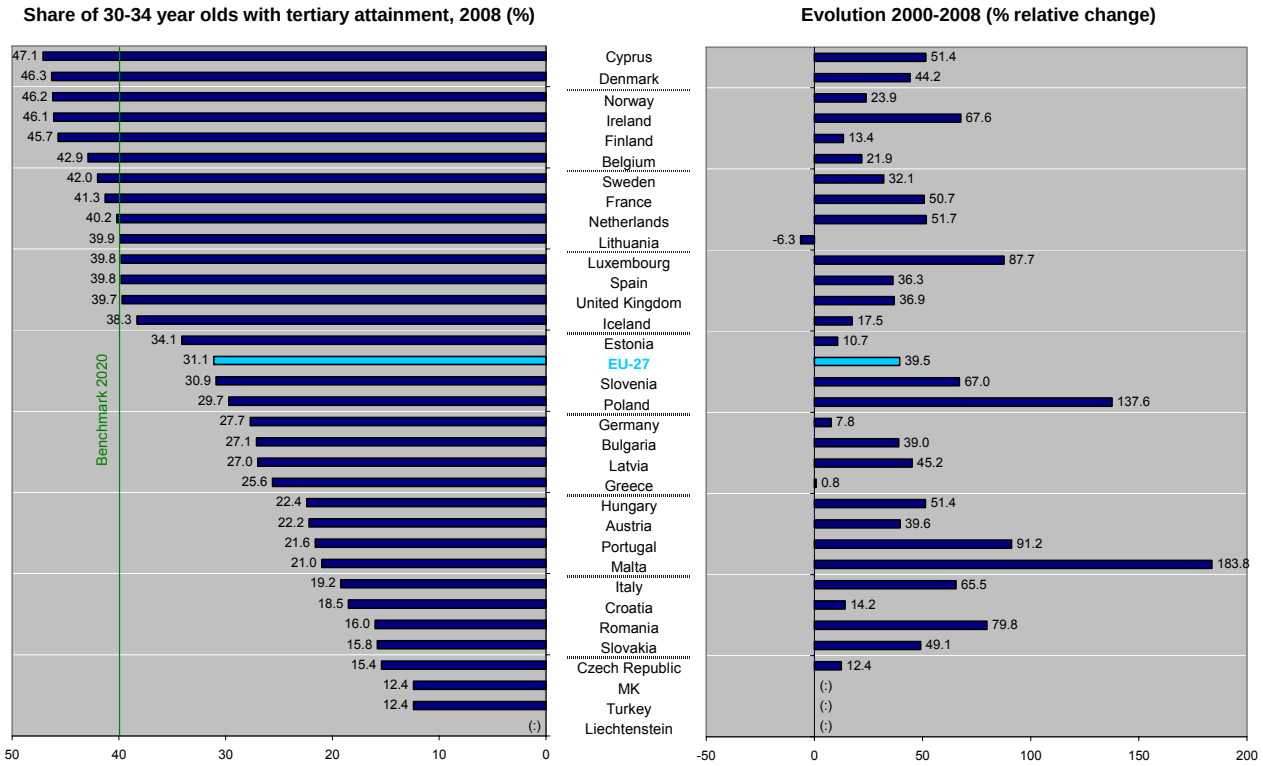
Data source: Eurostat (UOE),

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

3.4 Higher education attainment of the population

In May 2009 the Council adopted a benchmark on the tertiary attainment of the population: 40% of 30-34 year olds should by 2020 have tertiary attainment. In 2008 31% of 30-34 year olds in the EU had tertiary attainment, compared to only 22% in 2000. This represents an improvement of about 1 percentage point per year. In 2008, Cyprus, Denmark, Norway, Finland and Ireland showed the highest tertiary attainment, with rates of over 45%. Eight EU countries had already reached the 2020 target of 40%. In general Nordic countries perform well in tertiary attainment of young adults while Southern European countries (with the exception of Spain) and Central European countries with a strong vocational tradition tend to lag behind. Progress in tertiary attainment rates was strongest in Ireland, Luxembourg, Malta and Poland.

Chart II.3.4: Share of 30-34 year olds with tertiary attainment, 2000-08

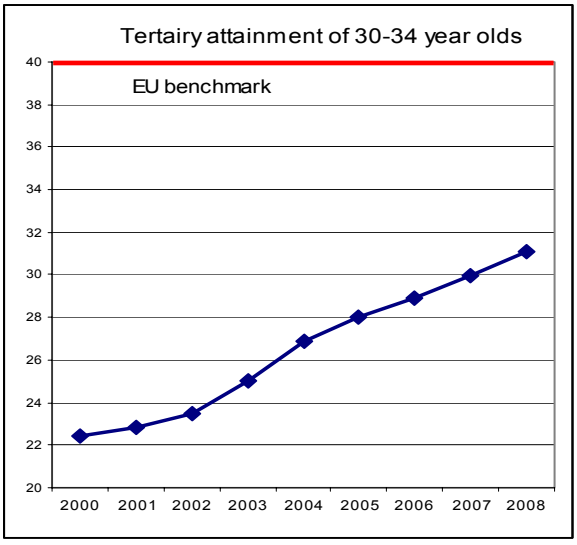


Source: DG Education and Culture - *Data source:* Eurostat
Note: Croatia: 2002 instead of 2000
*MK= Former Yugoslav Republic of Macedonia

Apart from a larger share of a cohort acquiring tertiary attainment, Ireland and Luxembourg have in this period also profited from a net migration of young adults with high educational attainment. The EU countries with the lowest tertiary attainment rates are the Czech Republic, Italy, Romania and Slovakia. The Czech Republic has not improved its tertiary attainment rate in the period 2000-2007. However, in 2008 progress in the Czech Republic in this field accelerated.

In 2006 in the EU about 29% of 25-34 year olds had tertiary attainment, compared to an average of 27% among OECD countries. In the USA and Australia tertiary attainment of young adults was 39% in 2006, some 10 percentage points higher than in the EU. The OECD countries with the highest tertiary attainment of young adults are Canada (55%), Japan (54%) and Korea (53%). Outside the OECD Russia (55%) and Israel (50%) show high tertiary attainment levels, but the results for Russia are believed to be overstated.

Chart II.3.5: Tertiary attainment of 30-34 year olds, 2000-2007



4. Labour Market outcomes

Increasing employment rates and enabling the EU to regain the conditions for full employment and to strengthen social cohesion by 2010 are among the most important objectives of the Lisbon strategy. Specific targets were set by successive European Councils on raising the overall employment rate to 70%, raising the employment rates of women to 60% and raising the employment rates of older workers (55-64 year olds) to 50 % by 2010.

There is broad agreement on policies for job-creation including active employment policies, a sound macro-economic framework, and investment in skills, research and infrastructure. Furthermore, the European Spring Council meeting in March 2008 recognised that flexicurity[36], in which lifelong learning is one the four key components, is the right approach to modernise and foster the adaptability of labour markets. Results of Lisbon related policies have also been positive. After re-launching the Lisbon strategy in 2005, and refocusing it on growth and jobs, Europe had, until 2008, produced relatively strong economic growth and increases in net job creation of about 9.5 million during 2006-2008.

However, the economic and financial crisis has impacted significantly on labour markets since then. According to the Commission spring forecast, employment is expected to contract by 2.5% in 2009 and a further 1.5% in 2010 resulting in a total loss of employment of 8.5 million in the EU. As a result, the unemployment rate is projected to increase to close to 11% in the EU by 2010 and the overall employment rate to fall from around 66% in 2008 to around 63.5% by 2010. Consequently, the target of 70% set within the Lisbon strategy appears out of reach for the near future (The Commission Economic Forecast Spring 2009).

This section focuses on skills and knowledge as central parameters for labour market outcomes and employability. The core indicator for measuring progress in this area is the share of the adult population with high educational attainment, which can be seen as a proxy for the high skilled workers available to an economy. [37]

The section is organised as follows: section 4.1, will explore the educational attainment of the population with a specific focus on the 25-64 year olds group, Section 4.2, will highlight the relationship between educational attainment and employment rates with a particular focus on the economic crisis. Finally, section 4.3, will look at the responses to medium and long term challenges in both shifts in skills demand and demographic development (drawing on the New Skills for New Jobs initiative).

4.1. Educational attainment of the adult population

The level of educational attainment of the adult population (aged 25 to 64) provides a crude measure of the knowledge and skills available in each country.[38] It represents the educational characteristics of the supply side of the labour market.

In 2008 at the EU level less than one third (28.5%) of the adult population had low level of educational attainment, almost half (47.2%) had a medium level and almost a quarter (24.3 %) a high level (see Table II.4.1 and Table Ann II.10). Compared with 2000, the share with low educational attainment had decreased by 7.1 percentage points while the share with medium and high educational attainment had increased by 2.3% and 4.8% respectively. Nevertheless, in 2008 almost 77 million persons aged 25-64 in Europe had low levels of formal educational qualifications, approximately 12 million fewer than in 2000.

Table II.4.1. Educational attainment (2000-2008) (25-64 year olds)

	Share of population (EU-27) in %		
	2000	2008	Change
Low educational attainment[39]	35.6	28.5	-7.1
Medium educational attainment	44.9	47.2	2.3
High educational attainment	19.5	24.3	4.8

Source: EUROSTAT (LFS)

Between 2000 and 2008 in every Member State – except for Denmark (see Table Ann II.10) - there was a shift in the adult population from low levels of educational attainment to medium and high levels. Spain, Belgium, Bulgaria, Ireland, Cyprus and Hungary experienced a more than 10 percentage point decrease in the share of the adult population with low educational attainment.

Share of the adult population with high educational attainment.

The core indicator: **Share of the population with high educational attainment**

The Council Conclusion of May 2007 adopted educational attainment of the population as one of sixteen core indicators for measuring progress on education and training systems.

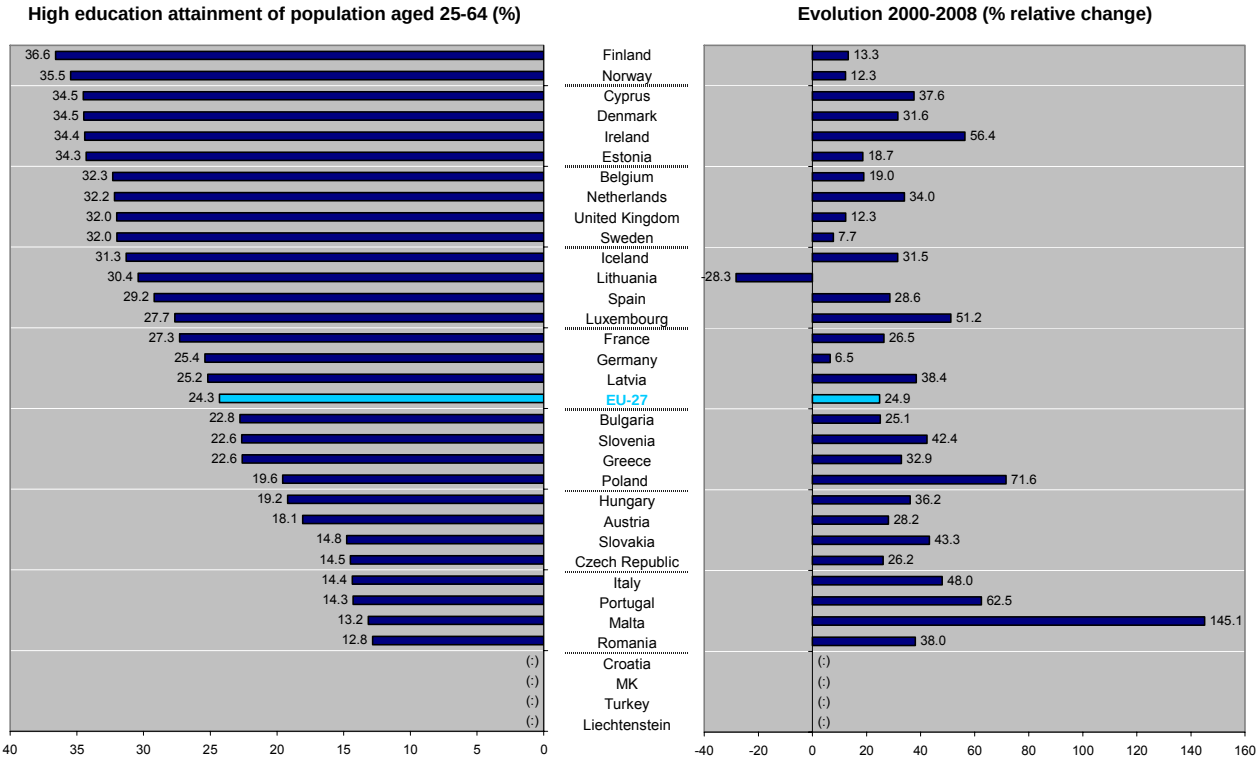
The Commission emphasised the **Share of the population with high educational attainment** as the central indicator for monitoring progress towards the knowledge-based economy.

Whereas the basic requirement for the post-war economy was secondary education, the one for a knowledge-based 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.[40] This 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.

The percentage of the adult population with a high level of educational attainment varies between 12.8% in Romania and 36.6% in Finland. Finland, Norway, Denmark and Cyprus are the four best performing countries (see Chart II.4.1) while Malta, Poland and Portugal have experienced the strongest growth over the period 2000-2008.

Chart II.4.1: High education attainment of the adult population aged 25-64 in %



Source: DG EAC - *Data source:* Eurostat (LFS)

Table II.4.2. High educational attainment of 25-64 year olds (in %)

	2008
EU27	24.3 [1]
USA	39
Canada	47
Japan	40
Australia	33
Korea	33
Mexico	15
New Zealand	38
Russian Federation	54 [2]
Brazil	8 [3]

Data source: OECD and EUROSTAT (LFS)
1. Year of reference 2008
2. Year of reference 2002
3. Year of reference 2004

While on average the share of the EU's adult population with high educational attainment is still clearly below key competitors (see Table II.4.2.); there is wide variation between EU countries and some are performing close to world leaders. The Russian Federation is the best performer at 54% (though figures might be overstated), Canada second best at 47%, US and Japan both have a share of around 40% of 25-64 year olds with higher education while Mexico and Brazil perform at substantially lower levels than EU27.

Generational differences

The cause of the increase in the share of the population with high educational attainment is that younger generations are better educated than older ones. As illustrated in Table II.4.3 - using a five year age group entering the labour market and a five year age group leaving the labour force - the skills profiles of the older generations are very different from the profiles of the younger generations.

Table II.4.3. Educational attainment (EU-27) 2008 (in %)

	Low	Medium	High
25-29 year olds	19.2	50.0	30.8
60-64 year olds	44.4	38.5	17.0

Source: EUROSTAT (LFS)

The proportion of 25-29 year olds with low educational attainment is almost 25 percentage points lower than the corresponding proportion of 60-64 year olds, while the shares with medium and higher levels are about 13 percentage point higher each. At the level of individual countries this shift is most noticeable in Ireland, Italy, Greece and Cyprus where the proportion of 25-29 year olds with low educational attainment is more than 40 percentage points lower than the corresponding proportion of 60-64 year olds with this level.

Gender differences

Women have experienced the strongest shift towards high educational attainment between 2000 and 2008 (Table II.4.4) and in 2008- for the first time- the share of females with high educational attainment across the EU surpassed that of men.

In the majority of countries the share of women with high educational attainment is greater than the corresponding share of men - still, in the Czech Republic, Germany, Greece, Luxembourg, Malta, the Netherlands, Austria and Romania the opposite is the case.

Table II.4.4. Educational attainment of men and women (2000-2008) (25-64 year olds)

	Men			Women		
	2000	2008	Change	2000	2008	Change
High educational attainment	20.6	23.8	3.2	18.5	24.7	6.2

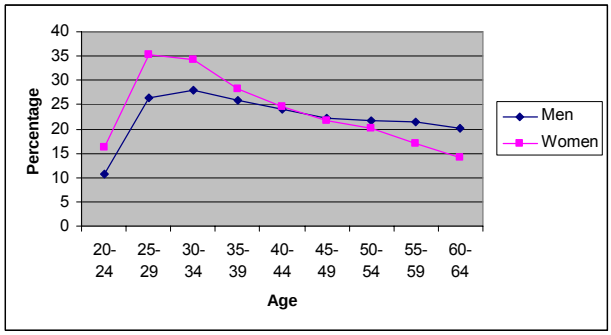
Source: EUROSTAT (LFS)

Generational and gender differences

Thus the last 20 years have brought about a major change in the relative share of men and women with high educational attainment. In the younger age groups (i.e. until 45 year olds), the share of women with high educational attainment is clearly greater than the corresponding share of men. In the age-groups older than 45 year olds, the opposite is the case – men have a greater share with high educational attainment than women.

Chart II.4.3 illustrates that while men have become better educated over the last 20 years (i.e. the share of 30-34 year olds with high educational attainment is 6.4 percentage points higher than the share of 50-54 year olds with the same educational level), women have experienced a much stronger shift in educational attainment. The share of 30-34 year old women with high educational attainment stands at 34.3% i.e. 14.1% higher than the corresponding share for 50-54 year old women.

Chart II.4.3. Generational differences in the share of men and women with high educational attainment, 2008



Source: EUROSTAT (LFS)

4.2. Educational attainment and employment rates

This section illustrates the overall link between educational attainment levels and employment rates and explores how the economic crisis has influenced this relationship.

'Observation on data'

The age span 15-64 is used in this section to ensure correspondence with labour market statistics (and the overall Lisbon goals) which uses this age span to measure activity, employment and unemployment rates. However, since the majority do not reach their final educational attainment level before reaching their twenties (or even mid to late twenties), this implies that people still in education are included as people with low educational attainment levels when calculating the employment rate (the denominator). The consequence is that the employment rates of people with low educational attainment is lower than it would have been if people still in education had been excluded from the denominator.

General trends

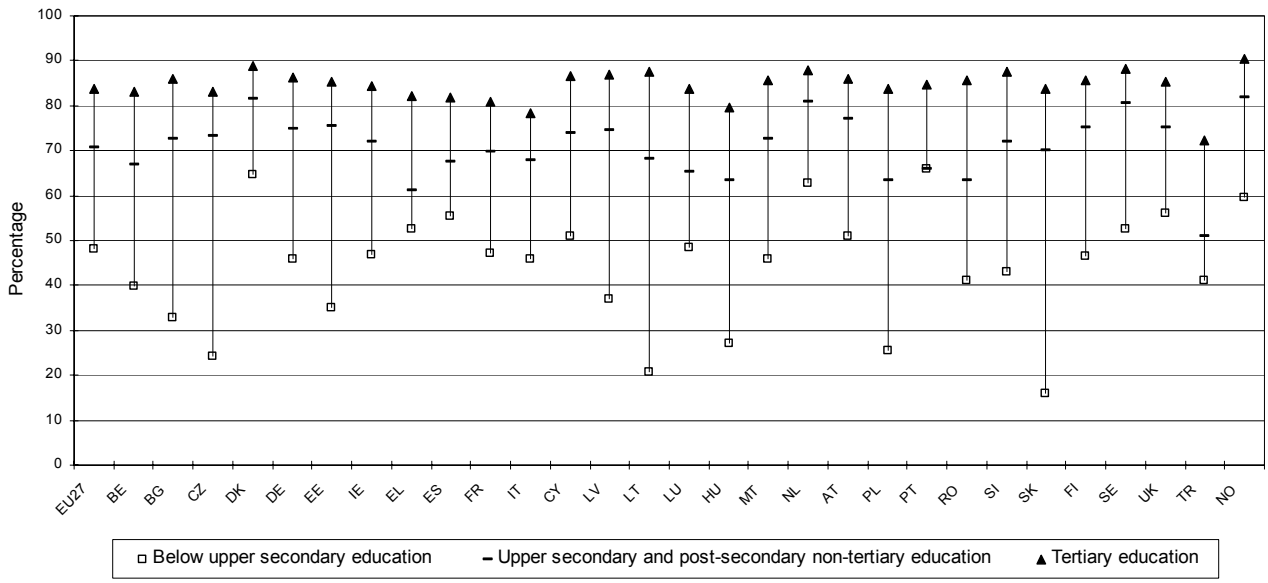
Research over the past decade has produced ample evidence that the monetary and non-monetary prosperity of individuals is related to their level of education and training. Education yields substantial returns to the individual in terms of earnings and employability and significant gains in economic growth and wider social benefits. However, while human capital theory does offer powerful explanations of relationships between the level of education and labour market outcomes, alternative theories qualify the role of human capital in several ways. The *screening theory* sees education as a "filter" mechanism that serves, at least partly, to reveal innate abilities rather than raising them. According to the *job competition* theory education

and training are used as weapons in the struggle for jobs. The *labour market segmentation theory* emphasizes the role of social barriers in the determination of employment opportunities while education plays a lesser role.

Given that most European countries has 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, measured in terms of student performance on cognitive achievement tests yield substantial payoffs on the labour market for the individual and society alike (Barro 2001 and Wößmann 2002).

In general, there is a positive relationship between educational attainment and employment rate. Yet, employment rates for the population with low level of education are significantly different among EU countries.

Chart II.4.4. Employment rates and educational attainment, in % (2008)



Source: Eurostat (LFS)

The overall tendency is clear across European countries - the higher the educational attainment is, the higher the employment rates are (see chart II.4.4 or Table II.4.5); The overall employment rate has improved by more than 3 percentage points (from 62.1% in 2000 to 65.9% in 2008, see Table II.4.5). The employment rate of people with low educational attainment levels was slightly decreasing; while the employment rates of people with medium (from 68.3% to 70.6%) and high educational attainment (from 82.4% to 83.9%) are moving upwards.

In some 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). As suggested above (observation on the data) this is also a consequence of the fact that the use of the age group 15-64 tends to under estimate the employment rate of the low educated.

Still, there are clear differences between countries in how people with different educational attainments perform on the labour market. This is particularly true for people with low educational attainment. Even when analysing the age-group 25-64 where this issue should be eliminated, the employment rate for this group varies between 32% in Slovakia to 72% in Portugal.

For people with medium levels of educational attainment the employment rate varies between 61% in Greece to 82% in Denmark while the employment rates for people with high educational attainment is below 80% only in Italy and Hungary. However, in the majority of EU countries (two-third of the Member States) it is well-above above 85% (chart II.4.4).

Table II.4.5 Educational attainment and employment rates (2000-2008)

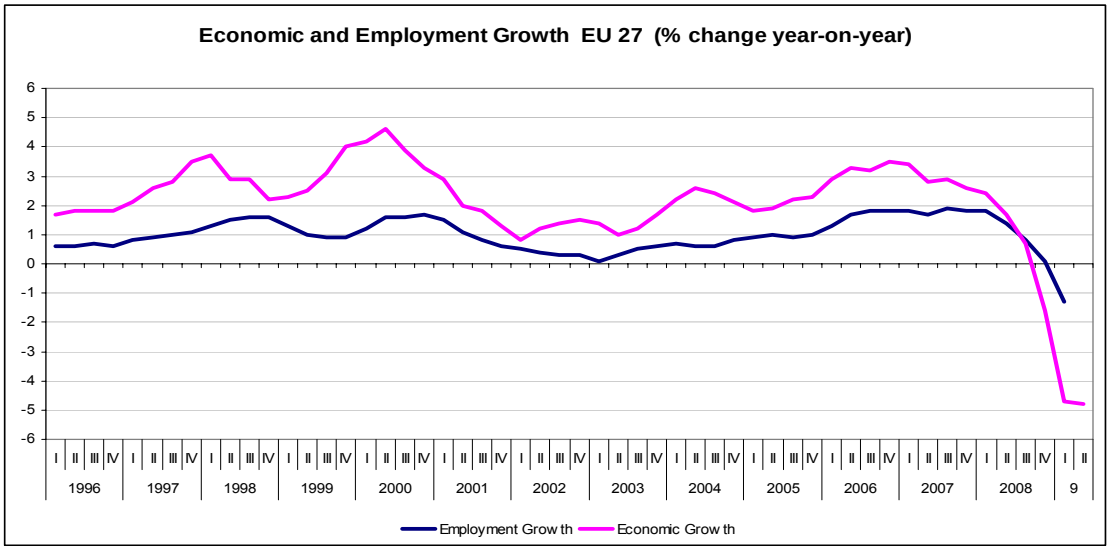
	Share of population (EU-27) (15-64) years old			Employment rates (EU-27) (15-64) years old		
	2000	2008	Change	2000	2008	Change
Low educational attainment	37.8	32.1	-5.7	48.8	48.1	-0.7
Medium educational attainment	45.1	46.6	1.5	68.3	70.6	2.3
High educational attainment	17.1	21.3	4.2	82.4	83.9	1.5
Overall	N.A.	N.A.	N.A.	62.1	65.9	3.8

The share of the population with low educational attainment has decreased remarkably (by 5.7%) while the share with medium and particularly high educational attainment has increased correspondingly (Table II. 4.5). These data illustrate that while structural reforms, which target employment rates, may have had a clear impact on the overall improvement in the employment rate, so have changes in the educational attainment of the population which have changed the educational composition of the population in the period 2000-2008 resulting in an overall increase of the employment rate (See Gros, D., 2006a for a similar argument).

Recent developments due to the economic crisis

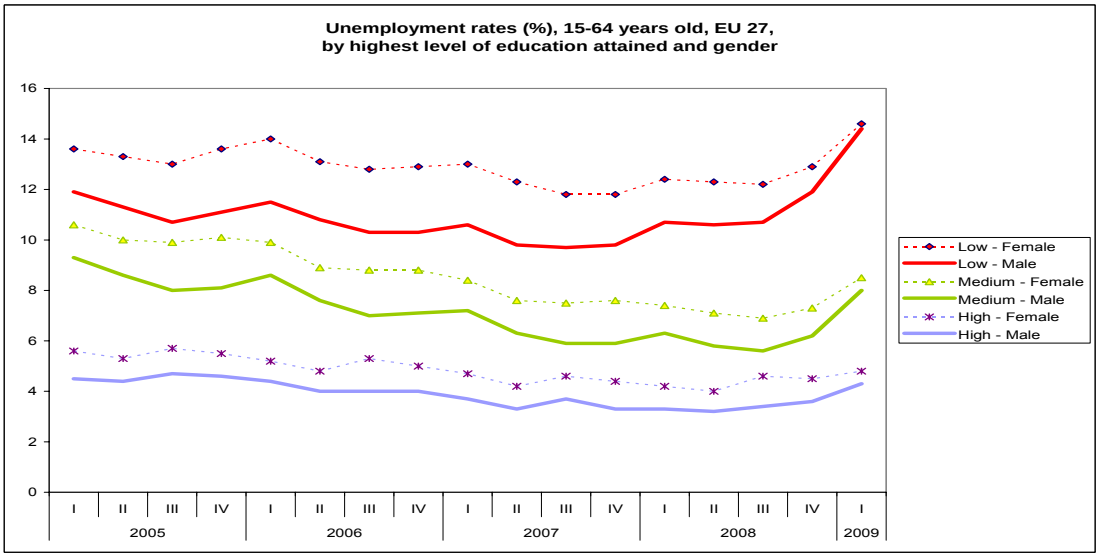
The economic downturn is bound to hit employment hard. The effect is just becoming visible because employment growth typically lags business cycle fluctuations (Chart II.4.5). Labour market conditions started to deteriorate by end 2008 and in the first quarter 2009 the number of persons in employment[41] decreased by 1.3% with respect to the same period of the previous year. By March 2009, there were four million more unemployed people than in the first quarter of 2008. Everything points to a sharp increase in unemployment rates in the near future. In May 2009, the European Commission forecast the unemployment rate to reach 10.9% by 2010 in the EU.[42]

Chart II.4.5: Economic and Employment Growth EU 27 (d)



Data source: Eurostat (European Quarterly National Accounts), extraction date 21/08/09
(d) Economic growth is the annual percentage change in Gross Domestic Product in volume. Employment growth is the annual percentage change in total employment (domestic concept). All percentage changes are with respect to the same period of the previous year. All data seasonally adjusted.

Chart II.4.6: Unemployment rates (%) by highest level of education attained and gender 15-64 years old, EU 27



Data source: Eurostat (LFS) extraction date 27 August 2009

Are the less educated workers more affected by the worsening of the labour market conditions that their more educated counterparts? The most recent data (last two quarters of 2008 and first quarter 2009) is inevitably short and also reflects seasonal behaviour.[43] But combined with data from previous years, it can however shed some light on the current reaction of the labour markets to the sudden contraction in economic activity.

In 2008, the number of employed workers with high level of educational attainment was still increasing in all EU countries (see Table Ann II.11). The increase for the EU-27 as a whole attained 4.1%. Data for the first quarter 2009 (see Table Ann II.12), shows that the employment for highly educated is still increasing (3%) except in Finland, Cyprus, Lithuania and Spain.

On the contrary, the number of workers with low levels of education contracted in 2008 by 2.5% in the EU-27 (following three years of much smaller reductions). The contraction for low qualified workers is most noticeable in Lithuania, Ireland and Latvia. In five countries (Estonia, Bulgaria, Slovakia, the Netherlands and Malta) however, more low-skilled workers were being employed (see Ann II.11). Data for the first quarter of 2009 indicates (see Ann II.12) that the employment perspectives for this group have contracted by 5.2%, but exhibited increases in Malta, Bulgaria, Cyprus, Netherlands, Finland, Romania and Denmark.

In 2008, the unemployment rates rose for low educated workers in twelve countries. Unemployment rates for medium skilled workers rose in eight countries. The corresponding rate for highly-skilled workers increased in only six countries (Table Ann II.13). Quarterly data (Chart II.4.6) shows that the rate of unemployment among those with lower level of education is increasing faster. This graph also shows that by gender, low skilled males are the ones experiencing the hardest job losses. Their unemployment rate has escalated closing up the traditional gap with their female counterparts.

Consequently, analysing EU performance overall, it appears that workers with low levels of educational attainment suffer most in this phase of the economic and financial crisis.

The job crisis is particularly worrisome for young people. Typically 15 to 24 years old (and to a lesser extend 25-30 years old) face higher unemployment rates than older workers. Unemployment rates for 15-24 year olds are particularly high in Greece, Italy, Spain, Romania, Hungary and Poland (Table Ann II.15). Table Ann II.14 shows that, for the EU-27 as a whole, the economic crisis is taking its toll and those with lower education level within this age group are assuming the highest cost. In effect, the unemployment rate of 15-24 year olds with low educational attainment is 5.3 percentage points higher in the first quarter 2009 that in the same period of 2008, while the same rate increased by 3.6 percentage points for the medium educated and 2.9 for the highly educated.

The trends described above are consistent with the observation that the largest decline in employment in late 2008 occurred in the manufacturing and construction sectors, while services (including financial) still registered slight positive growth.[44] Lower skilled workers may be facing a gloomy working outlook also because, in the event of a recession, firms start by laying off those with short term contracts.[45] And in 2008, one fifth of low skilled employees had a temporary job (see Table II.4.6). In particular, the very young (i.e. 15 to 24 years old) unskilled workers are at risk of losing their jobs, as nearly 53% of them have a temporary contract. By contrast, only 12% of highly skilled employees were hired for a limited period of time.

Table II.4.6. Temporary employees, as percentage of the total number of employees for a given educational attainment and age group, EU-27 (2008)

	Temporary employees (percentage of the total number of employees)			
	Age groups (years old)			
	15 - 24	25 - 39	40 - 64	15 - 64
Low educational attainment	52.6	20.2	11.3	20.6
Medium educational attainment	33.8	12.8	6.4	12.4
High educational attainment	35.0	15.0	5.6	11.6
Overall	39.7	14.8	7.4	14.0

Data source: Eurostat (LFS)

What will be the labour market performance in the following months? Previous experiences do not indicate clear, unique patterns. Evidence from France and UK shows that young people were the most affected by the worsening of labour market conditions in previous crises.[46] Studies find that in the 90s, young people who left school with few or no qualifications ended up shuttling between labour market programmes, inactivity and unemployment, without finding regular employment.[47] For those who accessed tertiary education, graduating in a worse economy has had a negative effect on wages for a long period.[48]

The rise in unemployment rates of young people, especially those with higher qualifications, implies a loss of human capital. At individual level, not finding a job in the few years immediately after educations may entail a disadvantage for the rest of the career. For the State, the loss in human capital means a lower return to the investment in education that has been made in the preceding ten to sixteen years.
The worsening of the labour market conditions may affect the demand for education (in particular, higher education and VET). However, in terms of activity rates (especially for the youth), the data available does not show substantial changes in 2008 with respect to 2007 and 2006 (Table Ann II.16).

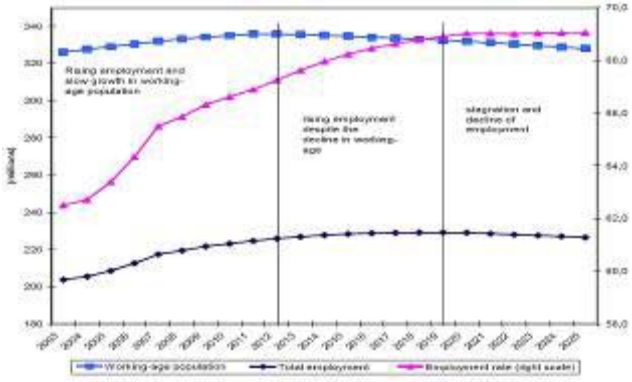
4.3. Shifts in skills demand and the aging population

EU governments face common challenges of global competition and demographic changes. Global competition implies delocalisation of labour intensive industries to low wage countries. This forces the developed economies to create the framework conditions (including the supply of appropriately skilled labour) for competing in knowledge intensive high value added segments. Aging populations pose major economic, budgetary and social challenges including the challenge of ensuring high employment rates to shoulder the burden of providing decent pensions and access to health and long term care for the elderly.

The first challenge drives up the demand for skills and qualifications in most occupations. The second stems from a lack of young productive individuals as the working age population start to decline beginning from 2010. Both challenges call for an increase in the educational attainment of the population. Governments therefore need to concentrate on securing a better match of the demand and supply of skills and to focus on estimated long term patterns of total employment and employment rate.

The importance of the employment rate[49] in the context of projected demographic changes is illustrated (Chart II.4.7) (European Commission, 2008).[50]

Chart II.4.7. Projected working-age population and total employment, EU27



Source: European Commission and Economic Policy Committee (2008)

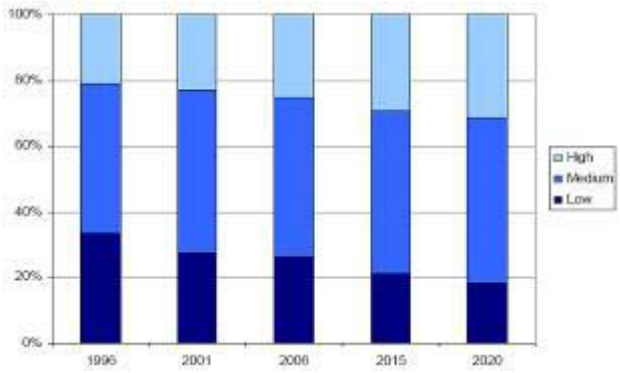
The total number of persons employed (15-64 years old) is projected to increase significantly up to 2019, but after 2019 the demographic effects of an ageing population will outweigh this effect.

In this context, and following an invitation from the European Council in 2008[51], Cedefop has embarked on work to project the skill needs in Europe.[52] The rationale for forecasting is that labour markets are imperfect and that there are long and variable lags between decisions on investment in skills and when these finally become available. Without information there are likely to be more or greater mismatches in labour supply and demand, leading to wage inflation, unemployment, unfilled vacancies and associated inefficiencies.[53]

The first results of the skill needs forecasts at the EU level (undertaken before the unset of the financial and economic crisis) 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..[54] 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 all 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.

Chart II.4.8. Past and anticipated employment shares by education attainment level



Source: Cedefop (2008), EU27

As argued in this chapter, up-grading educational attainment of the population goes hand in hand with increases in employment rates – a necessary ingredient for counteracting the current crisis and for facing up to the future challenges of demographic change and productivity growth.

CHAPTER III

Promoting equity, social cohesion and active citizenship

MAIN MESSAGES
Equity, social cohesion and active citizenship

- **Progress in combating early leaving from education and training has been slow in the EU.** Some central and eastern European countries (Poland, Czech Republic and Slovakia), Lithuania and Finland already perform well with a share of **early leavers** below the EU benchmark of 10%.
- **There is a clear divide in the EU between those countries that pursue inclusive teaching of pupils with special educational needs and those that pursue segregated teaching**. In all Member States, pupils with learning difficulties are more often taught in regular classes than children with disabilities.
- **Participation of adults in lifelong learning is not equally available to all different groups of adults;** rates are higher among the youngest (25 to 34 years old), the most educated and the employed.
- **The probability that a young migrant is an early leaver from education and training is more than double that for a national (26.8% vs. 13.6%).** Many children with migrant background suffer from educational disadvantages and unequal patterns exist in terms of access to, and achievements in, education.
- **Boys experience more difficulties than girls in adapting to the compulsory school environment,** so they are over-represented among pupils with disabilities or learning difficulties, being 61% of pupils in the first category and 65% in the second one.
- **Gender-specific choices of the field of study are still pronounced.** In upper secondary, boys more often enrol in vocational education (57%) where girls mainly choose general courses (54%). In higher education, women graduates are more numerous (59% in 2007) but, despite recent progress, men still predominate in Mathematics, Science and Technology (68%).
- **The share of low achievers in reading literacy among pupils in lower secondary education in the EU is increasing.** From 2000 to 2006 the proportion of low performers in reading literacy aged 15 increased from 21.3% to 24.1%. This should be seen against a benchmark for 2010 which anticipate a significant reduction of 20%.
- **Early teaching of foreign languages is advancing in Europe.** The average number of foreign languages learned in the EU is 1.4 at lower secondary education, and still far behind the goal that young people should learn at least two foreign languages. In lower secondary education, one observes a small increase in the proportion of pupils learning English, French or Spanish.
- **Education plays a central role for active citizenship.** Recent research shows that increased educational attainment has a positive effect on active citizenship. Higher education attainment has by far the biggest effect.

In this chapter we examine the evidence relating to a range of issues which have an important impact on the overall equity of the educational system. These are early childhood education, as a way to address educational disadvantage; early leaving from education and training, which can lead to a weaker position in society and in the labour market; the inclusion in mainstream schools of students with special educational needs; participation in adult learning. In addition to that, proficiency in key competencies such as reading, mathematics and science is examined, together with language and ICT skills. These are considered necessary competencies to be able to adapt in a changing world. Special attention is paid to the situation of migrants in education and training, where some inequalities can be found, and to differences between boys and girls from compulsory school to tertiary education.

1. Equity

1.1 Early childhood education

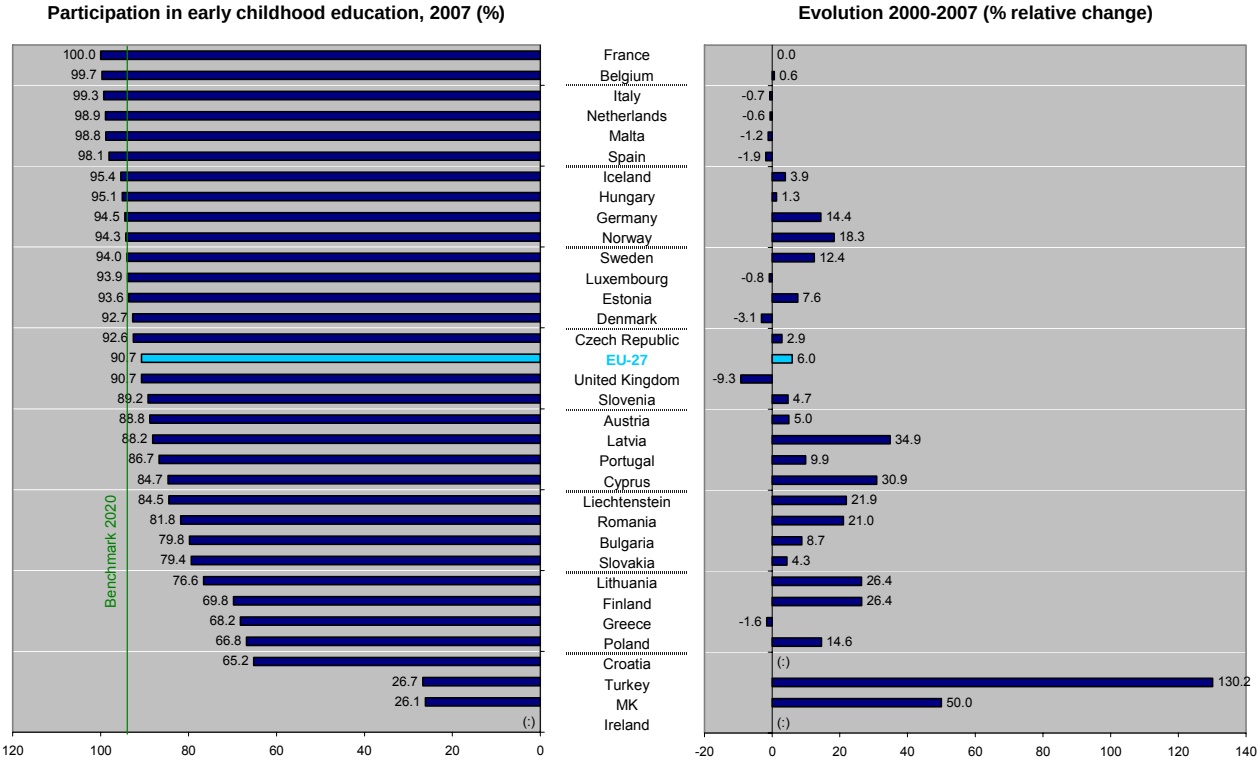
Increasing participation in early childhood education is the first step in the direction of making lifelong learning a reality, and is therefore an integral part of lifelong learning strategies (see chapter I.1).

Moreover, several studies have analysed positive effects of early childhood education from an educational and social perspective. It has been found that all children could benefit from it, especially those facing personal or familiar unfavourable situations, as it has proven to be effective to counter potential educational disadvantages (NESSE, 2009).

Council conclusions on the updated framework for European cooperation in education and training 2010-2020 (European Council, 2009) underlined the equity dimension of early childhood education mentioning that high participation and high quality provision can be effective ways to address educational disadvantage. A new benchmark was set in order to monitor progress and contribute to evidence-based policy making.

European benchmark
By 2020, at least 95% of children between 4 years old and the age for starting compulsory primary education should participate in early childhood education.

Chart III.1.1: Participation in early childhood education (rates)
(between 4-years-old and starting of compulsory primary)



Source: DG Education and Culture - *Data source:* Eurostat - UOE.
Notes: MK: the former Yugoslav Republic of Macedonia
United Kingdom: break in series between 2002 and 2003 (earlier figures are overestimated).

Up to the last Progress report, this area was monitored referring to the core indicator "participation rate in pre-school education of 4 years old children". The new indicator considers a wider age group, approaching more closely the Barcelona target[55] and giving a more complete picture of early childhood education.

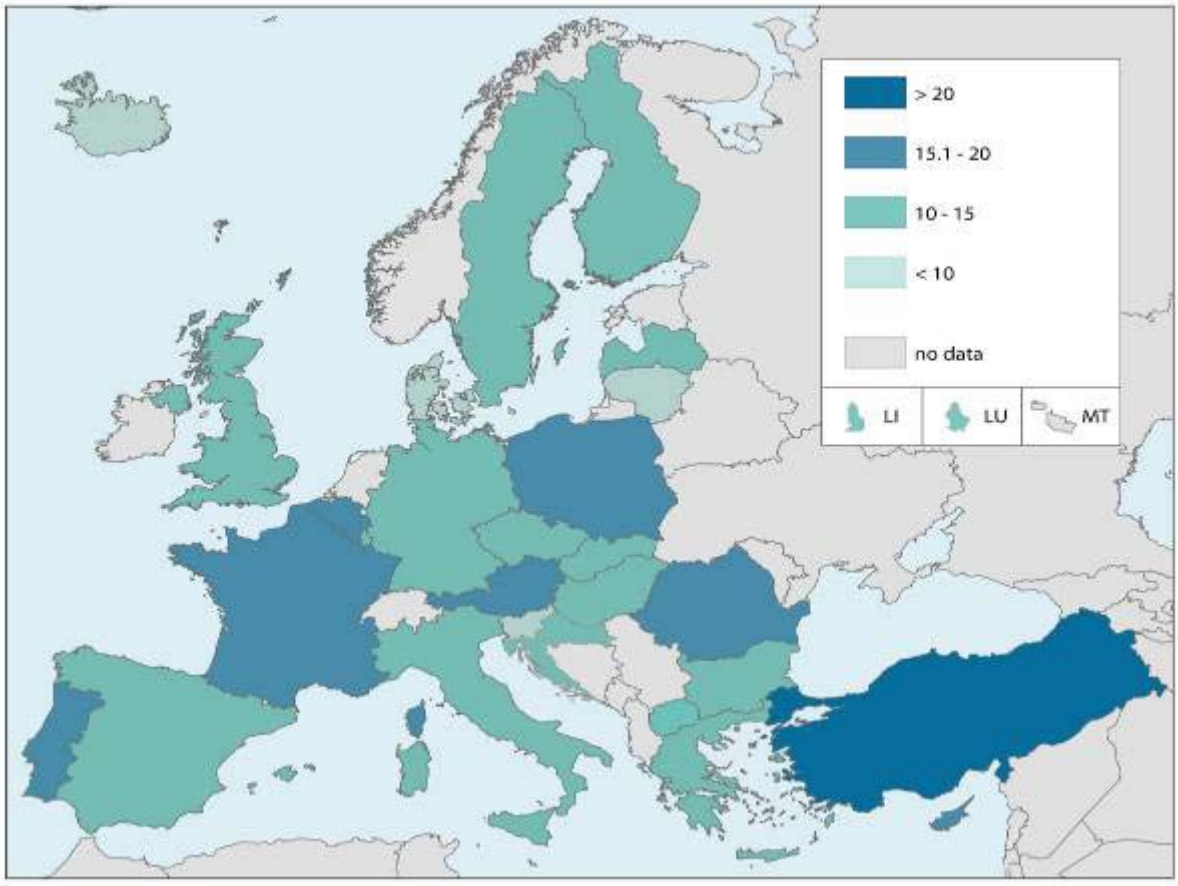
The new benchmark for 2020

Compared with the value of the previous indicator, the new one is slightly higher, due to the fact that it includes older children who are, on average, participating more in early childhood education. A comparison for 2007 shows that the participation rate of 4 years old was about 88% while the early childhood education participation rate[56] was 90.7%.

Recent trends are quite similar. The EU average of participation in early learning was steadily rising during the last 7 years (+ 6% relative change, see Chart III.1.1).

Even though some measurement and definitional issues are to be solved in view of higher data comparability, some conclusions on the new benchmark can be drawn. A number of countries are far below the benchmark, as is the case for Poland, Greece and Finland where participation rate is less than 70%. Different reasons contribute to that: operational and financial constraints in increasing the supply of early childhood education in the whole country, cultural norms and pedagogical approaches can all play a relevant role.

Chart III.1.2: Ratio of pupils to teachers in pre-primary school (ISCED 0)



Data source: Eurostat - UOE

On the other hand, in several Member States participation is at the level of the benchmark for 2020 or even higher, and in three of them attending early education is a de facto reality for almost all young children (France, Belgium and Italy).

Candidate countries have a low performance in this field, the highest participation rate being found in Croatia (65.2%). Looking at industrialized countries outside the EU, in Japan participation to early childhood education is almost universal (96.4%) while in the US less than 70% of young children attend early education (Table Ann. III.1).

Participation rates increased notably in some Member States, namely Latvia (+35%), Cyprus (+31%) and Finland (+26%). But the increasing trend is not shared by all countries, as 8 of them in fact present a decrease in participation rate. The most notable cases are to be found in United Kingdom (-9.3%, see note) and in Denmark (-3.1%).

Teachers in pre-primary school

The issue of ensuring good quality provision remains central as many different studies underline that poor quality early childhood education can even be detrimental. Quality is hardly measurable as such but it is possible to measure some pre-conditions of it along different dimensions, ranging from the level of training of teachers, to the involvement of parents, to a favourable child/staff ratio (NESSE, 2009; Eurydice, 2009).

Professional staff involved in pre-primary education are now required to have a higher educational level (ISCED 5A or 5B) everywhere apart from the Czech Republic, Romania, Slovakia, Malta and Austria. In the latest two countries, only a stream at the upper secondary level exists.

As for the ratio child/staff, the latest UNICEF report (2008) suggests a maximum level of 15 children to 1 teacher. The situation in Member States is quite varied, as shown in Chart III.1.2, with the ratio ranging from 7.8 in Lithuania to 19.2 in France. Also Poland, Romania, Cyprus, Austria Belgium and Portugal would not comply with UNICEF suggestions. As for candidate countries, Turkey has a high ratio of around 26 children for each teacher, while Croatia and the former Yugoslav Republic of Macedonia range between 12.4 and 11.3. In the US, a low level in participation combines with a very favourable child/staff ratio (10.3) while in Japan, where participation is much higher, every teacher follows almost 17 children (Table Ann III.2).

Children with disadvantaged background

Research shows that children with disadvantaged background are those who can profit the most from a good quality early childhood education. In practice, they are often less likely to get it and several studies found that in most countries children living in low-income households or with migrant background have less access to good quality early learning. Also children living in rural areas tend to have a more difficult access to early childhood education due to a lack of supply at close range as is the case, for example, in Poland (Eurydice, 2009).

1.2 Early leavers from education and training

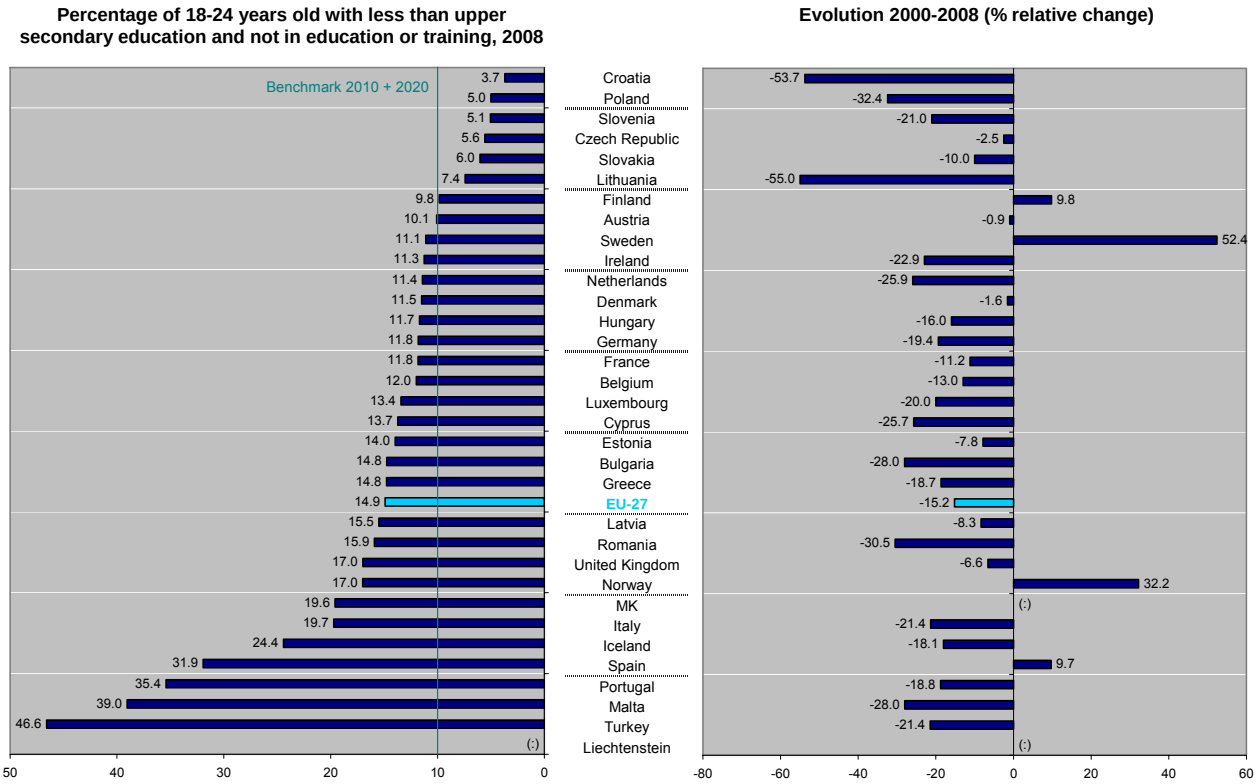
One of the main targets of the EU policy in the field of education is to lower the number of young people who have left school without an upper secondary education and do not participate in any kind of further education or training. It is considered a crucial achievement in order to enhance economic growth and social cohesion.

The EU benchmark

The benchmark for 2010 to achieve a level of no more than 10% early school leavers in the EU has been maintained for 2020, considering that Member States encountered notable difficulties in substantially reducing it since 2000 (see also the Introduction chapter).

European benchmark
By 2020, the share of early leavers from education and training should be less than 10%.

Chart III.1.3: Early leavers from education and training, 2000 and 2008 (rates)



Source: DG Education and Culture *Data source:* Eurostat (Labour Force Survey), 2008
Data for Slovenia and Croatia lack reliability due to a small sample size.
Finland and Portugal: provisional data
Cyprus: Students studying abroad are not covered by the survey; this indicator could therefore be overestimated.
Bulgaria, Poland and Slovenia: evolution refers to the period 2001-2008.
Czech Republic, Ireland, Latvia, Slovakia and Croatia: evolution refers to the period 2002-2008.
Additionnal notes about this indicator are available at: http://epp.eurostat.ec.europa.eu/portal/page/portal/structural_indicators/indicators/social_cohesion

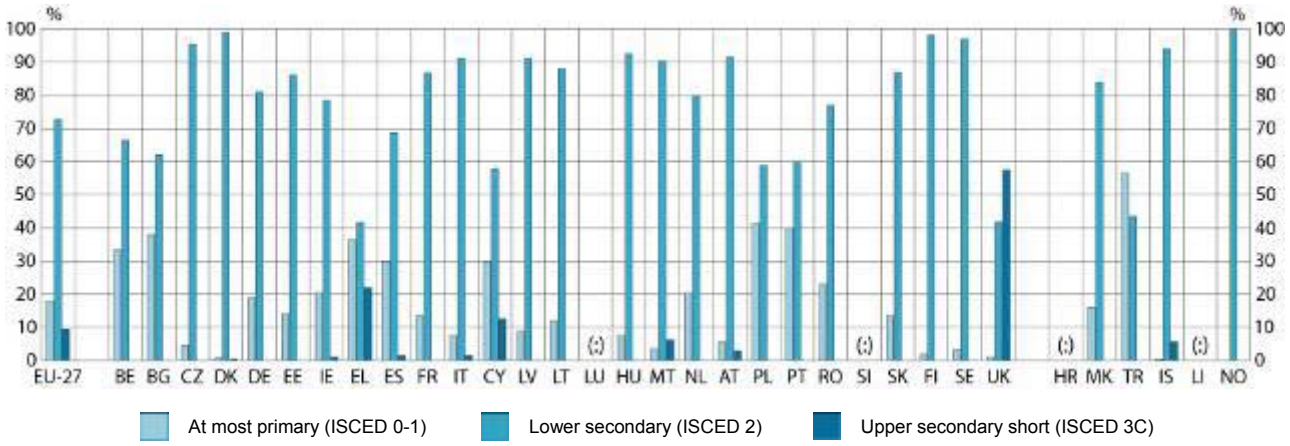
In 2008 the average rate of early leavers was 14.9% for EU-27, just 2.7 percentage points lower than in 2000[57] (chart III.1.3).

In spite of slow progress, some countries already perform quite well with a share of early leavers well below the benchmark, mainly in Central and Eastern Europe, the best performers being Poland, Czech Republic and Slovakia. Another group of Northern-Central Europe countries have a rate not far from the benchmark, less than 12%. However, countries like Italy (19.7%) and especially Spain, Portugal and

Malta (with more than 30%) are still dealing with a considerable share of early leavers from education and training.

These countries had significant improvements since 2000, with change exceeding 18%, except for Spain. Its efforts to decrease the incidence of early leavers didn't succeed yet and the indicator actually increased during the period (+ 9.7%). Other countries experienced an increase in the share of early leavers, mainly the Nordic ones: Norway, Sweden and, to a smaller extent, Finland. Despite the worsening of this indicator, the latter still performs better than the benchmark.

Chart III.1.4: Early leavers from education and training by highest educational level achieved, 2008 (Percentage)



Data source: Eurostat (Labour Force Survey), 2008
Data for Denmark, Malta, Austria and Iceland lack reliability due to a small sample size.
Portugal: provisional data

In candidate countries with reliable data the indicator is very high: in the former Yugoslav Republic of Macedonia it is at about twice the benchmark level and in Turkey the rate is almost 50%.

In spite of some weaknesses of available data[58], it can be concluded that enhancing the human capital in EU by supplying young people with a minimum level of education and training is still an issue to be tackled in several Member States.

Highest educational level achieved before leaving education and training

Most early leavers in the EU (almost 3 out of 4) succeeded in completing lower secondary education, i.e. compulsory education in the majority of European countries (chart III.1.4). The percentage of those who achieved a particular kind of upper secondary education (ISCED 3C short courses, including some vocational or pre-vocational training) is less than 10%. In fact, these courses exist only in some countries and ISCED 3C short is the highest level of education for a significant part of early leavers in few Member States, such as Greece and the UK. In the latter, this group is the most important as 57% of early leavers completed a short course in upper secondary education.

Considering the risk of social exclusion linked to low education, the fact that about 1.2 million young people, i.e. 18% of early leavers in the EU, have completed at most primary school should be regarded as particularly alarming. This percentage is almost negligible in Nordic countries and UK, while it is very high in Bulgaria (38%), Portugal (40%) and Poland (41%)[59].

In Turkey, this group is the most numerous one, as it accounts for 57% of the total number of early leavers, i.e. more than 1 out of 4 young people living in the country.

Employment status of early leavers

As mentioned in chapter 2.4, there is a positive relationship between educational attainment and employment, so the population with lower level of education has generally lower employment rates.

In 2008, only 55% of early leavers of education and training in the EU are employed (Table III.1.1). The rest are either unemployed or outside the labour market and therefore are those more at risk of social exclusion.

In some countries, mainly in Northern and Southern Europe, the labour market is more open to low skilled workers, so that young people with a low education level can more easily find a job.

Table III.1.1 Early leavers from education and training by employment status, 2008 (Percentage)

	Employed	Unemployed and Inactive
EU-27	54.6	45.4
Belgium	49.5	50.5
Bulgaria	31.3	68.7
Czech Republic	38.8	61.2
Denmark	71.9	28.1
Germany	45.5	54.5
Estonia	68.7	31.3
Ireland	45.5	54.5
Greece	64.9	35.1
Spain	63.0	37.0
France	48.4	51.6
Italy	51.3	48.7
Cyprus	70.6	29.4
Latvia	60.0	40.0
Lithuania	47.9	52.1
Luxembourg	65.4	34.6
Hungary	35.8	64.2
Malta	77.5	22.5
Netherlands	75.6	24.4
Austria	60.4	39.6
Poland	43.7	56.3
Portugal	76.2	23.8
Romania	57.0	43.0
Slovenia	63.1	36.9
Slovakia	22.0	78.0
Finland	56.1	43.9
Sweden	59.4	40.6
United Kingdom	53.0	47.0
Croatia	48.0	52.0
MK*	23.6	76.4
Turkey	39.0	61.0
Iceland	84.9	15.1
Liechtenstein	:	:
Norway	79.1	20.9

Data source: Eurostat- LFS
*MK= former Yugoslav Republic of Macedonia
Unreliable data for Lithuania, Slovenia and Croatia because of the small sample size.
Portugal: provisional data

The percentage of employed early leavers is the highest in Malta, Portugal, the Netherlands, as well as in Iceland and Norway. On the other end of the spectrum, only a minority of early leavers are employed in Slovakia (22%), in Bulgaria and in Hungary (respectively 31% and 36%).

A comparison with third countries

A comparable measure used in extra-EU countries is the drop out rate, even if referring to a concept slightly different from the EU early education and training leaver.

In the US, according to official data, 8.7% of young people were "status dropouts"[60] in 2007. The rate is decreasing at a similar pace to that experienced in the EU, as it was 14.1% in 1980 (National Center for Education Statistics, 2009).

Substantial disparities exist across income groups, geographic areas and races (Center for Labour Market studies, 2009). Dropouts are notably less frequent among white young persons than among black and especially Hispanic young people.

Recently, the US administration expressed clear intention to address the dropout issue through preventative measures and through second chance opportunities.

In Canada drop outs are defined in a slightly different way[61] but the aim to reduce the incidence of this disadvantaged category is the same as in the EU and the US. In fact, in Canada there is clear evidence that dropouts have more difficulties in getting a job, especially in times of recession (Statistics Canada, 2005).

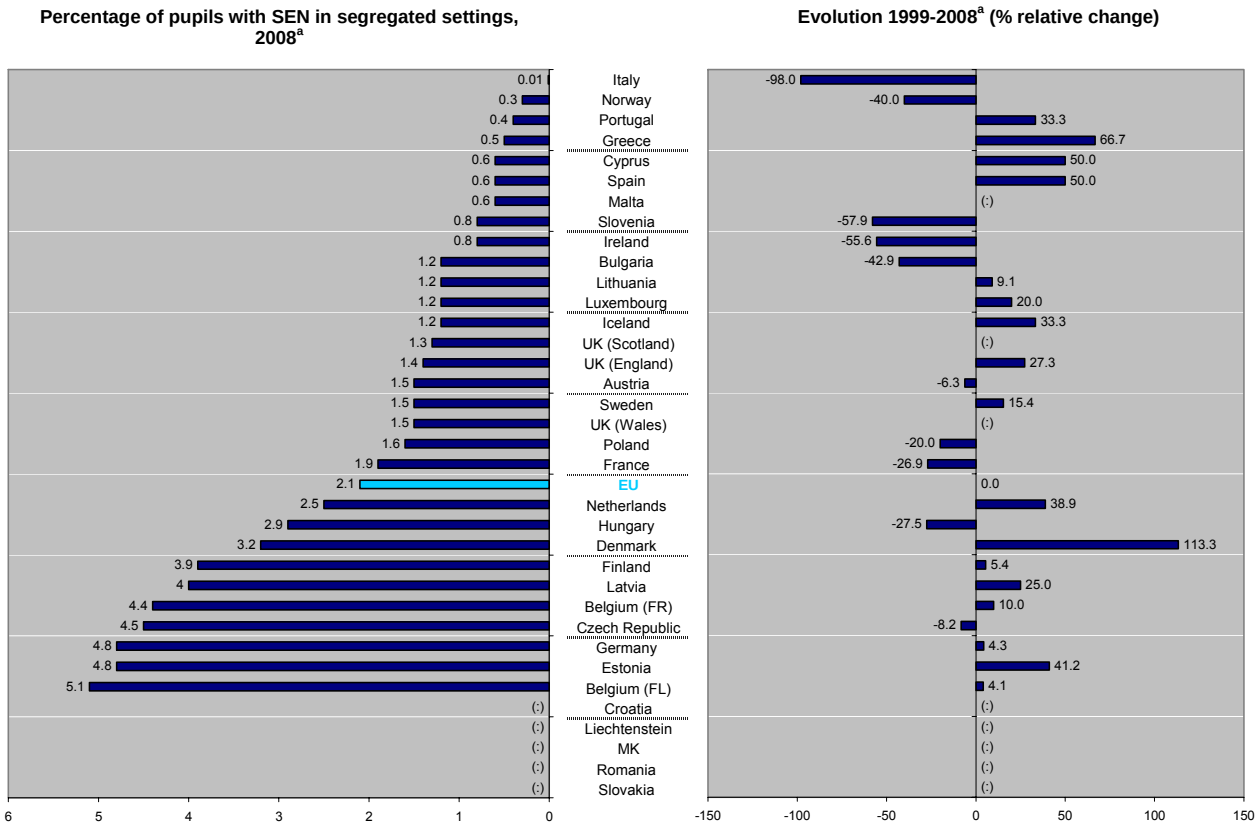
The dropout rate has been declining in recent years, and in 2004 it was 9.8%. The trend is common to all provinces, but it is more pronounced in the Atlantic part of the country and in urban areas.

Programs to encourage young people to stay in school until they get a diploma are considered to be successful. Second chance programs have also been put in place. A high number of drop outs (about 33%) take advantage of these programs, but not all succeed, suggesting that more comprehensive initiatives need to be taken.

1.3 Special education needs

The inclusion of students with special education needs (SEN) in mainstream schools and, more in general, the goal of inclusive education has been part of the EU agenda in the field of equity in education for several years. Recently, Council Conclusions on a Strategic framework for European cooperation in education and training identified, among the objectives for the period 2010-2020, the need "to ensure that all learners – including those …with special needs…- complete their education" (Council, 2009).

Chart III.1.5: Pupils with special education needs in segregated settings, 1999-2008 (Percentage of total pupils in compulsory education)



Source: DG Education and Culture *Data source:* European Agency for Development in Special Needs Education and Eurydice for 1999-2001; European Agency for Development in Special Needs Education for 2007-2008

Additional notes:
Evolution in small percentage figures should be considered with caution, as a little variation can result in noticeable relative change.
EU average calculated as arithmetic average of EU Member States for which data are available.
[a] Data refer to 2007 for: Austria, Belgium (Flemish Community), Denmark, Estonia, France, Germany, Hungary, Iceland, Ireland, Lithuania, Luxembourg, Netherlands, Portugal, Spain, Switzerland and United Kingdom (Scotland and Wales).
1999: Refers to school years 1999/2000 and 2000/2001.
Denmark: data refer to pupils with the most serious needs in special classes only; break in series in 2007.
Sweden: data refer to pupils in special schools and classes only.
United Kingdom: data refer to pupils with statements of SEN only.

There are substantial differences between countries in the definition itself of what constitutes a special need.
Therefore, two different approaches have been applied in the field of international studies on SEN. The first one uses national definitions as the basis of data collection. This is the approach followed by the European Agency for Development in Special Needs Education. An alternative approach was developed by OECD, and then followed by CRELL, in order to collect more internationally comparable data. It is explained more fully in the paragraph "An international classification – the OECD-CRELL project".

Recently, Eurostat launched a new project in order to answer the Council request to provide information on the definition of an indicator on special needs education, appropriate data to monitor progress in SEN and other relevant technical specifications (Council, 2007a).

National classifications of special education needs

The national approach followed by the European Agency presents some difficulties, due to the fact that figures on SEN as reported by each country are strongly related to administrative, financial and procedural regulations, which can differ widely.

Countries include different categories of learners within their definitions of SEN such as disability (sensory, physical, psychological), learning difficulties, behaviour problems, health problems, social or other kinds of disadvantages (see Watkins, A. (Editor), 2009).
A clear definition of what is meant by inclusive education and a segregated setting does not exist in all countries' legislation and is not always used to produce an official decision. Therefore, when interpreting data some considerations should be taken into account:
- national figures may only cover SEN pupils with an official designation, but in some countries other pupils are also included;
- some countries do not count pupils in fully inclusive settings, even if they receive some form of support for their special needs;
- decisions of SEN are not in themselves comparable. The decision-making process is often an exercise that acts as a mechanism for resource allocation.

Special education needs pupils in segregated settings

Nevertheless, it is possible to compare the percentage of pupils in compulsory school who are educated in segregated settings, as it refers to a concept that most countries are able use in data collection[62].

The expected trend would be in the direction of a decrease of that percentage, as there is a growing consensus that, whenever possible, pupils with special education needs should be included in regular, mainstream schools rather than in special institutions.

During the period 1999-2008, no notable progress was made towards more inclusive settings for educating pupils with special needs in EU as a whole, although some changes in national legislation and policy for SEN do highlight possible moves towards inclusion that may have an impact on the EU indicator thereafter. Presently, the EU average of SEN pupils in compulsory education taught in segregated settings is 2.1%, including both special schools and segregated classes in mainstream schools (see chart III.1.5).

The situation varies between individual countries. The indicator is about 4 - 5% in some Western and Baltic European countries (Belgium, Germany, Estonia and Latvia) and in Czech Republic. It is very low (no more than 0.6%) in most Southern European countries and in Norway. In Italy, where a fully inclusive policy has been put in place, almost no pupils with SEN are educated in segregated settings.

During the period, the percentage of SEN pupils in segregated settings increased in most countries. Among those above the EU average, the increase was notable in Denmark, Estonia, the Netherlands and Latvia. Decreases were more evident for countries with a very low rate of SEN pupils in segregated settings.

Changes observed do not always correspond to major shifts in policy and legislation. Also changes in resourcing and financing structures that act as levers for placement of pupils with SEN or improvements in the data collection methodology, could affect reported numbers about SEN pupils and the settings they are taught in.

An international classification – the OECD-CRELL project

OECD promoted a framework aiming to enlarge the concept of SEN and to collect internationally comparable data on all pupils receiving extra resources for their education. Three categories of students are included: those having physical disabilities, pupils with behavioural and learning difficulties; pupils with a disadvantaged socio-economic background[63]. A recent OECD-CRELL joint research study (OECD, 2009), supported by the Commission, has increased both quantity and quality of available data, also including EU countries which were not previously covered[64].

As for the share of pupils with special needs arising from impairing conditions, great differences can be found among OECD/EU countries The EU average is 3.3% of pupils, with country values ranging from 1.1% in Bulgaria to 5.0% in Finland. Considering that the international disability rate is 2.5% (UNICEF, 2004), and since it is unlikely that the 'organic' bases of disability differ greatly among countries, these differences presumably reflect national approaches to the conceptualisation of disability, in identification procedures and in policy priorities. Further work would be needed to better understand whether some countries are over-identifying children with disabilities while others may be under-identifying them.

The kind of setting in which SEN pupils are educated varies notably, both for pupils with disabilities and for those with learning difficulties (chart III.1.6).

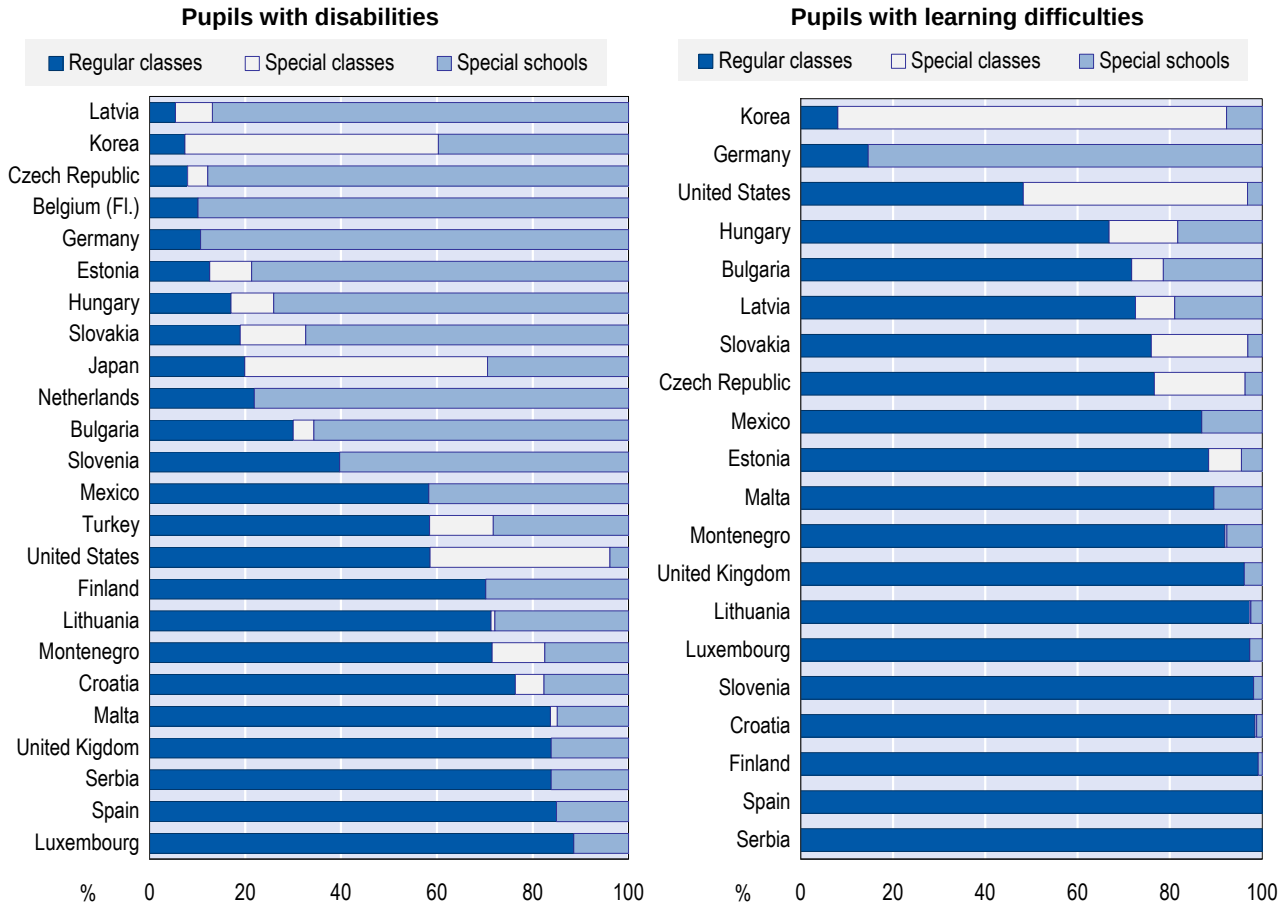
As for pupils with disabilities, inclusive education is not the common practice in Latvia, Czech Republic, Belgium (Flemish Community) and Germany, in which more than 85% are taught in special schools. Looking at countries for which data are available, special classes are common outside Europe: in Korea and Japan more than 50% of pupils with disabilities are in this kind of settings, and in US they are 38%.

In contrast, pupils with learning difficulties are usually included in regular classes in most European countries (and other OECD countries as well). Germany is a notable exception, as also pupils in this category are mainly educated in special schools (85%).

Differences in inclusion policies may be influenced by characteristics of regular schools and their

curriculum, as well as training possibilities for and attitudes of teachers. Different cultural and societal norms (whether parents and educators consider it more appropriate placing students in mainstream or special schools) may also influence national SEN policies.

Chart III.1.6: Pupils with special education needs by category of need and type of setting, 2005 (percentage distribution)



Source: DG Education and Culture *Data source:* OECD, CRELL

1.4 Adult education and training

In this section, main results from the Adult Education Survey (AES) will be analysed with special attention to the equity dimensions of adult learning where the survey provides important insight.[65] Data from the survey are presently available for 22 EU countries plus Croatia and Norway[66].

Inequalities in participation

Lifelong learning activities are not equally attended by different groups of adults. Higher participation rates are found among the youngest (25 to 34 years old), the most educated people and employed adults.

Age is a strong barrier to participating in LLL in all countries (see also chapter I.1), and the wider generational gap is found where LLL overall participation rates are quite low (see Table III.1.2). There are also considerable inequalities relating to initial education which tend to be retained or even amplified by LLL. The less educated people have notably lower participation rates in AES (18% vs. 58.8%). This finding is in line with results from LFS, which show that participation rate is 5 times lower for the less educated than for adults with high education attainment.

The gap is particularly pronounced in countries such as Poland – where the participation rate for low and high educated people is 4.7% and 54.4%, respectively – Greece and Hungary (see Table III.1.3).

In countries where the LLL system is more developed, namely those with higher participation rates as the Nordic countries and the UK, the relative gap between poorly and highly educated adults is much more limited.

Table III.1.2 Participation in adult learning by age, 2007 (rates)

Country	Age			Total
	25-34	35-54	55-64	
EU average	**45.3**	**37.5**	**21.7**	**36.0**
Belgium	56.3	42.3	23.5	40.5
Bulgaria	44.7	39.7	20.3	36.4
Czech Republic	44.1	43.0	21.7	37.7
Germany	53.3	48.7	28.2	45.4
Estonia	52.5	42.6	27.5	42.1
Greece	22.7	14.0	5.1	14.5
Spain	39.7	30.8	17.0	30.9
France	48.2	35.9	16.2	35.1
Italy	30.5	23.0	11.8	22.2
Cyprus	53.2	41.1	20.1	40.6
Latvia	39.0	34.3	21.8	32.7
Lithuania	42.7	35.1	19.0	33.9
Hungary	15.8	9.0	2.5	9.0
Netherlands	59.7	44.9	28.8	44.6
Austria	47.1	45.7	25.4	41.9
Poland	34.1	20.7	6.8	21.8
Portugal	40.3	25.5	10.9	26.5
Slovenia	52.2	42.6	22.2	40.6
Slovakia	51.0	48.3	23.8	44.0
Finland	66.0	58.6	37.8	55.0
Sweden	81.0	76.4	60.7	73.4
United Kingdom	58.8	50.3	37.0	49.3
Croatia	33.5	20.2	9.0	21.2
Norway	65.0	55.5	41.2	54.6

Source: Eurostat, AES

Inactive and unemployed adults are also weak actors in LLL: at EU level, the participation rate of employed adults is 43.4%, while for the unemployed it is 24.5% and for inactive people just 17.3% (see Table III.1.3). This pattern holds in every country included in the study, and it is clearly consistent with the fact that the majority of non-formal learning activities are provided by employers and employers' organizations (43.4%).

Participation of unemployed is especially low compared to that of employed in some Eastern countries, such as Slovakia and Czech Republic. The largest gap can be found in Bulgaria, with participation rates for employed 7 times higher than for unemployed, together with quite a poor situation also for inactive.

The most comprehensive systems are capable of providing a wide range of activities meeting not only the need to update workers' knowledge but also providing the training for developing skills for work and life as requested by unemployed and inactive adults. This is especially the case in Norway and Sweden, but also in Austria and the Netherlands. In Greece, even though participation is overall low, the unemployed are enabled to take part in education and training almost as much as employed adults.

Table III.1.3 Participation in adult learning by educational attainment and labour status, 2007 (rates)

Country	Educational attainment			Labour status		
	Low	Medium	High	Employed	Unemployed	Inactive
EU average	**18.0**	**36.3**	**58.8**	**43.4**	**24.5**	**17.3**
Belgium	19.8	38.4	63.3	48.9	34.4	17.6
Bulgaria	15.1	39.2	52.8	50.2	7.1	6.5
Czech Republic	14.8	36.6	62.4	47.6	12.6	9.9
Germany	19.9	45.4	63.2	53.0	29.3	26.2
Estonia	19.7	35.9	60.6	49.2	17.3	14.6
Greece	4.0	15.2	31.8	17.8	13.2	5.4
Spain	17.0	35.5	51.1	35.9	25.0	16.6
France	19.1	34.1	57.1	42.3	28.6	12.4
Italy	8.2	30.2	51.4	27.7	16.9	11.4
Cyprus	16.0	39.5	64.7	48.0	31.1	15.7
Latvia	11.0	27.2	58.5	40.1	16.3	10.9
Lithuania	8.8	24.9	61.9	43.4	16.7	8.0
Hungary	2.6	8.6	19.4	12.1	5.5	3.4
Netherlands	25.4	42.0	65.5	52.7	41.1	24.7
Austria	19.1	41.9	68.1	48.3	41.4	23.8
Poland	4.7	15.8	54.4	30.1	13.9	4.5
Portugal	15.9	45.6	64.0	31.5	21.0	9.9
Slovenia	12.7	39.0	67.6	47.7	27.5	21.5
Slovakia	14.2	40.8	61.8	54.0	15.7	11.0
Finland	35.2	51.8	72.9	62.0	34.7	36.3
Sweden	55.9	72.4	89.9	79.3	58.6	51.8
United Kingdom	33.4	52.5	62.6	56.6	33.5	29.8
Croatia	3.9	21.2	54.9	32.3	5.0	6.0
Norway	37.8	51.9	72.3	60.3	45.8	29.9

Source: Eurostat, AES

Education attainment: Low= Isced 0-2; Medium= Isced 3-4; High= Isced 5-6

Characteristics of non-formal learning activities

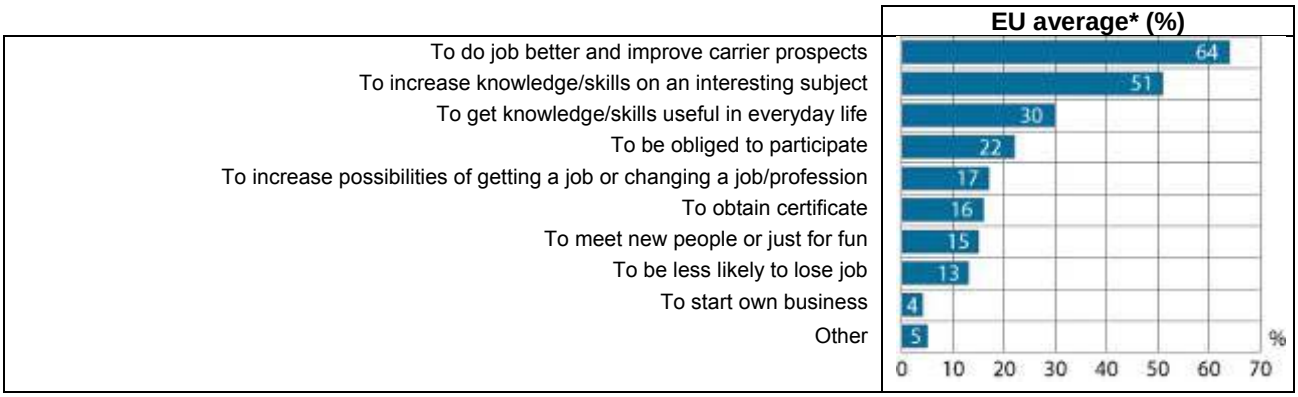
The Adult Education Survey offers also deeper insight so far as non-formal education and training activities are concerned. This knowledge can help to improve understanding of what users are looking for in LLL programs and which the main obstacles to participation are. The policy question is how to make LLL more attractive and how to enlarge access to it.

Non-formal courses are usually quite short: mean EU instruction hours are 70 with courses for the employed being shorter (62 hours) than those attended by unemployed and inactive adults (respectively 161 and 98 hours). Variation among countries is notable, the duration ranging from 45 hours in Bulgaria to 114 in Belgium. They are mainly job-related and are often provided and sponsored by the employer (see chapter II.2).

Respondents answered to the question about the main reasons for training giving the following picture: "to do a better job and to improve career prospects" accounts for almost two thirds of answers given by participants in any kind of non-formal education and training. But more general reasons were also ranked quite high, such as "to increase knowledge/skills on an interesting subject" and "to get knowledge/skills useful in everyday life" (51 and 30%). Only 16% of participants were interested in the more formal aspects of the course (i.e. aiming at getting a certificate). The purely leisure-linked reason ("to meet people or just for fun") was chosen by 15% of respondents (see chart III.1.7).

Some relevant differences between European countries should be highlighted, as they show different attitudes among participants in LLL. In some of them (e.g. Nordic countries but also Greece, Spain and Portugal) more than 60% of participants in a non-formal course did it in order "to increase knowledge or skills on an interesting subject" not necessarily job-related. On the other hand, this kind of "pure knowledge" reason was almost completely disregarded in Poland and Slovenia, being indicated by just 8 to 13% of participants. The majority of participants were obliged to do so in two eastern countries (Slovakia and Hungary) where a model of "compulsory training" is prevalent (Table Ann III.3).

Chart III.1.7 Reasons for participating in non-formal education and training, 2007



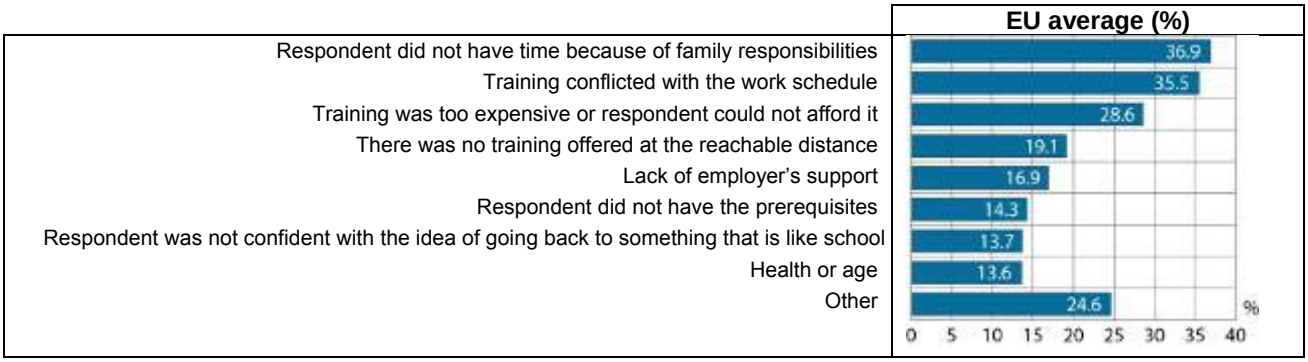
Data source: Eurostat (AES)
* EU-19 average, excluding EL, FR and UK
EL and UK data are no comparable - BG, CY, ES, CZ, PT, FI did not interview participants taking part in 'guided on the job training'

Obstacles to participation

Almost 50% of respondents declared that they didn't want more training but that figure could, in fact, hide a sort of discouragement induced by different kinds of difficulties.

The main reasons preventing those wishing to participate were: family responsibilities and conflicting work schedules (see chart III.1.8). They both relate to a lack of flexibility in organizing personal time and working time. The third problem mentioned by a large number of non-participants was the cost of courses, considered to be too expensive by 28.6% of respondents. It was mentioned as the main problem preventing access to adult learning by the majority of respondents in Eastern Europe and Baltic countries. Other possible obstacles, such as the lack of employer support or the absence of facilities at reachable distance, didn't appear to be relevant.

Chart III.1.8 Obstacles to participation in non-formal education and training, 2007



Data source: Eurostat (AES)
Note: France is excluded from the calculation of the EU average of this table because of the missing information.

2. Key competences

The Recommendation of the European Parliament and the Council on Key Competences for Lifelong Learning of December 2006 (Council, 2006a) stated that each citizen will need a wide range of key competences to be able to adapt in a changing and interconnected world. The Recommendation defined a framework consisting 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 core indicators in the coherent framework of indicators and benchmarks (Council, 2007a).
This section analyses the defined key competences where data are available. For the area of communication in mother tongue and competences in mathematics and science, data comes from the OECD PISA survey. In the area of communication in foreign languages no data are currently available. However the forthcoming European survey on language competences will provide data on pupils' foreign language skills in 2012. Until then the available data on the teaching of foreign languages in the Member States will be examined. Concerning digital competence, available data from Eurostat on the use of and the attitudes to ICT will be examined along with recent studies in the field. Recent works on social and civic competences are discussed in the Active citizenship part of this section.

2.1 Reading, Mathematics and Science Literacy

Low achievers in reading literacy: European benchmark 2010

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.

The benchmark is based on an indicator taken from the PISA 2000 survey, which makes it possible to identify the share of pupils who have a low level of foundation skills. The score on the PISA scale is divided into five levels. Pupils performing at level two 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 two 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 one or lower.

Chart III.2.1 below shows the development regarding the benchmark on low achievers in reading literacy. Reaching the European benchmark implies that the share of low achievers in the EU[67] have to decrease from 21.3% in 2000 to 17% in 2010. However the average number of low achievers in the same countries increased 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 EU has a relatively high share of low performers, though both the USA[68] 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.

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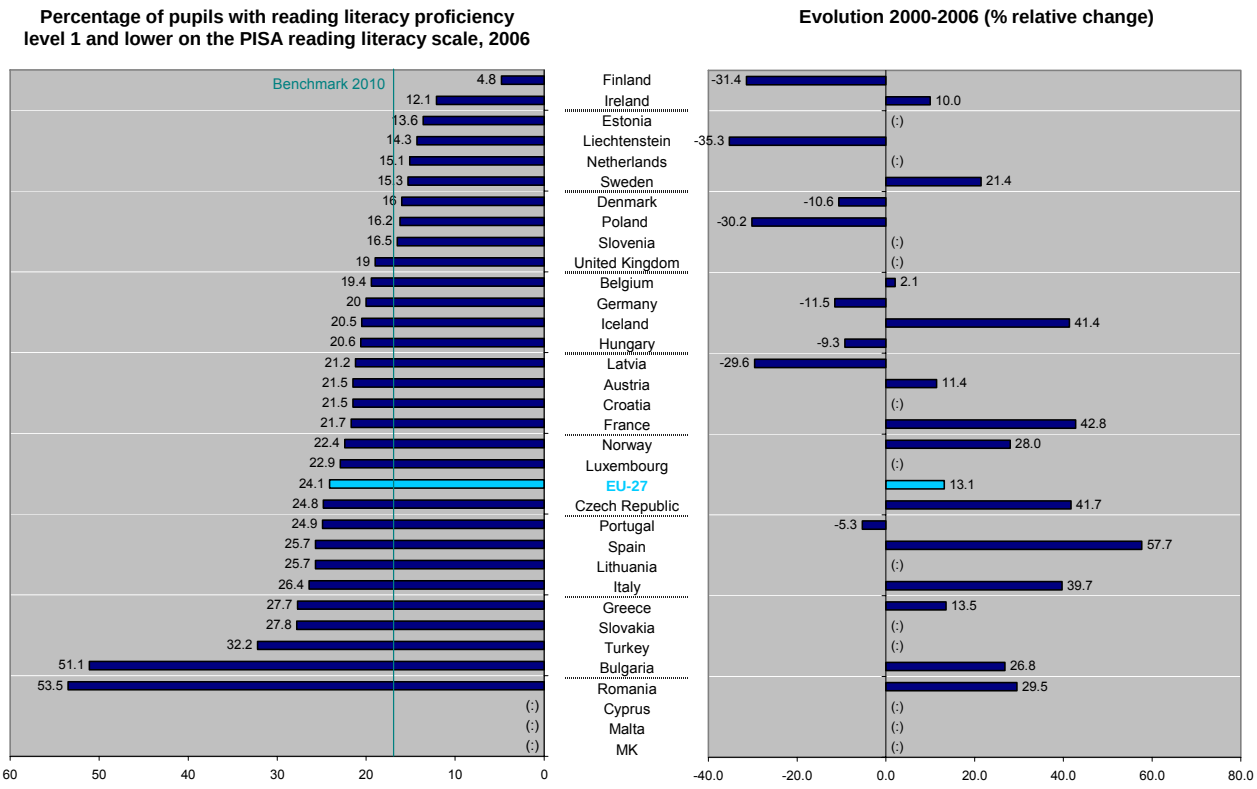
Chart III.2.1 Low achievers in reading, 2000-2006 (PISA reading literacy scale)



Source: DG Education and Culture *Data source:* OECD PISA database 2000 and 2006
Note: EU figure (2000-2006): weighted average based on number of pupils enrolled and data for 18 countries

Low achievers in basic skills: European benchmark 2020

In May 2009 the Council adopted a benchmark in the area of low achievers in basic skills. This benchmark will cover the low performers in reading, mathematics and science.

European benchmark
By 2020 the percentage of low-achieving 15-year-olds in reading, mathematics and science literacy in the European Union should be less than 15%.

As analysed above, the EU average figure for low performers in reading increased between 2000 and 2006 in most Member States. In order to reach the new benchmark set for 2020 the average figure has to decrease by more than 35% from the level in 2006. In 2006 the share of low performing 15 year-olds in the EU was 23.1% for the 25 participating EU countries[69].

For mathematics the situation is worse than for reading; the average figure of low achievers in mathematics was 24.0% in 2006. The share of low performers will have to be reduced by 37% to reach the 2020 benchmark.

When it comes to science the situation is better than for reading and mathematics but will still require attention. The average share of low performers in science in the Member States was 20.2% in 2006. This implies that a decrease of almost 26% in low performers is needed to reach the 2020 benchmark.

Reading literacy in the EU countries

Although the average share of low performers for the 25 countries participating in the PISA survey in 2006 is high, there are large differences in performance between the Member States. Finland had only 4.8% low performers, followed by Ireland (12.1%) and Estonia (13.6%). Hence these three Member States already fulfil the benchmark set for 2020 of not more than 15% low performers. The Netherlands (15.1%) and Sweden (15.3%) are very close to the European benchmark. 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. (more than 31%). 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 II.2.1 spells out the development from 2000 for individual countries. 13 countries recorded an

increase in 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 2006 is 492 points. In the EU countries the average score fell slightly from 491 points in 2000 to 487 points in 2006. Performance deteriorated in a large number of Member States. The only EU countries where average performance improved significantly were Poland and Latvia.

Finland has the highest score among the Member States with 547 points followed by Ireland (517), Poland (508), Sweden (507), the Netherlands (507), Belgium and Estonia (501).

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 in the OECD) in terms of mean performance, but has also the smallest performance gap between its pupils.[70] Estonia, Spain, Denmark and Slovenia have relatively small differences between top and low performers. Bulgaria, Czech Republic and Belgium have the largest performance gap among the Member States.

Comparing EU reading literacy worldwide

Finland is the top performer among the participating OECD countries. The five countries with the smallest share of low performers are Finland (4.8%), Korea (5.8%), Hong Kong (7.1%), Canada (11%) and Ireland (12.1%). Among the 10 best performers of all countries that took part in the survey four were European countries, Estonia and Lichtenstein joining Finland and Ireland.

Japan scored on average 498 points, slightly above the average of 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.

Mathematics literacy in the EU countries

The average share of low performers in mathematics in the EU is 24% in 2006. Finland has the smallest share of low performers in the EU with only 6%. Netherlands (11.5%), Estonia (12.1%) and Denmark (13.6%) also perform better than the benchmark for 2020. In Romania and Bulgaria, more than half of the pupils are in this category.

As a result of a change in the survey scope, the results from the mathematics test can only be compared in 2003 and 2006. The majority of countries (13) reduced the share of low performing students in mathematics in this period. Greece, Finland and Denmark all reduced the share of low performers by more than 10%. On the other side, France reported a 34% higher share of low performers in mathematics; the Czech Republic and Iceland also recorded an increase of more than 10% between 2003 and 2006.

Distribution and mean performance of pupils in mathematics

The average score for all participating countries in mathematics in PISA 2006 was 498 points. Finland had the highest mean score of all the OECD countries with 548 points. Netherlands (531), Belgium (520), Estonia (515), Denmark (513), the Czech Republic (510), Iceland (506), Austria (505), and Slovenia (504) had mean performance levels significantly higher than the OECD average performance level. On an EU level average performance decreased slightly from 495 in 2003 to 492 score points in 2006.

For most countries, average performance in mathematics remained unchanged. Greece (increase of 14 points), was the only EU country, to significantly improve its performance since 2003. In France, Belgium, the Netherlands and Sweden performance declined.

Estonia, Finland and Ireland have the lowest variance between high and low performing students[71]. Austria, Germany, the Czech Republic and Belgium have relatively large differences between high and low average performers.

Comparing EU mathematics literacy worldwide

Finland is the best performing country of those assessed when it comes to the share of low performers in mathematics 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%).

In 2006 the average performance of the US was 18 points lower than for the average EU and the US average figure was down 9 points from 2003. Japan performs significantly better than the EU although the average results dropped nine points from 534 in 2003 to 523 in 2006. China (Chinese Taipei (549) and Macao (525)) Korea (547), Hong Kong (547), Canada (527), New Zealand (522) and Australia (520) all perform higher than the average of the EU.

Science literacy in the EU countries

In 2006 the PISA survey included a detailed profile of student performance 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.

The average proportion of low performers in science for the Member States is 20.2%. However, several Member States are already performing better than the future benchmark. Finland has the smallest share of low performing pupils with only 4.1%. Estonia (7.7%), Liechtenstein (12.9%), the

Netherlands (13.0%), Slovenia (13.9%) and Hungary (15.0%) are the countries closest to Finland and also performing better than the future benchmark. Alarmingly, more than 40% of pupils in Bulgaria and Romania are low performers in science.

Distribution and mean performance of pupils in science

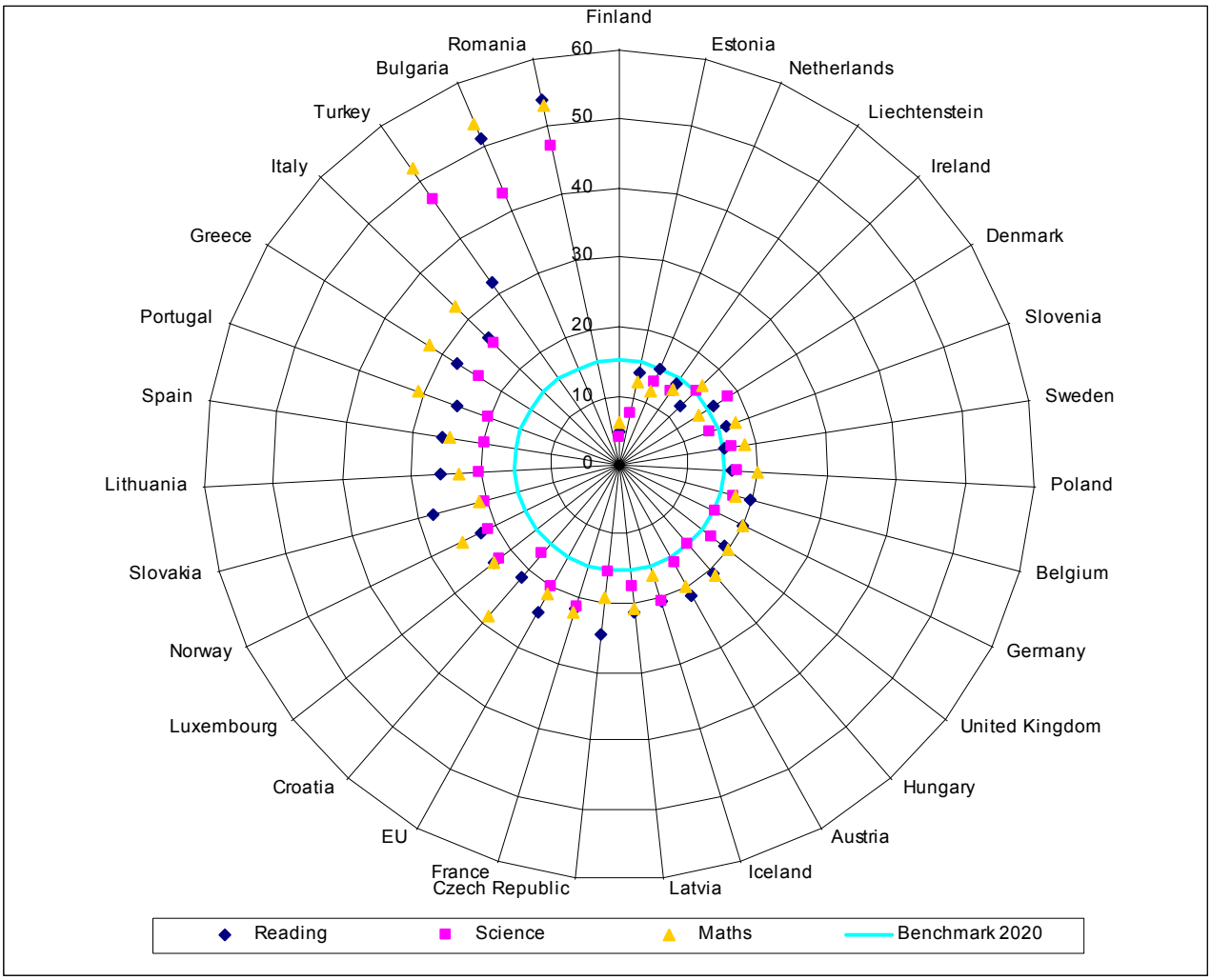
The average score for the participating EU countries in science is 496 points. Due to the changes in the science survey, progress is not possible to measure. The best performing EU countries when it comes to average figures are again Finland (563), Estonia (531) and the Netherlands (525).

Comparing EU science literacy worldwide

The average OECD figure for low performers in science is 19.2%. The best performers in the OECD are Finland and Estonia. The countries following are non-European countries: Hong Kong (8.7%), Canada (10.0%), Macao-China (10.3%), Korea (11.2%), Chinese Taipei (11.6%), Japan (12.0%) and Australia (12.9%). The US performs below the OECD average with 24.4% low performers; Russia has a score of 22.2% low performers.

Comparing low performers in reading, mathematics and science, 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 lower 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. (See chart III.2.2 and Table Ann III.4)

Chart III.2.2 Low achievers in mathematics, science and reading, 2006 – Benchmark 2020



Source: DG Education and Culture *Data source:* OECD, PISA database 2006

Progress in mathematics and science literacy: results from the TIMSS survey

The Trends in International Mathematical and Science Study (TIMSS) 2007 was the fourth survey on comparative assessments in mathematics and science achievement at the fourth (10-11 year olds) and eighth (14-15 year olds) grades. The survey is carried out every four years.

In the 2007 edition 12 EU countries (13 educational systems) participated at grade four and 11 countries (12 educational systems) at grade eight. The top performers according to average scores in mathematics and science are countries from East Asia. Russia also scores better than the EU countries for fourth graders.

The EU countries perform at different levels on the different tests. For mathematics England is a top performer both at grade four and eight. Latvia, the Netherlands and Lithuania are other good performers at grade four, while at grade eight Hungary is the best performing EU country.

On the science achievements, students from England and Latvia score highest among the Member States for fourth graders just ahead of Hungary and Italy. For students at the eighths grade England, the Czech Republic, Hungary and Slovenia are the best performers. Progress among EU countries is mixed. England and Slovenia improved their results while Bulgaria, Romania, the Czech Republic and Hungary were falling behind.

PISA and TIMSS can not be directly compared due to the nature of the tests and the different age-groups. While the surveys appear to have similarities, such as the content areas studied, they were designed to serve different purposes. Hence there may be differences in results or in trend estimates among the studies. By focusing on literacy, PISA draws not only from school curricula but also from learning that may occur outside of school. The objective of PISA is to measure what skills and competencies students have acquired and can apply to real-world contexts by age 15. TIMSS assessments on the other hand are based on frameworks for the topics from curricula in mathematics and science to be assessed.

2.2 Language Skills: Learning and Teaching

The Barcelona European Council in 2002 set the target of "the mastery of basic skills, in particular by teaching at least two foreign languages from a very early age" (Council 2002c, paragraph 44).

In the Conclusions on the strategic framework for European cooperation in education and training, ET 2020[72], the Council invited the Commission, to submit by the end of 2012 a proposal for a possible benchmark in the area of languages based on the results of the ongoing work on the first European Survey on Language Competences.

At present, 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, 2008)[73].

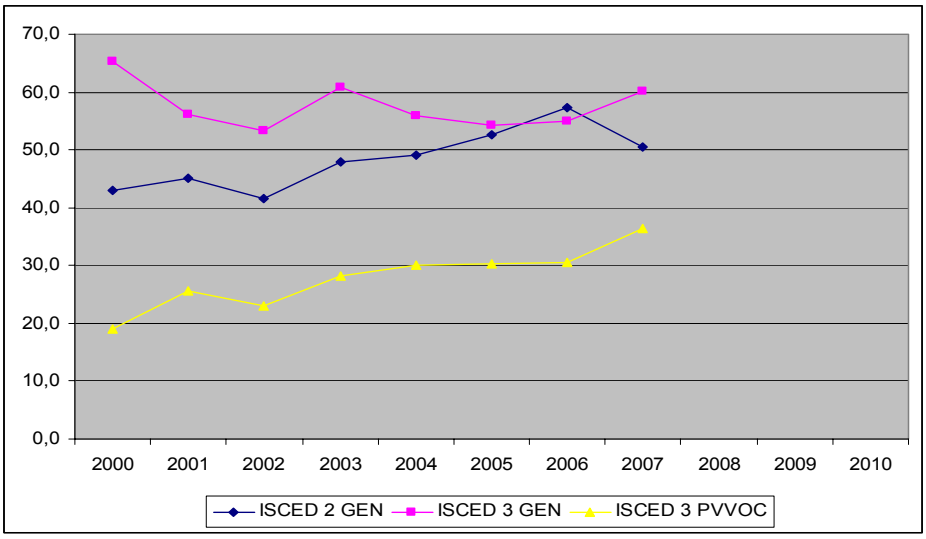
In 2007, more than half of the pupils in the EU were learning at least two foreign languages in secondary general education: in lower secondary 50.5% and 60.2% in upper secondary education in general programmes. (See Chart III.2.3). The number of students learning two foreign languages has decreased compared to 2006 in lower secondary education by 6.9 percentage points and increased by 5.2 percentage points in upper secondary education general as well as in pre-vocational and vocational education: + 5.8 percentage points for the EU average. In lower secondary education, pupils learn already more than two foreign languages in Luxembourg (2.5), in Malta and in Finland (2.2 in both countries) and two in Denmark, Estonia, Italy, Cyprus and Romania.

In upper secondary general education, more than two foreign languages are learnt by students in Luxembourg (3.0), Finland (2.7), the Netherlands (2.6), Belgium Flemish Community (2.5), Estonia (2.4) as well as Czech Republic, Slovenia and Sweden (2.1 in each of the 3 countries).

In prevocational and vocational upper secondary education, students learn in average two languages in Estonia and in Luxembourg and less than one in Germany (0.5), Denmark and Lithuania (0.9 in both countries) (see Table Ann III.5).

For the prevocational and vocational upper secondary education, the average number of foreign languages learned per pupil (1.1) is sensibly lower than in general upper secondary education (1.6).

Chart III.2.3: Percentage of pupils learning at least two foreign languages in EU 2000-2007.



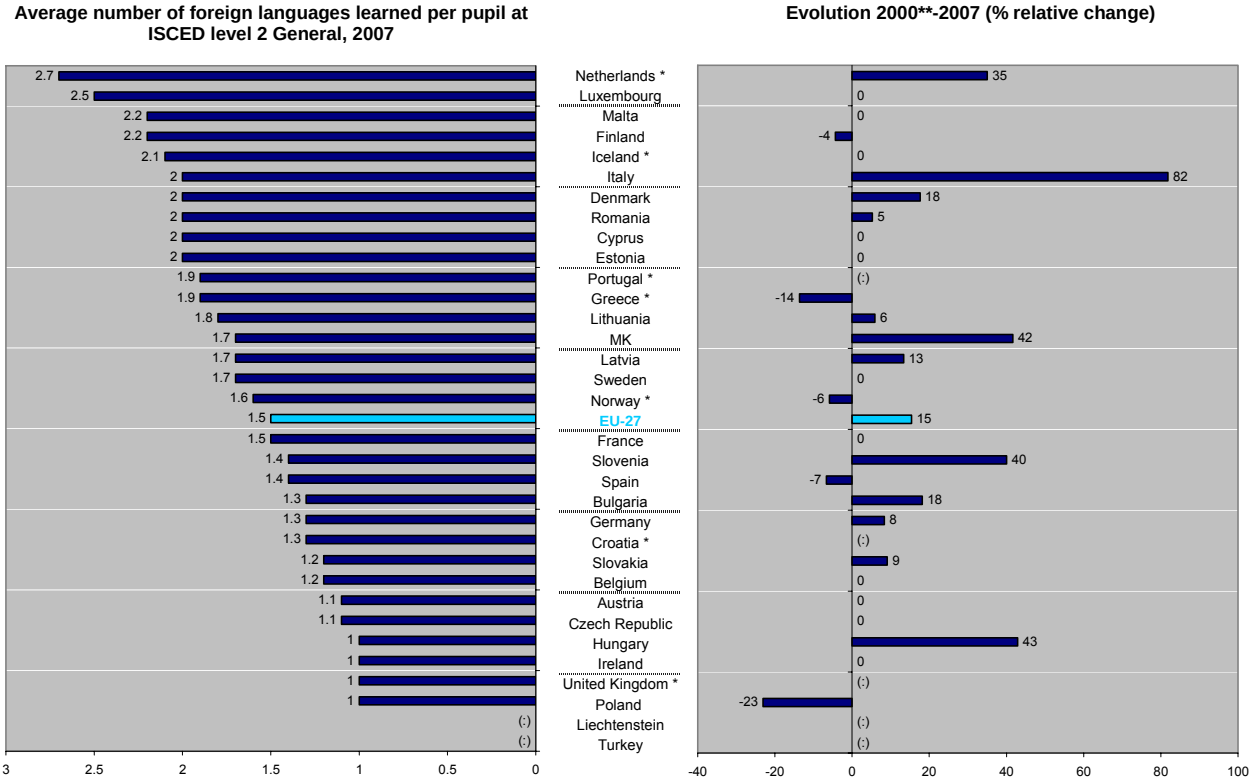
Source: Eurostat

Foreign language teaching is arranged in the following ways (EURYDICE, 2008):

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. (UK, IE)

Chart III.2.4: Average number of foreign languages learned per pupil at ISCED level 2 General, 2000-2007



Source: DG Education and Culture - *Data source:* Eurostat
* 2006 data
** 2001 data for Greece and the Netherlands

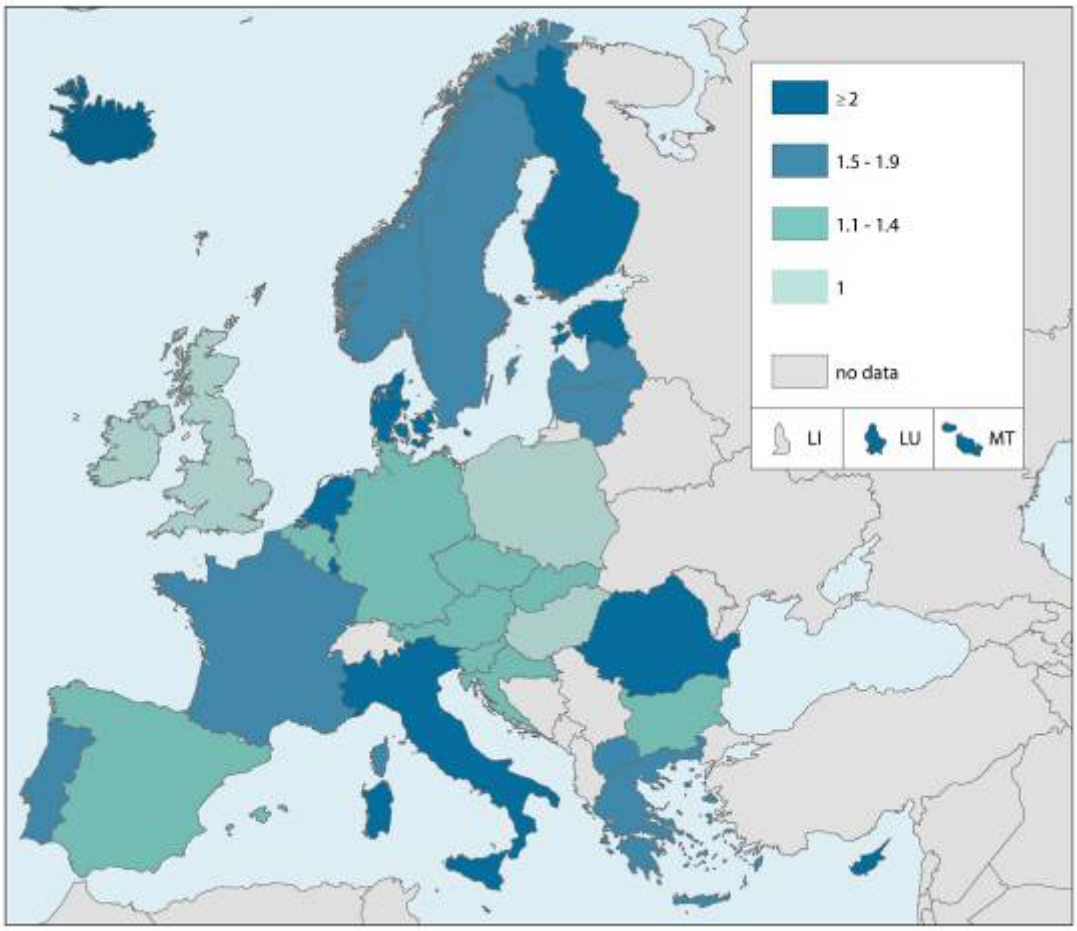
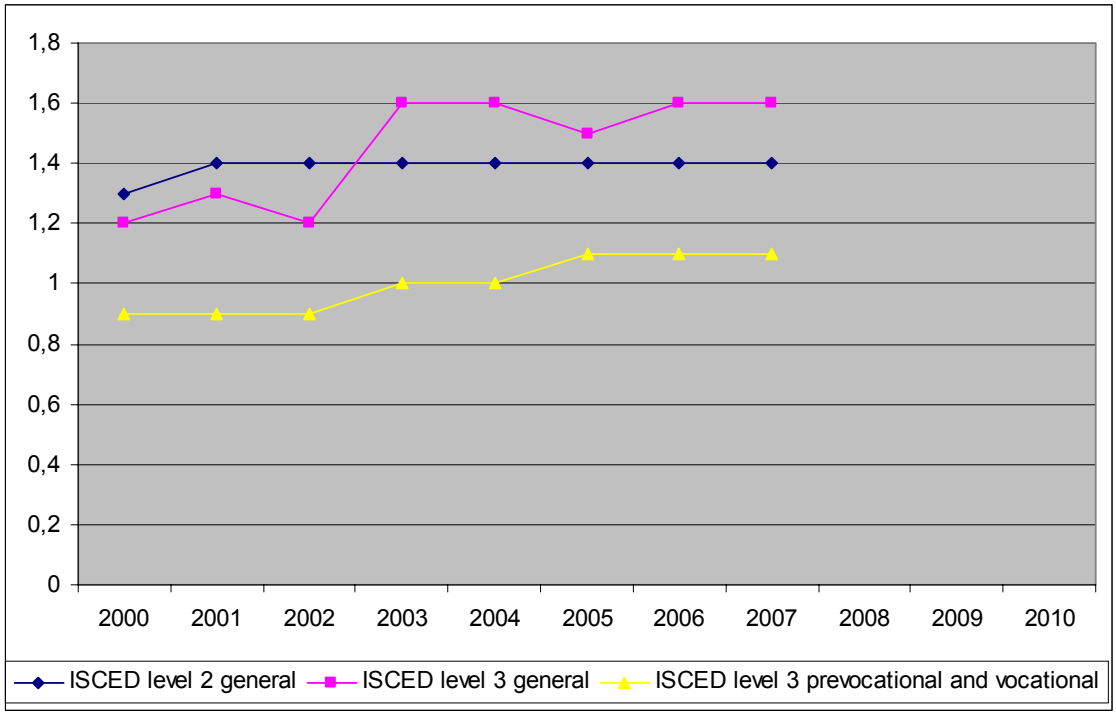


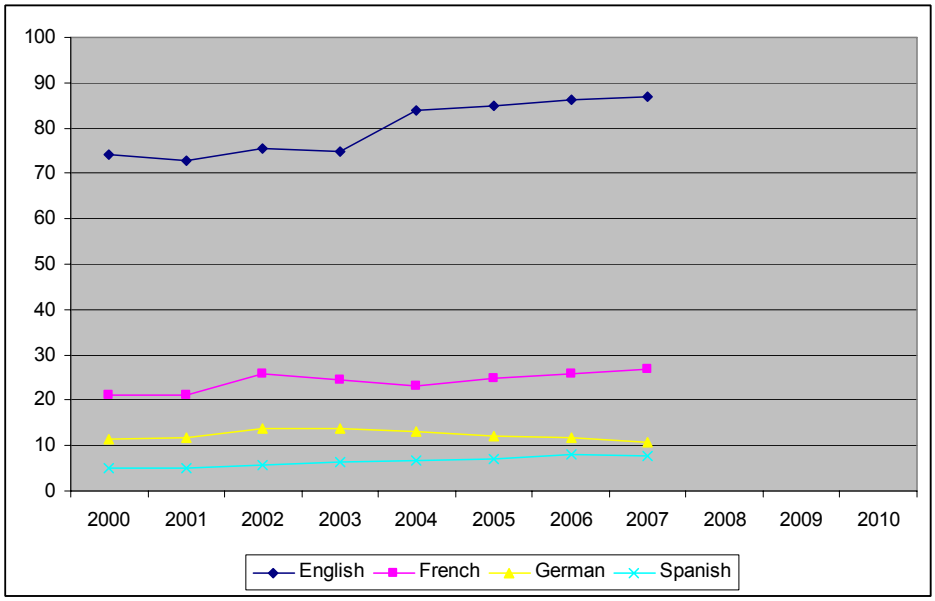
Chart III.2.5: Average number of foreign languages learned per pupil in EU 2000-2007



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

The EU average number of foreign languages learned per pupil in upper secondary general education has remained unchanged since 2006 (1.6).
Since 2000 the biggest increase of the number of languages taught in lower secondary education took place in Italy (+ 82%), in Hungary (+43%), in the Former Republic of Macedonia (+42%) and in Slovenia (+40%), while a decreased occurred in Poland (-23%), in Greece (-14%) and in Spain (-7%). On the EU level the average increased by 15 %. (See chart III.2.4).

Chart III.2.6: Proportion of pupils learning English, French, German and Spanish at ISCED level 2 in the EU (2000-2007)



Source: Eurostat

The proportion of pupils learning English in lower secondary education increased from 74.3% in 2000 to 86.8% in 2007. The highest relative increase is for the teaching of Spanish but from a low base. Only 7.7% of pupils were learning Spanish in 2007, the increase is more than 50% from 2000. The number of pupils learning French and German has also increased, at 27% and 10% respectively. (See Table Ann III.6)

2.3 ICT skills for young and adults

Use of ICT in education and training is a priority in all European countries, but progress has been patchy. Europe's digital sector has made strong progress since 2005.[74] However 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.[75]

Evidence of the impact of ICT use on learning and learners are 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 necessary 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.).

The Study on Technology's impact in Primary Schools (STEPS) focused on providing evidence on the impact of ICT in primary schools in three main areas: teachers, learners and schools. All Member States plus Iceland, Liechtenstein and Norway participated in the study.

There is a broad consensus among the 30.000 teachers and head teachers about the positive impact of ICT. 75% of primary teachers use computers in class. They mention that pupils are more motivated and attentive; significant learning benefits and positive impact for collaborative work. Only 1% is against the use of ICT. The study underline that there has been a move away from dedicated computer labs to use in class and the use in classroom has increased from 28% in 2001 to 68% in 2006. However, there are huge differences across countries.

At present only limited data are available on ICT competences amongst adults at European level. Thus, the current way of measuring adults' ICT skills refer more to actual use than to competences. In terms of monitoring tools, EUROSTAT's Information Society Statistics (ISS) use two main surveys on "ICT usage in enterprises" and "ICT usage in households and by individuals". When individuals are asked to judge their own computer skills one third of the average in the EU respond that their skills are sufficient if they were to look for a job or change jobs within a year. The most confident users are found in the Nordic countries and in Luxembourg. In these counties about half of the population rate their computer skills to be sufficient. At the same time one in four responds that their skills are not sufficient if changing job. In Lithuania, Bulgaria, Latvia and Portugal at least 40% report on insufficient computer skills. (see Table Ann III.7)

In terms of trends, the percentage of people using the internet and computers has increased in the last three years in the EU. However, the usage gap between low and highly educated individuals has not narrowed in the EU. In 2008, 85% of people with high education used the internet on average once a week. The similar figure for individuals with low or no education was 35%. The development in EU countries is relatively stable and only a few countries have narrowed the gap the last years. For frequency of computer use, low educated individuals are catching up in a majority of EU countries. Gender differences are being reduced in almost all Member States, but the gap in terms of age is growing.

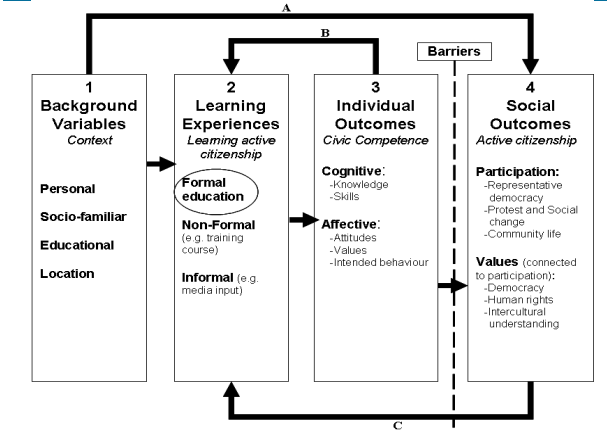
The current measures of ICT skills and use do not explain how ICT are used for complex problem solving, creativity and innovation. Even if further improvements to ICT measurement should be encouraged Eurostat will include data collection on eSkills on a bilateral basis in their Household survey from 2010 and a special module with a focus on e-skills is foreseen in 2011 and it will improve the knowledge base in the field.

2.4 Active citizenship

Exploratory research has in recent years taken place on indicator development for active citizenship and civic skills by CRELL at the JRC.

The working definition of active citizenship which has been used within this research 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).

Chart III.2.7 Measuring Active Citizenship working model



Source: CRELL/JRC (2006)

Two composite indicators have been developed – one on active citizenship (actions) of adults and one on civic skills of pupils. The civic skills composite indicator was based on the 1999 IEA Cived survey and will be updated in 2010 when the results of the 2009 Civic study (ICCS) study are becoming available.

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. The IEA has carried out in 2009 a new study, which will support the measuring of civic competences in the future.

Impact of formal education on active citizenship

The CRELL research centre has measured the impact of years of formal education on active citizenship (Hoskins, D'Hombres and Campbell, 2008). The results uniformly suggest that there is a significant democratic return associated with formal education. The analysis showed that education is positively and significantly correlated with active citizenship behaviour. Tertiary education has by far the biggest effect. 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

Table III.2.1 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

Source: ESS

positive identity of active citizen and that the lack of access to higher education can introduce "negative attitudes, identity and behaviour".

3. Migrants

There is evidence that many children with migrant background suffer from educational disadvantages and unequal patterns exist in terms of access to and achievements in education. Several factors may underlie this gap, among them a poor socio-economic background, insufficient knowledge of the instruction language, children's and families' attitudes towards education, limited access to childcare facilities, lack of support from the educational environment (Green Paper, 2008, UNICEF, 2008).

3.1 Special education needs and the issue of language

Recent research claims there is an over-representation of migrant children in schools for pupils with special needs (see NESSE, 2008 and Soriano, V. et al., in press). This is especially the case in provision addressed to pupils with learning and behavioural problems.

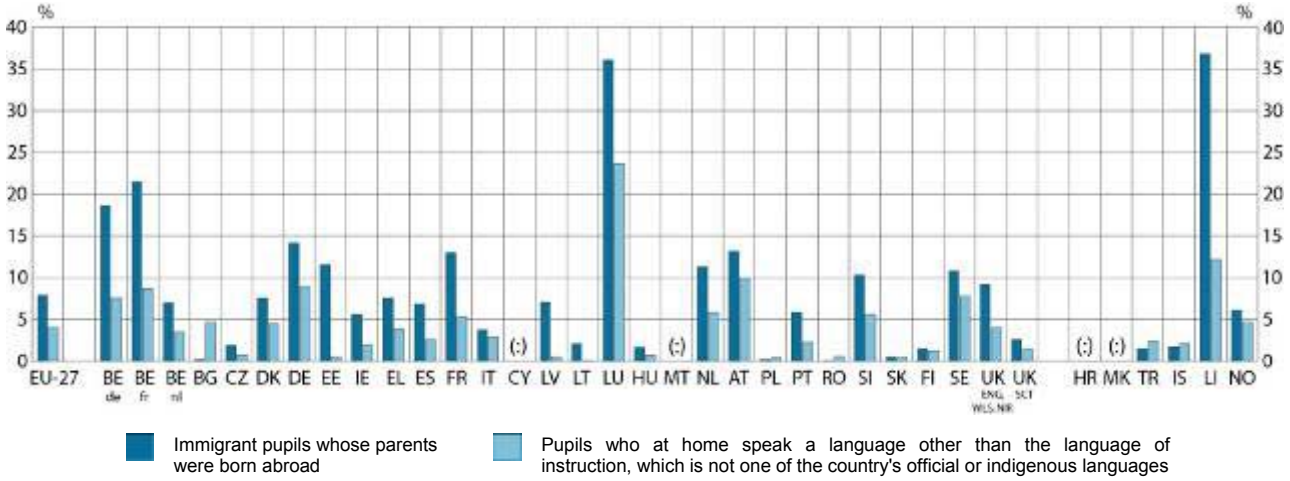
This situation needs to be carefully analysed and cannot be interpreted in a simple way, as several factors are interrelated and need to be considered: type of special need actually recognized, type of population, possible links with low socio-cultural and/or economic status of households. However, the fact that pupils with an immigrant background are sometimes over-represented in special schools seems to highlight that there is confusion in distinguishing between language difficulties and learning problems.

The issue of a different mother tongue for migrants is clearly a central one, as difficulties in the language of instruction could severely hamper children's success at school and hinder parental involvement, preventing an efficient communication between school and families (Eurydice, 2008).

The PISA 2006 international survey provides some information about 15-year-old pupils who at home speak a language other than the language of instruction (which is not one of the country's official or indigenous language). They are 4% as an average of EU participating countries (chart III.3.1) and it can be assumed that they are mainly immigrant pupils.

Chart III.3.1: Migrants and languages

Proportion of 15-year-old immigrant pupils (whose parents were born abroad) and the proportion of pupils of the same age who say that at home they mainly speak a language other than the language of instruction, which is not one of the country's official or indigenous languages, 2005/06



Source: Eurydice *Data source:* OECD, PISA database 2006
Note: Immigrant pupils include first and second generation migrants

Considering countries where the presence of migrant pupils is noticeable (at least 10%) the rate of pupils speaking another language is higher in some Member States such as Luxembourg, Austria and Germany (ranging between 9% and 24%). In other EU countries the issue of language is less relevant as it can be assumed that most migrant pupils speak the same one as that which is used in school. This is the case in France and the Netherlands, probably due to the characteristics of their main migration inflows.

All Member States have put in place specific provisions to support the learning of the host country's language, such as language classes for migrant pupils, early language testing and pre-school language courses, special training for teachers to support pupils with insufficient linguistic competence.

3.2 Key competencies

Migrant pupils' performance in school may suffer from linguistic and cultural differences, leading to significant gaps between their educational achievements vis-à-vis their peers. The PIRLS survey on literacy (2006) shows that migrant pupils generally score less well than natives for competencies acquired by the fourth grade of primary school.

In almost all countries, pupils with one parent born in the country perform better than children whose parents are both migrants.

PISA reports that immigrant pupils have similar or higher levels of positive learning dispositions compared to their native peers. However results confirm a poorer performance for 15-years old pupils with a migrant background in reading, mathematics and science compared to native pupils[76].

The differences in performance vary between countries and in some countries it exceeds 70 points. These differences are significant, bearing in mind that 40 points can be considered equivalent to one year of instruction. Second generation migrant pupils perform better than first generation migrant pupils in most countries where data exist. The OECD underlines that definitive conclusions cannot be drawn directly from the PISA results; longitudinal studies would be required to study outcomes across generations.

3.3 Early leavers from education and training

Young migrants are generally more at risk of dropping out from the education and training system without having attained an upper secondary qualification.

When looking at the rate of early leaving (see also section III.1.2) the gap between migrants and natives is significant. In the EU as a whole, the probability that a young migrant is an early leaver from education and training is almost double that for natives (26.8% vs. 13.6%).

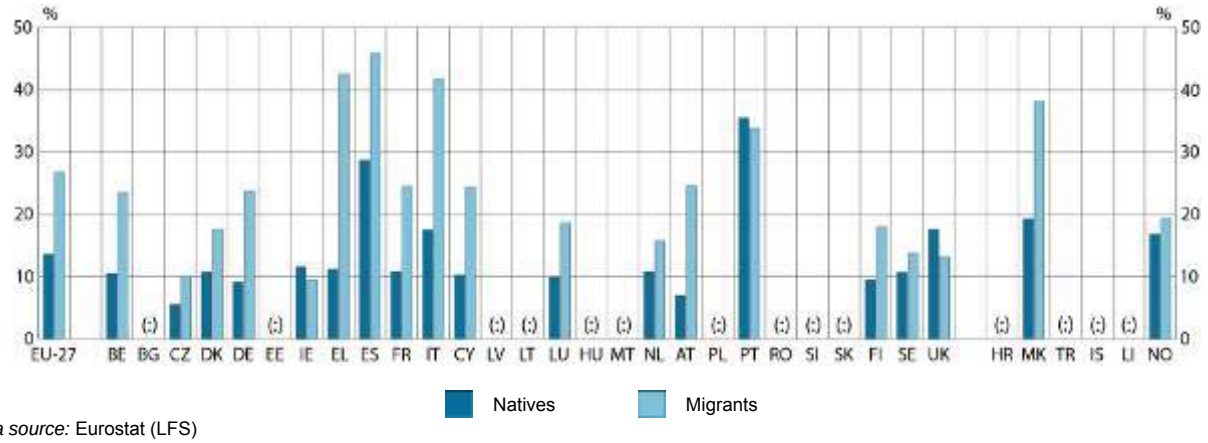
Considering countries with a sufficient sample size, the highest ratios of early leavers among migrants are to be found in Southern Europe (Spain, Greece and Italy) where more than 40% of migrants are in this disadvantaged condition (chart III.3.2). These are mostly countries in which the overall rate is far above the EU average. In relative terms, migrants are at least 3 times more often early leavers in Greece, Austria and Slovenia. Also in Germany the migrants' ratio of early leavers is 2.6 times higher than the one for natives.

This may indicate either a situation in which discrimination against migrants is a serious issue or

that immigration flows consist mainly of low-qualified young workers[77].

The opposite holds for countries where migrants with low educational attainment are attending more education and training than young natives. This is not frequent in Europe, but is the case in 3 countries: United Kingdom, Ireland and Portugal.

Chart III.3.2: Early leavers from education and training by migrant status, 2008 (rates)

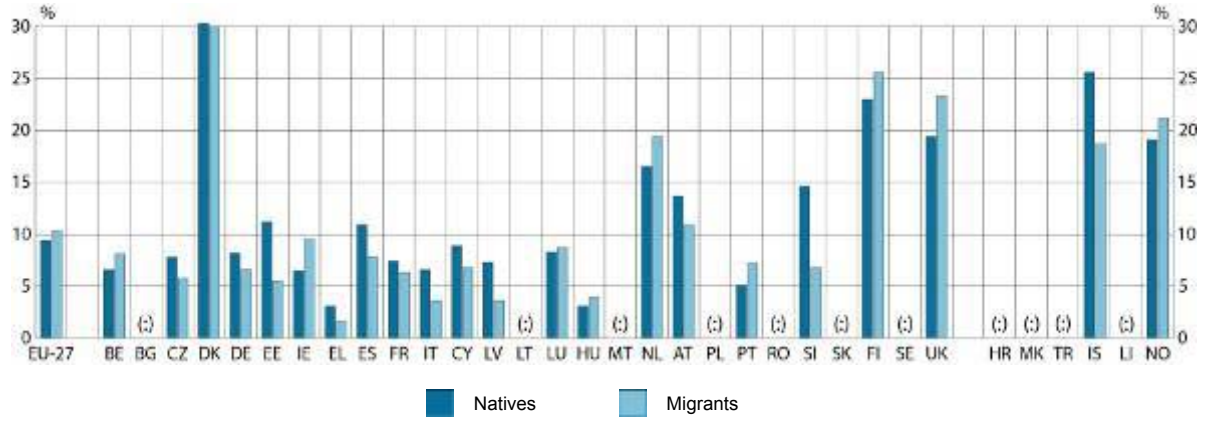


Data source: Eurostat (LFS)
Additional notes:
- Migrants include non-nationals and born abroad.
- Data for Czech Republic, Luxembourg, Finland and the former Yugoslav Republic of Macedonia lack reliability due to small sample size

3.4 Adult participation in lifelong learning

Adult learning is important both for economic development and to enhance social cohesion. It could be particularly meaningful for migrants, helping their adaptation to the local labour market and providing a sense of social engagement.
In the EU as a whole, participation in lifelong learning is slightly higher for migrant adults than for natives. This is the case especially in Netherlands, Ireland and UK, where the migrant participation rate exceeds that of nationals by at least 3 percentage points, but it is also higher in Nordic countries, Portugal and Belgium (chart III.3.3).
Excluding Member States where migrants are too few to draw general conclusions, in 9 EU countries they have poorer opportunities to access adult learning. The system is particularly unfavourable to them in Italy, Greece and Latvia, where migrants' participation rates are about half those of natives.

Chart III.3.3: Adult participation in lifelong learning by migrant status, 2008 (rates)



Data source: Eurostat (LFS)
Additional note:
- Migrants include non-nationals and born abroad.
- Data for Estonia, Hungary and Slovenia lack reliability due to small sample size

4. Gender inequalities

For many years the main gender issue in education was that men received better education than women. Since the mid-1990s the gender gap has changed direction becoming, at the broad level, unfavourable to men. It is fully acknowledged that women's qualifications are now higher (EC Report on equality between women and men - 2008) and that women

have overtaken men as far as the number of tertiary level graduates is concerned, especially for the youngest generations (see section II.4).

At present, the issue about gender equality in education relates mainly to equal cultivation of different capacities and elimination of gender stereotypes. The definition of the 2010 EU benchmark on the increase of women graduating in Mathematics, Science and Technology addressed this kind of concerns.

In this section, some example of gender inequalities in education will be discussed, with particular reference to difficulties faced by boys and girls in the school system and to gender-driven educational choices.

4.1 Differentials in schooling

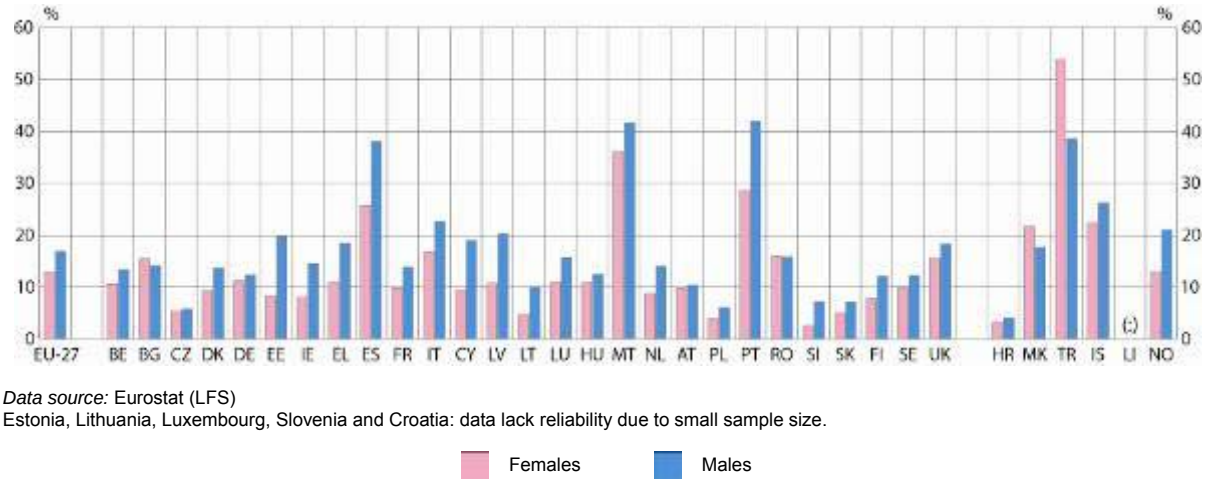
Pupils with special education needs
During the period of compulsory education, boys can experience more difficulties than girls in adapting to the school environment. They are over-represented among pupils with disabilities and, more often than girls, they present emotional and behavioural problems, or specific learning difficulties which require ad hoc support from teachers.

Results from the OECD-CRELL research on pupils with special educational needs (see section III.1.3) show that, in EU countries covered by the study, boys make up 61% of pupils with disabilities and 65% of pupils with learning difficulties. They are clearly over-represented, especially in the second category, as in the whole population boys are just about 51%.

Early leavers from education and training
Difficulties persist in upper secondary education. Boys and girls are almost equally represented among students, but the former are much more likely to be early leavers from education and training: in 2008 the rate for males was 16.9%, for females 12.9% (chart III.4.1).

The gap is not a new phenomenon and it does not seem to be disappearing. While the overall early leaving rate is slowly decreasing, the difference in percentage points between male and female early leavers is 4.0, almost the same as in 2000.

Chart III.4.1 Early leavers from education and training by gender, 2008 (rates)



Data source: Eurostat (LFS)
Estonia, Lithuania, Luxembourg, Slovenia and Croatia: data lack reliability due to small sample size.

This males' disadvantage is common to almost all EU countries, apart from Bulgaria where the gap has always been quite narrow, and in 2008 women are slightly more likely than men to be early leavers. On the contrary, rates are notably higher for males in most southern European countries, especially in Spain and Portugal, in which a high overall rate is associated with a wide gender gap.

Gender differences in basic skills: evidence from PISA
Average boys and girls performance in basic skills differ depending on the subject matter. In the reading assessment girls outperform boys: in 2006 almost twice as many 15 year old boys as girls had low reading skills (respectively 30.4% and 17.6%). In all Member States females perform better on average than males. Greece and Finland show the highest difference between girls and boys while the smallest gender gaps were in the Netherlands and the United Kingdom.

The overall gender difference in mathematics was less than a third as large as for reading, and contrary to the reading literacy, in all the Member States boys outperformed girls or there was no significant difference. The largest average gender difference is found in Austria.

Girls and boys showed no significant differences in average science performance in the majority of countries. Boys and girls also have similar attitudes to science in some countries.

Whether and to what extent those differences are driven by innate attitudes or influenced by learned behaviour is widely debated (Eurydice, forthcoming). However, the performance gaps between boys and girls imply a need to specifically address the low skills in reading (of boys) and in mathematics (of girls) in order to improve overall performance.

4.2 Educational choices

General and vocational education

In upper secondary education, students split almost equally between general and vocational or pre-vocational programmes. But the gender imbalance is particularly pronounced, with a clear prevalence of young women in general courses, of men in vocational streams (Eurydice, 2009).

The gender gap can be found in almost all European countries, and is particularly marked (more than 20 percentage points) in countries such as Estonia, Malta, Italy, Poland and Bulgaria. The over-participation of young men in vocational streams is quite limited or even reversed only in a few countries, namely Belgium, Netherlands, UK and Ireland (see Table Ann III.8). There is no apparent pattern in these differences, neither geographical nor linked to the degree the vocational strand is developed in the country.

Gender imbalance among graduates in MST

Considering tertiary education, the student population as a whole shows an imbalance in favour of women. In 2007, they represented 55% of all students in the EU, outnumbering men by about 2 million. This imbalance is even more pronounced among graduates as in 2000 57% of graduates in the EU-27 were female and their share increased further to 59% in 2007.

On the contrary, males predominate in MST. Despite policy efforts to encourage women to choose these fields, at the EU level, the female share of MST graduates increased just slightly, from 30.7% in 2000 to 31.9% in 2007. Greece and Romania have the highest share of female MST graduates (40% or more) while the biggest increases since 2000 have been in Germany, Malta, Slovakia and Denmark (> 5 percentage points, Table III.4.2).

Since there was little change in the share of female MST students over the period 2000-2007, no significant improvements in the gender balance in MST graduates (who will be drawn from these students) are likely in the next few years. In fact, the share of female MST students has hardly changed since 2000 (The EU average was 29.6% in 2000; and 30.2% in 2007).

Table III.4.1 Female graduates by field, 2000-2007, ISCED 5-6, (Percentage)

ISCED field	% female graduates		Countries with the highest shares of female graduates (2007)
	2000	2007	Highest 2
Life sciences	61.2	63.4	Bulgaria 76.1 Latvia 75.4
Physical science	38.9	45.1	Cyprus 67.9 Poland 66.4
Mathematics, statistics	49.4	50.9	Estonia 85.9 Cyprus 74.4
Computing	23.9	18.6	Bulgaria 52.6 Greece 46.4
Engineering	15.6	18.4	Greece 34.5 Romania 32.1
Manufacturing Processing	40.7	47.3	Denmark 86.5 Lithuania 76.2
Architecture, building	32.1	36.2	Greece 53.9 Italy 50.1

Data source: Eurostat (UOE)

Table III.4.2 Females as a proportion of all MST graduates (ISCED 5 and 6)

	Females as a proportion of all MST graduates		
	2000	2006	2007
EU-27	30.7	31.6	31.9
Belgium	25.0	26.5	27.2
Bulgaria	45.6	41.2	39.3
Czech Republic	27.0	26.5	29.3
Denmark	28.5	34.1	36.0
Germany	21.6	28.6	29.8
Estonia	35.7	42.9	38.7
Ireland	37.9	29.1	31.3
Greece	:	40.9	44.2
Spain	31.5	30.0	29.9
France	30.8	27.9	28.1
Italy	36.6	36.1	37.0
Cyprus	31.0	35.9	31.5
Latvia	31.4	32.4	32.7
Lithuania	35.9	31.6	32.5
Luxembourg	:	:	32.0
Hungary	22.6	27.9	26.8
Malta	26.3	25.9	37.8
Netherlands	17.6	18.4	18.9
Austria	19.9	24.5	23.8
Poland	35.9	39.2	39.2
Portugal	41.9	39.7	34.8
Romania	35.1	38.6	40.0
Slovenia	22.8	25.7	25.0
Slovakia	30.1	34.8	35.4
Finland	27.3	28.5	28.9
Sweden	32.1	34.4	33.1
United Kingdom	32.1	30.8	31.1
Croatia	:	35.3	34.9
MK *	41.6	46.0	39.8
Turkey	31.1	29.8	31.1
Iceland	37.9	:	34.2
Liechtenstein	:	19.6	30.4
Norway	26.8	28.4	28.6
United States	31.8	31.3	31.0
Japan	12.9	14.6	14.4

Data source: Eurostat (UOE)
*MK= Former Yugoslav Republic of Macedonia

Greece: result for 2005 instead of 2006

The share of women amongst MST students is lower than amongst MST graduates, implying a lower drop-out rate for women.

Gender imbalance is especially pronounced in engineering (18% female graduates) and computing (19%) 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 predominate (63%).

The high share of women in fields of tertiary education other than MST shows that there is clear potential to increase the female share in MST too.

CHAPTER IV

Enhancing creativity and innovation, including entrepreneurship at all levels of education and training

MAIN MESSAGES
Enhancing creativity , Innovation and Entrepreneurship

Creativity and Innovation

- As measured by the European Innovation Scoreboard (2009) **three Nordic countries (SE, FI, DK), together with Germany, and the UK, make the highest innovation performance in the EU**, with an often strong concentration of the "creative class" in and around capital cities with very high levels of educational attainment. A process of EU convergence of innovation performance can be observed with low growth rates of performance among mentioned high performers and high growth rates among low performers (RO, LV and BG).

Mathematics, Science and Technology graduates and researchers

- **With a growth of over 33% the number of graduates in Mathematics, Science and Technology has already in 2000-2007 grown by more than twice the rate set as target for 2010 by the EU benchmark.** The targeted growth of 15% implies an increase of some 100 000 graduates by 2010. However, an increase of some 230 000 MST graduates has already been achieved reaching 917 000 new graduates in 2007.

- There is a strong difference in growth in the number of Mathematics, Science and Technology graduates between fields of graduation. **The number of computing graduates has increased by about 80% since 2000, while the number of graduates from life sciences and physics increased only slightly or even decreased.**

- **Some 45 000 or about 5% of Mathematics, Science and Technology graduates in the EU are PhD graduates** (2007) compared with 22 400 in the USA (5.3%) and only 6 500 in Japan (2.9%).

- **The EU has significantly fewer researchers per 1000 employees on the labour market (some 6 in 2006) than the US (about 9) and especially Japan (more than 10).** The total number of researchers on the labour market in the EU (1.3 million) is slightly lower than in the USA and in China (both 1.4 million) but nearly twice as high as in Japan.

Entrepreneurship

- **Entrepreneurship is a recognised objective of the education systems and embedded explicitly in national framework curricula in only six EU countries (CY, ES, FI, IE, PL, UK)**

1. Creativity and innovation

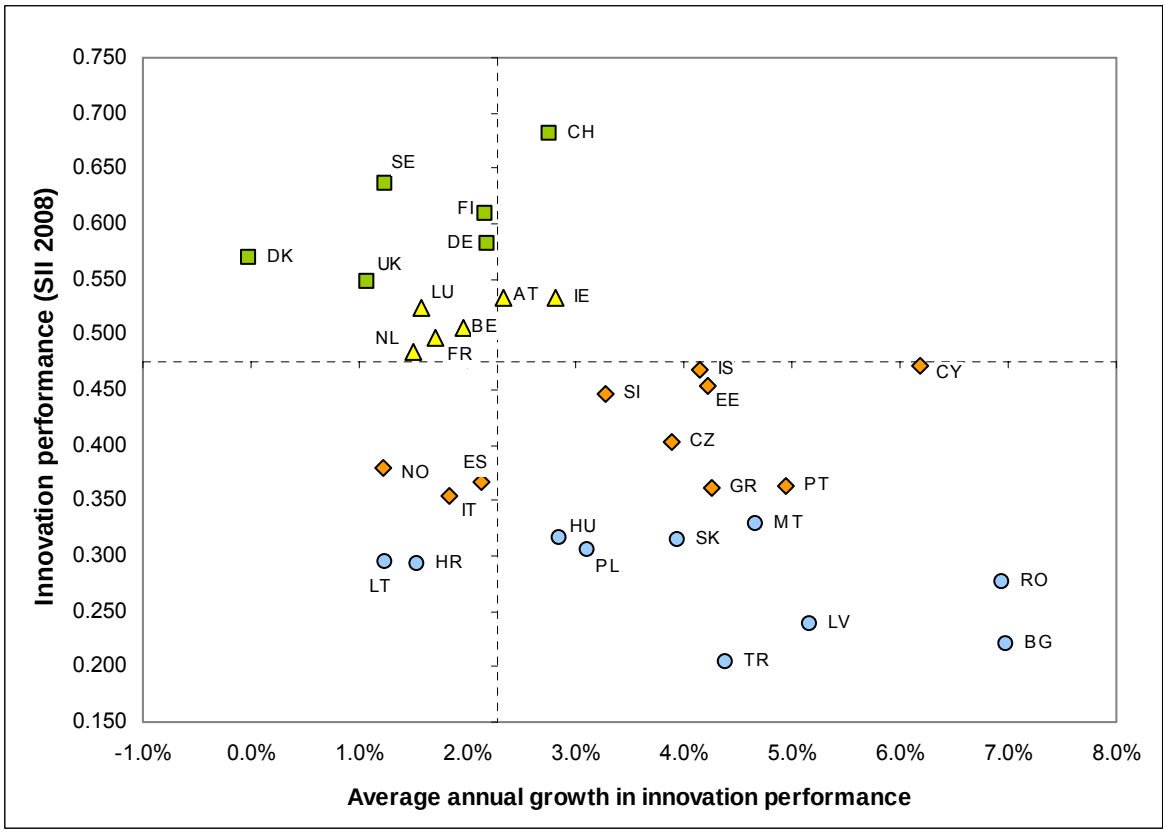
"Creativity is a crucial component of our capacity to innovate. And innovation is a key factor not just to become more competitive but also to improve our quality of life and the sustainability of our development"[78]. Considering this fundamental function and in the frame of the European Year of Creativity and Innovation, there are several ongoing activities undertaken by the European Commission that relate to the measurement of creativity and innovation at national, regional and individual levels[79].

1.1 Innovation and creativity of nations and regions

Concerning innovation, the European Innovation Scoreboard[80] (EIS) provides a comparative benchmarking of national innovation performance across the European Union and Croatia, Turkey, Iceland, Norway and Switzerland. On the basis of the 29 EIS indicators (see Ann IV.1), countries can be classified into four clusters:

- **Innovation leaders** with innovation performance well above the EU average and all other countries: Denmark, Finland, Germany, Sweden, Switzerland and the UK;
- **Innovation followers** with innovation performance below those of the innovation leaders but above that of the EU average: Austria, Belgium, France, Ireland, Luxembourg and the Netherlands;
- **Moderate innovators** with innovation performance below the EU27 where the first 4 countries show a better performance than the last 6 countries: Cyprus, Czech Republic, Estonia, Greece, Iceland, Italy, Norway, Portugal, Slovenia and Spain;
- **Catching up countries** with performance well below the EU average[81]: Bulgaria, Croatia, Hungary, Latvia, Lithuania, Malta, Poland, Romania, Slovakia and Turkey.

Chart IV.1.1: Convergence in innovation performance



Source: European Commission
Additional note: see Table Ann. IV.2

All countries with the exception of Denmark have improved their innovation performance in the last five years. Most of the countries below the EU average are improving their performance at higher rates than

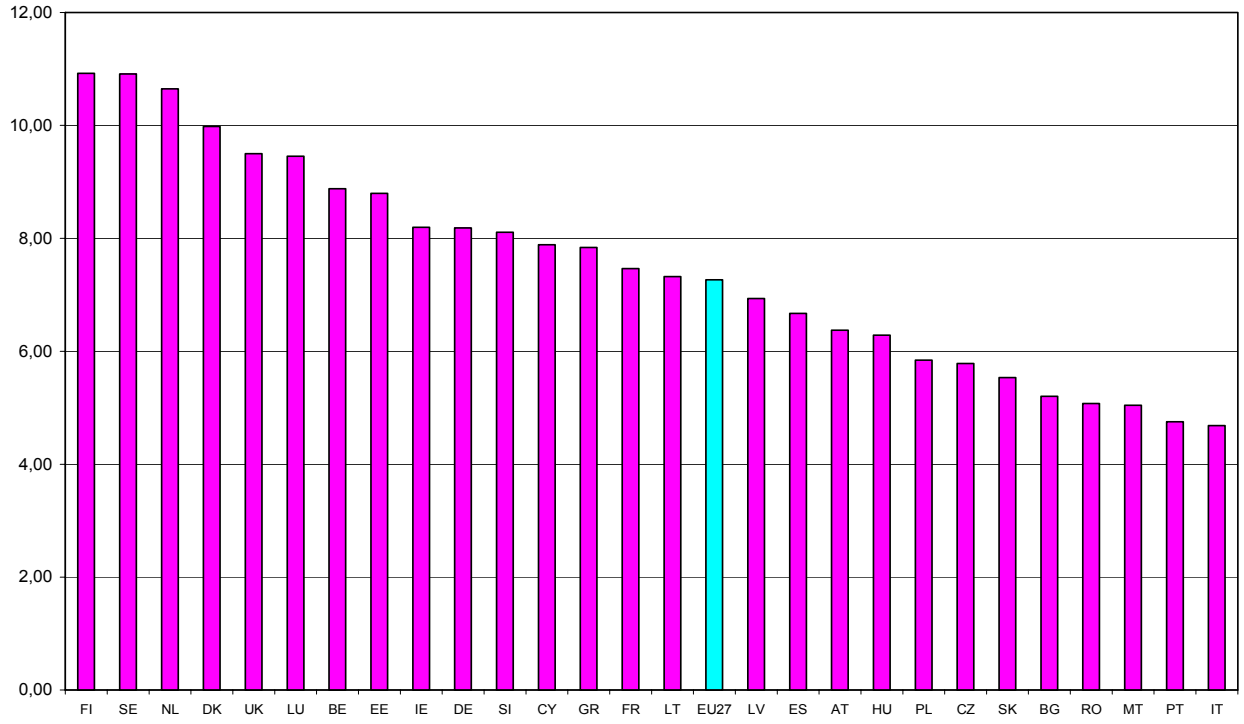
the EU average growth in the last five years, except in the case of Spain, Italy, Norway, Croatia and Lithuania. Those performing above the EU average, generally progress slower than the EU average and only in this latter group Austria, Iceland and Switzerland show higher rates than the EU in the last five years.

Indicators on innovation are pointers of the capacity of countries to transform their creative capacities into innovative results. However, the relationship between creativity and innovation is complex. Many factors are involved for creativity and innovation to appear covering institutional, economical, human and social resources dimensions[82].

There is a need of an "enabling environment" conducive to creativity for innovation to appear. For example, it is likely that cultural activities[83] play a role in enhancing creativity and innovation and creative industries and the "creative class" are catalysts for change and innovation[84]. The creative class[85] is defined as share of the population doing creative work. It is based on the ISCO definition of occupations. (See Table Ann IV.5).

The core creative class is concentrated in and close to the capital regions, in Benelux and Nordic countries, Ireland and the United Kingdom. In these areas - often large cities - the share of foreign-born graduates and broadband access is also higher. Evidence at European regional level thus confirms that creative occupations are associated with areas where there are high levels of skills and a heterogeneous and tolerant environment.

Chart IV.1.2: Core Creative Class employment – national level



Source: European Commission

1.2 Measuring creativity skills and competences

Education and training are core tools to help people to develop their talent and creativity. Analysis at the national level using the EIS data has shown that creative education is associated with higher levels of innovation: "(…) policies aimed at improving levels of educational attainment and policies aimed at improving creative thinking in education will, after a number of years, have a positive effect on a society's innovative performance" [86] .

The previous indicators on innovation and creativity at national and regional levels could be regarded as indicators of the environment where creativity flourishes. Some of them (such as creative class index) are proxies for creative people, but it is clear that precise measures of an individual's creativity do not exist. In order to better understand the relationship between the environment that fosters creativity, people's creativity and innovation, it is necessary to have information on the actual levels of people's creativity.

There is a need of individual level measures that will permit clearer understanding of the role of creativity in innovation and economic growth. In particular, it would be necessary to assess if students after compulsory levels are leaving schools with the adequate levels of creative capacities, creativity cut across the eight key competences adopted by the Council as one aspect to prepare students for

lifelong learning. It is, thus, important to look into possible ways of assessing creativity in students. The conference: "Can creativity be measured ?" organised by the Commission aimed at starting the process of identifying possible ways of achieving this goal[87]. The measurement of creativity would require several different techniques capturing aspects of diverse nature, involving contextual information, attitudinal aspects, personality traits as well as cognitive aspects.

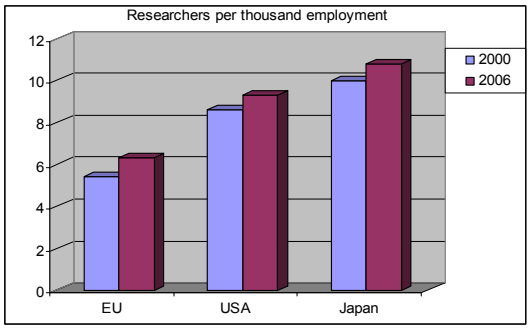
2. Graduates in Mathematics, Science and Technology

European benchmark
The total number of graduates in Mathematics, Science and Technology in the European Union should increase by at least 15% by 2010.[88]

Science and technology are vital to the knowledge-based and increasingly digital economy. The education of an adequate supply of science specialists is also important in the light of the goal set by the Barcelona European Council of increasing overall investment on research and development (R&D) to 3% of GDP by 2010 (European Council, 2002b).

The EU has today still slightly fewer researchers on the labour market than the US and is lagging behind both the US and Japan when it comes to the number of researchers as a proportion of the total labour force (see Chart IV.2.1).

Chart IV.2.1: Researchers per thousand total employment, 2000 and 2006



Data source: Eurostat, OECD

2.1 Evolution of the number of MST students

The number of tertiary MST students has increased by about 16% since 2000, or on average by 2.1% per year. Growth has been particularly strong in Malta, Cyprus and Romania.

For some countries, however, the number of MST students stagnated or even declined. The latter was the case in Austria (partly a result of the introduction of tuition fees in 2001/02), Ireland, Belgium, Spain, Bulgaria and Sweden (Table IV.2.1).

Growth in the number of students has been slower than growth in the number of graduates since an increasing share of students takes several degrees (Bologna effect). In the EU, MST students accounted in 2007 for nearly a quarter of the total student population, some 4.6 million students (2007) compared to 2.8 million in the US and 750 000 in Japan (Source Eurostat (UOE)).

Table IV.2.1: Number of MST students (ISCED level 5A, 5B and 6), 2000-2007

	Number of tertiary MST students (in 1000)			Ø Growth per year
	2000	2006	2007	2000-07
EU-27	**4000e**	**4514**	**4638**	**2.1**
Belgium	74.6	68.8	62.9	-2.4
Bulgaria	64.5	63.2	64.3	-0.1
Czech Republic	74.5	77.4	83.2	1.6
Denmark	38.3	41.5	43.6	1.9
Germany	587.2	708.2	701.2	2.6
Estonia	11.4	15.3	15.8	4.8
Ireland	45.3	41.0	40.6	-1.6
Greece	:	93.6	184.5	:
Spain	525.1	522.5	499.8	-0.7
France	:	522.5	549.4	:
Italy	433.2	475.8	477.6	1.4
Cyprus	1.8	3.9	4.2	12.5
Latvia	15.1	20.0	20.2	4.2
Lithuania	33.4	48.0	48.1	5.4
Luxembourg	0.4	0.6	:	6.3
Hungary	65.7	77.6	79.2	2.7
Malta	0.7	1.4	1.8	13.6
Netherlands	80.8	85.3	85.2	0.8
Austria	73.9	61.2	64.4	-1.9
Poland	285.2	477.3	473.1	7.5
Portugal	102.2	107.4	108.5	0.9
Romania	124.2	191.3	217.0	8.3
Slovenia	19.7	24.2	25.8	4.0
Slovakia	38.1	50.3	53.6	5.0
Finland	97.9	115.4	113.3	2.1
Sweden	106.0	109.8	105.4	-0.1
United Kingdom	477.4	510.5	515.2	1.1
Croatia	:	32.4	32.9	:
MK *	12.0	12.4	14.1	2.4
Turkey	301	488.2	506.3	7.7
Iceland	1.7	2.4	2.5	5.5
Liechtenstein	:	0.16	0.2	:
Norway	26.9	33.5	34.1	3.4

Data source: Eurostat (UOE)
Annual growth per year represents geometric mean.
*MK= Former Yugoslav Republic of Macedonia

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

2.2 Evolution of the number of MST graduates

With a growth of over 33% in the number of MST graduates in the period 2000-2007, the EU has already progressed with more than twice the rate of the EU benchmark for 2010 in the field.
After strong growth in the beginning of the period, however, the increase decelerated somewhat after 2005.

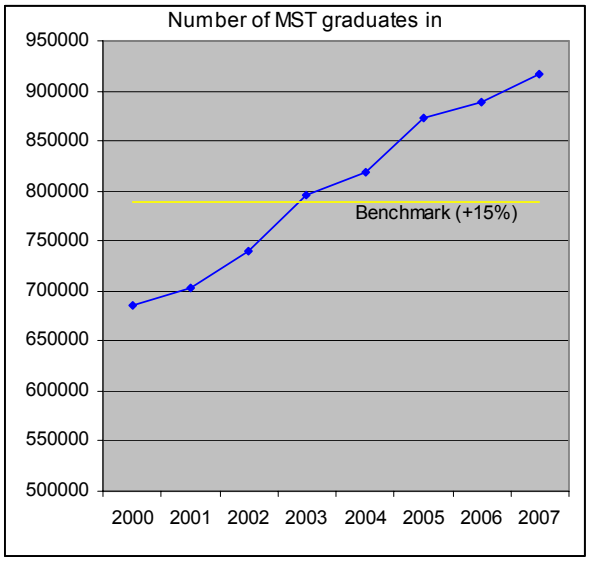
Taking 2000 as the base (when there were 686 000 graduates), the target growth of 15% implies an

absolute increase of some 100 000 graduates by 2010.
However, an increase of some 230 000 MST graduates has been achieved with a total of 917 000 graduates in 2007 (chart IV.2.2).

In the period 2000-2007 Portugal, Slovakia and Poland reported the highest annual growth rates (>12%), followed by Italy, the Czech Republic and Romania (>10%).

Despite the general positive trend, Ireland, Sweden and Lithuania showed a considerable decrease in numbers in 2007 by 5% or more.

Chart IV.2.2: Number of graduates in Mathematics, Science and Technology (ISCED 5 and 6), 2000-2007



Data source: Eurostat (UOE)

While the EU progressed faster than both the US and Japan (in Japan the number of graduates has decreased since 2000), growth is particularly strong in emerging economies like China, where it has more than quadrupled since 2000 to reach nearly 2 million in 2006 [89] (Chart IV.2.3).

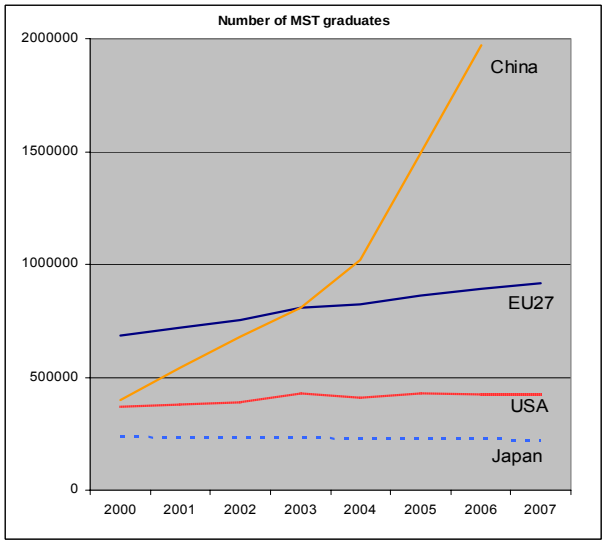
The availability of a large pool of MST graduates in low-wage countries will have a growing impact on high-technology industries worldwide and increasingly affects the comparative advantage (relative abundance of highly skilled workers) of developed countries.

The average number of graduates in Mathematics, Science and Technology in the EU was 10.2 per 1000 inhabitants aged 20-29 in 2000 and 13.4 in 2007. Related to a one-year age cohort, this implies that about 13% of young people take a degree in MST although some double counting is taking place (about 15%).

France, Ireland, Finland, Portugal and Lithuania have a relatively high number of MST graduates, with over 18 per 1000, whereas Hungary, Malta, Cyprus and Greece have below 8 per 1000.

The significant growth in numbers of MST graduates that has been achieved since 2000 in the EU might not continue in the coming years.

Chart IV.2.3: Total number of graduates in Mathematics, Science and Technology – international comparison of trends 2000-2007

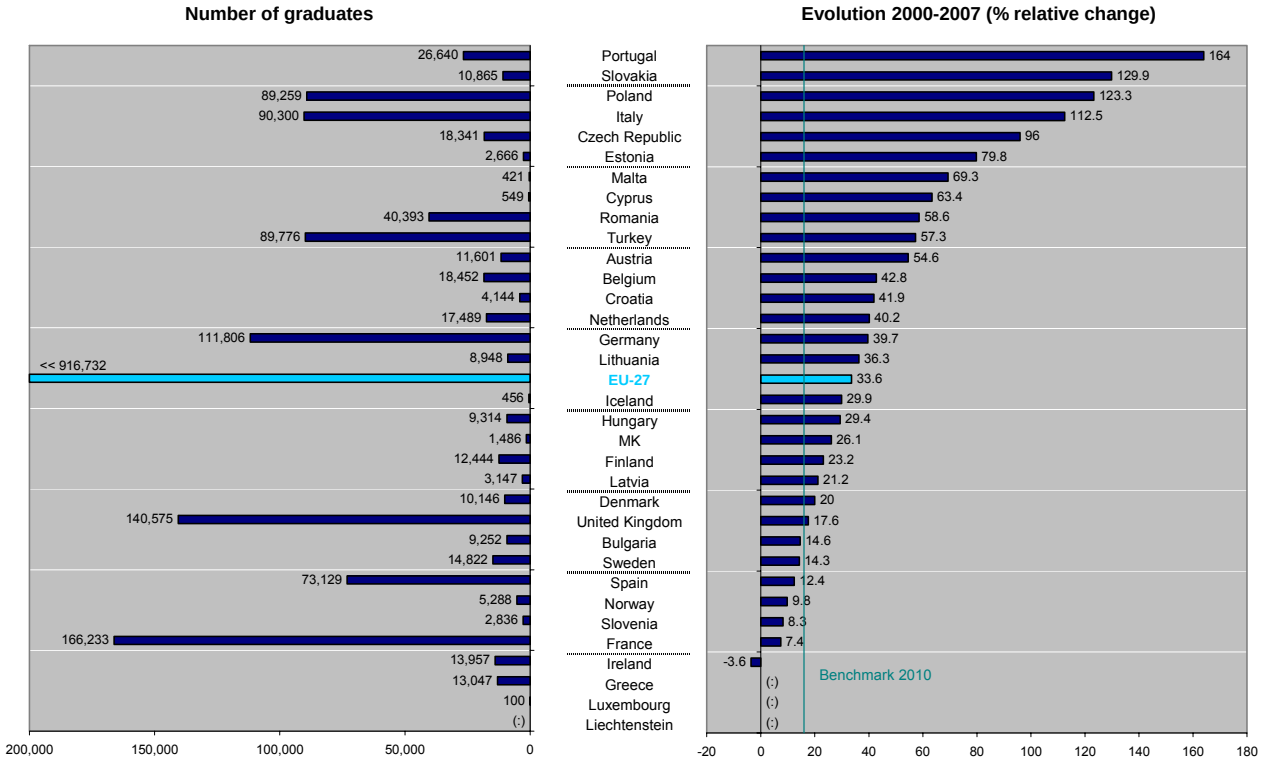


Data source: Eurostat and Statistical Bureau of China

Long-term demographic trends, especially the strong decline in birth rates in the new Central and Eastern European countries 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 2007, growth in the number of MST graduates had already slowed to 3.1%, while growth in student numbers amounted to 2.7%. A further deceleration in coming years is likely.

Chart IV.2.4: Graduates in Mathematics, Science and Technology



Source: DG EAC, calculations based on Eurostat (UOE) data, LU: data represent results for the year 2000

Additional notes : See also Table Ann IV.6
Evolution 2000-2007: for Croatia, Italy, Latvia, Malta, Poland, Romania, United Kingdom result extrapolated from growth rate for years with valid data

2.3 Growth in number of graduates by field and educational levels

Table IV.2.2: Number of graduates by field(EU 27)

ISCED fields	Graduates (1000)		Growth (in %)
	2000	2007	2000-07
Life sciences (42)	91.6	96.1	4.9
Physical science (44)	86.9	83.1	-4.4
Mathematics, statistics (46)	37.5	47.8	27.5
Computing (48)	83.9	149.5	78.2
Engineering (52)	264.4	313.6	18.6
Manufacturing (54)	32.0	47.6	48.9
Architecture, building (58)	88.8	120.7	35.9

Data source: Eurostat; in the case of physical science and computing, no data are available for Romania. Includes estimates for Greece for 2000 and Ireland for 2007.

Growth since 2000 has been very strong in computing (nearly 80%), while engineering, manufacturing, mathematics and architecture showed medium level growth rates. Growth was slow in life sciences. In physical science there has been even a slight decline in the number of graduates since 2000 (Table IV.2.2; see also Tables Ann.IV.7 and Ann IV.11).

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

2.4 The growth in number of MST graduates by type of programme

The graduates from academic programmes requiring an ISCED level 5A second degree grew strongly between 2000 and 2007, partly a result of the Bologna process, while the number of new PhDs increased only moderately (see Table IV.2.3)

Table IV.2.3: Growth in the number of MST graduates by type of programme

ISCED field	Graduates (in 1000)		Growth (in %)
	2000	2007	2000-2007
Academic programmes, all first degrees (5A)	460.4	564.5	22.6
Academic programmes, second degree (5A)	60.0	153.5	155.8
Occupation-oriented programmes, first qualification (5B)	131.3	146.2	11.3
Occupation-oriented programmes, second qualification (5B)	2.1	0.5	-73.9
Second stage leading to an advanced research qualification (6)	35.7	45.3	29.1

Source: Eurostat (UOE), Note: PHD/Doctorate in 2007 represented over 96% of all ISCED 6 degrees

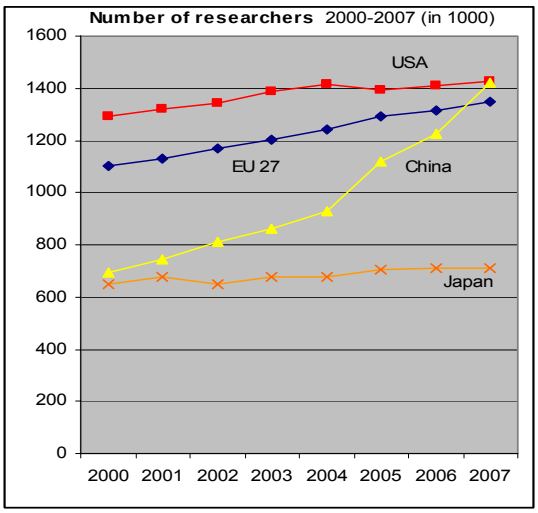
2.5 MST Graduates and researchers on the labour market

In 2007 about 45 000 or 5% of MST graduates in the EU were PhD graduates (ISCED level 6), compared with 22 400 in the US (5.3%) and only 6 500 in Japan (2.9%). In the EU, this represents an increase of almost 30% compared to 2000 (Table IV.2.3). These are graduates with research training; some of them could be expected to find positions as researchers on the labour market.

The increase in MST graduates and the relatively high number of PhD level graduates has, however, not been reflected in sufficient employment of researchers in many Member States. Partly as a result of a lack of science jobs, a high share of graduates opt for non-science and non-engineering career. Some of these graduates furthermore choose to take up positions outside the EU (European Commission, 2005b, p.12).

It is 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. Nevertheless an upward trend in the EU as regards the number of researchers can be observed. The number of researchers (full time equivalents) in the EU increased in the period 2000-2007 by 22.5% or 250 000 (Table IV.2.4).

Chart IV.2.4: Trend in the number of researchers



Source: Eurostat (UOE)

Despite the high number of new MST PhDs produced by the EU, the EU (1.36 million researchers (2007) - full time equivalent - see Chart IV.2.5). has still slightly fewer researchers on the labour market than the US (1.43 million), in absolute terms but as a proportion of the total labour force. In 2007, China has overtaken the EU in absolute terms too with 1.42 million researchers. Japan, although with a smaller total number of researchers (0.71 million, 2006) has a much higher proportion of researchers in employment per 1000 employed and counts 10.8 researchers per 1000 against 6.3 researchers per 1000 in the EU (Source: Eurostat , OECD)

Table IV.2.5: Number of Researchers

	Number of researchers (in 1000 full time equivalents)			Average annual growth since 2000	Researchers per 1000 of total employment	
	2000	2006	2007	2007	2000	2006
EU-27	1106.8	1331.2	1355.7	2.9	5.4	6.3
BE	30.5	34.9	35.9	2.4	:	7.8 (05)
BG	9.5	10.3	11.2	2.4	3.4	3.3
CZ	13.9	26.3	27.9	10.5	2.9	5.3
DK	:	28.8	29.6	2.4	:	10.2
DE	257.9	279.5	284.3	1.4	:	7.4 (05)
EE	2.7	3.5	3.7	4.8	4.7	5.6
IE	8.5	12.2	:	6.1	:	5.9 (05)
EL	:	19.9	20.8	3.1	:	4.5 (05)
ES	76.7	115.8	122.6	6.9	:	5.9
FR	172.1	211.1	211.1	3.0	7.4	8.2 (05)
IT	66.1	88.4	:	5.0	3.2	3.7
CY	0.3	0.7	0.8	14.8	1.0	2.0
LV	3.8	4.0	4.2	1.5	4.1	3.8
LT	7.8	8.0	8.5	1.3	5.5	5.1
LU	1.6	2.1	2.2	4.1	:	11.5(05)
HU	14.4	17.5	17.4	2.7	3.8	4.2
MT	:	0.5	0.5	3.7	:	3.4
NL	42.1	47.3	44.1	0.7	:	5.0 (05)
AT	:	29.2	31.4	5.4	:	:
PL	55.2	59.6	:	1.3	3.8	4.2
PT	16.7	24.6	28.0	7.6	3.3	4.1 (05)
RO	20.5	20.5	18.8	-1.2	1.9	2.5
SI	4.3	5.9	6.3	5.4	4.8	5.9
SK	10.0	11.8	12.4	3.1	4.7	5.1
FI	:	40.4	39.0	-1.7	:	17.0
SE	:	55.7	:	3.9	:	12.7(05)
UK	:	176.2	175.5	1.1	:	:
HR	:	5.7	6.1	-6.5	:	3.6
MK*	:	:	:	:	:	:
TR	23.1	42.7	49.7	1.6	1.1	2.0
IS	:	2.4	2.2	3.8	:	13.5(05)
LI	:	:	:	:	:	:
NO	:	24.5	24.5	3.4	:	9.5 (05)

Source: DG EAC, based on Eurostat and OECD data, (05)/ *= 2005 data

*MK= Former Yugoslav Republic of Macedonia

The number of researchers represents full time equivalents, total number of researchers for the EU for 2007 (headcount): 2.016 million

3. Entrepreneurship

Entrepreneurship is an important area that refers to an individual's ability to turn ideas into action. It is related to creativity, innovation and risk taking, as well as the ability to plan and manage projects in order to achieve objectives. Entrepreneurship is one of the eight key competences for lifelong learning included in the recommendation of the European parliament and the Council[90]. The European Commission is committed to promoting entrepreneurship through education at all levels. However there is a lack of internationally comparable data in the field.

The Eurobarometer report from 2007 on entrepreneurial mindsets shows that in the US more people prefer to be self employed than in the EU (61% compared to 45%).

The initiative "Small Business Act" (SBA)[91] for Europe aims to create favourable conditions for the growth and sustainable competitiveness of European small and medium-sized enterprises (SMEs). Community and national policies should take better account of the role of SMEs in economic growth and job creation.

In the 7th Framework Programme for Research and Technological Development, the Commission proposes a series of measures stimulating the cooperation between academic and private sectors. The Marie Curie Industry-Academia Partnerships and Pathways action aims to boost skills exchange between the commercial and non-commercial partners, including in particular SMEs. The main objective of the Marie Curie Initial Training Networks is to train young people who embark on a research career and to improve their research skills, including those relating to technology transfer and entrepreneurship.

The Commission promotes a business culture through networking of enterprises and exchanges of experience. Member States are encouraged to take measures in the fields of education, training and taxation to support entrepreneurs.

The Commission underlines that people in Europe need to see that self employment is a potentially attractive career option.

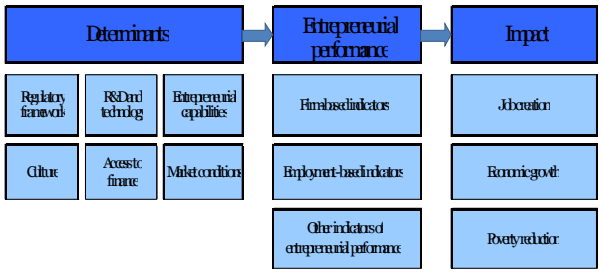
It is further stressed that "*the education system, and in particular the school curricula, do not focus enough on entrepreneurship and do not provide the basic skills which entrepreneurs need. Children can learn to appreciate entrepreneurship from the beginning of their education*".[92]

Member States where entrepreneurship is well established in the curricula are still a small minority. Entrepreneurship is a recognised objective of the education systems and embedded explicitly in national framework curricula in Spain, Finland, Ireland, Cyprus, Poland and the UK but implementing means (teacher training, teaching materials) still needs to improve.[93]

The primary purpose of entrepreneurship education at university is to develop entrepreneurial capacities and mindsets. The teaching of entrepreneurship has yet to be sufficiently integrated into university curricula - indeed it is necessary to make entrepreneurship education accessible to all students as innovative business ideas may arise from technical, scientific or creative studies. The Commission (Directorate General Enterprise and industry) published in 2008 a survey on the offer of entrepreneurship programmes in Higher Education. The survey shows that more than half of the student population in Europe does not have access to entrepreneurship education. For instance only 1/4 of specialized institutions (excluding business schools) and 1/3 of multidisciplinary institutions without a business school offer this type of programmes.[94]

The OECD-Eurostat Entrepreneurship Indicators Programme (EIP) aims to build a knowledge base measuring the rates at which new firms are created or close down, studying factors which allow enterprises to grow and assessing the impact of small businesses on jobs, turnover and trade. It has provided a framework for indicators on entrepreneurship (see Chart IV.3.1).

Chart IV.3.1: Framework for indicators on entrepreneurship

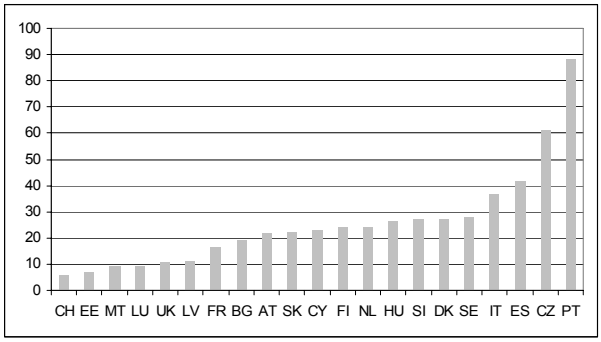


Source: M. Schmiemann (2009)[95]

Initial findings cover 15 European countries, the US, Canada and New Zealand. The results show that in 2005 the number of new businesses as a proportion of all companies – the "birth rate" - was highest in Romania, Estonia, Lithuania and the Slovak Republic. Strong growth and economic restructuring related to European Union adhesion is likely to have been the key factor[96].

Chart IV.3.2 shows the density of enterprise "birth rate", defined as the number of new enterprises divided by the total number of enterprises (in 10 000) in 2005 in the participating EU countries. This shows the amount of new enterprises created in relation to the total number of companies in a country. Southern European countries show a high proportion of new starts, together with the Czech Republic.

Chart IV.3.2: Density of enterprise "birth rate"



Source: Eurostat and OECD

Annexes

ANNEX 1

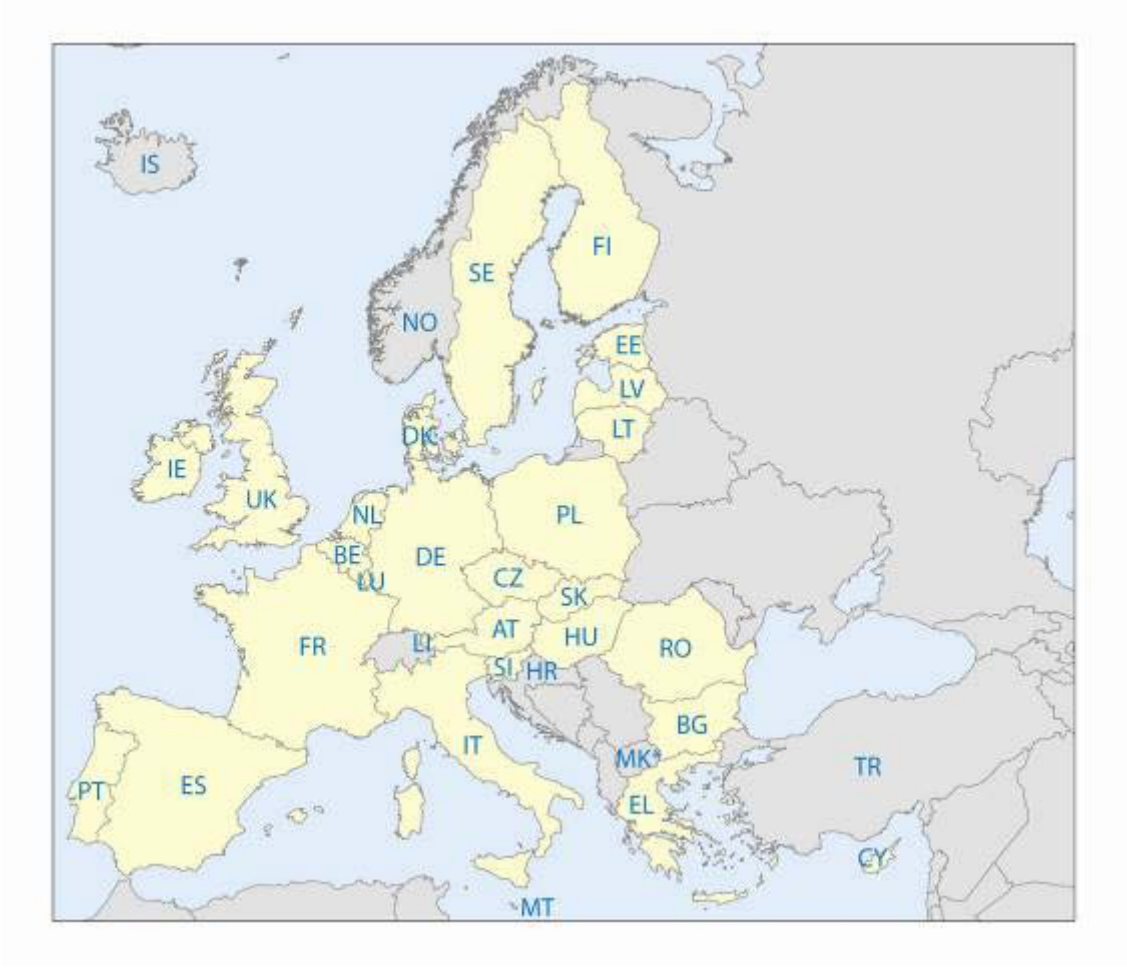
STANDING GROUP ON INDICATORS AND BENCHMARKS

Austria	Mr	Mark	**NÉMET**	Federal Ministry for Education, Arts and Culture
Belgium (Flemish community)	Ms	Micheline	**SCHEYS**	Flemish Ministry of Education and Training
Belgium (French community)	Ms	Nathalie	**JAUNIAUX**	Communauté française de Belgique
Bulgaria	Ms	Irina	**VASEVA-DUSHEVA**	Ministry of Education and Science
Cyprus	Ms	Athena	**MICHAELIDOU**	Cyprus Pedagogical Institute
Czech Republic	Mr	Vladimir	**HULIK**	Institute for Information on Education
Denmark	Mr	Simon	**HEIDEMANN**	Ministry of Education
Estonia	Ms	Tiina	**ANNUS**	Ministry of Education and Research
Finland	Ms	Kirsi	**KANGASPUNTA**	Ministry of Education
France	Mr	Claude	**SAUVAGEOT**	Ministry of National Education
Germany	Ms	Daniela	**NOLD**	Statistisches Bundesamt
Germany	Mr	Jens	**FISCHER-KOTTENSTEDE**	Hessisches Kultusministerium
Greece	Mr	Dimitrios	**EFSTRATIOU**	Ministry of National Education
Greece	Mr	Nikos	**PAPADAKIS**	Ministry of Education and Religious Affairs
Hungary	Ms	Judit	**KÁDÁR-FÜLÖP**	Ministry of Education and Culture
Iceland	Mr	Gunnar Jóhannes	**ÁRNASON**	Office of Evaluation and Analysis
Ireland	Ms	Deirdre	**DUFFY**	Department of Education and Science
Italy	Ms	Annamaria	**FICHERA**	Ministry of Education
Italy	Ms	Gianna	**BARBIERI**	Ministry of Education
Lithuania	Mr	Ričardas	**ALIŠAUSKAS**	Ministry of Education and Science
Luxembourg	Ms	Marion	**UNSEN**	Ministry of Education and Training
Malta	Mr	Raymond	**CAMILLERI**	Directorate for Quality and Standards in Education
Netherlands	Ms	Pauline	**THOOLEN**	Ministry of Education, Culture and Science
Norway	Mr	Ole-Jacob	**SKODVIN**	Ministry of Education and Research
Poland	Ms	Anna	**NOWOZYNSKA**	Ministry of National Education
Portugal	Mr	João	**TROCADO DA MATA**	Ministry of Education
Portugal	Mr	Nuno	**RODRIGUES**	Ministry of Education
Romania	Mr	Romulus	**POP**	Ministry of Education, Research and Youth
Slovakia	Mr	Peter	**PLAVCAN**	Ministry of Education
Slovenia	Ms	Zvonka	**PANGERC PAHERNIK**	Slovenian Institute for Adult Education
Spain	Mr	Enrique	**ROCA**	Institute of Evaluation
Spain	Ms	Isabel	**ALABAU**	Institute of Evaluation
Spain	Mr	Jesús	**IBAÑEZ MILLA**	Ministry of Education and Science
Sweden	Mr	Mats	**BJÖRNSSON**	Ministry of Education, Research and Culture
United Kingdom	Mr	Steve	**LEMAN**	Department for Children, Schools and Families
United Kingdom (Scotland)	Mr	Peter	**WHITEHOUSE**	Scottish Executive
Organisations	Ms	Katja	**NESTLER**	Cedefop
	Mr	Jens	**JOHANSEN**	European Training Foundation

ANNEX 2

LIST OF ABBREVIATIONS

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		
ES	Spain	**CC**	**Candidate Countries**
FR	France	HR	Croatia
IE	Ireland	MK*	The former Yugoslav Republic of Macedonia
IT	Italy		
CY	Cyprus	TR	Turkey
LV	Latvia		
LT	Lithuania	**EEA**	**European Economic Area**
LU	Luxembourg	IS	Iceland
HU	Hungary	LI	Liechtenstein
MT	Malta	NO	Norway
NL	Netherlands		
AT	Austria	**Others**	
PL	Poland	JP	Japan
		US/USA	United States of America

* ISO code 3166. Provisional code which does not prejudge in any way the definitive nomenclature for this country, which will be agreed following the conclusion of negotiations currently taking place on this subject at the United Nations (http://www.iso.org/iso/country_codes/iso_3166_code_lists.htm)

General abbreviations

ACCI	the active citizenship Composite indicator
AES	Adult Education Survey
ALL	Adult Literacy and Life-skills Survey
ARWU	The *Academic ranking of World Universities*
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 (depending on JRC, European Commission)
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
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
JRC	Joint Research Centre (European Commission)
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
THE	Times Higher Education
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

ANNEX 3

BIBLIOGRAPHY

Agilis, S.A., Osler. A., Street, C., Lall, M., and Vincent, K. (2001), *Not a problem? Girls and School Exclusion,* National Children's Bureau for the Joseph Rowntree Foundation, London.

Alexander, K.L., Entwisle, D. R., and Horsey, C.S. (1997), "From first grade forward: Early foundations of high school drop-out", *Sociology of Education*, No. 70, pp. 87-107.

Allulli, G., Di Francesco G., Pecorini C. and Tramontano I., *Achieving the Lisbon Goal: The Contribution of Vocational Education and Training Systems Country Report : Italy,* CEDEFOP.
http://www.refernet.org.uk/documents/Country_Report_Italy.pdf

Alvaro, F. (2007), *ESPAIR Education par le sport de plein air contre le décrochage scolaire*, Study supported by the Lifelong Learning Programme of the European Commission, Associazione Centri Sportivi Italiani, Italy.

Ammerman, P., *Achieving the Lisbon Goal: The Contribution of Vocational Education and Training Systems Country Report: Malta*, CEDEFOP.
http://www.refernet.org.uk/documents/Country_Report_Malta.pdf

Arcand, J.L. and d'Hombres, B. (2007), *Explaining the Negative Coefficient Associated with Human Capital in Augmented Solow Growth Regressions*. JRC/CRELL Scientific and Technical Reports 22733 EN, Office for Official Publications of the European Communities, Luxembourg.

Arneson, R. J. (1989), "Equality and equal opportunity for welfare", *Philosophical studies*, No. 56, pp. 77-93.

Associazione Centri Sportivi Italiani, *ESPAIR: Education par le sport de plein air contre le décrochage scolaire,* project financed by the Socrates Programme Action 6.1.2, Italy.

Atkinson, M., Lamont, E., Gulliver, C., White, R. and Kinder, K. (2005a), *School Funding: a Review of Existing Models in European and OECD Countries*, LGA Research Report 3/05, Slough: NFER.

Audas, R. and Willms, J. D. (2001), *Engagement and Dropping our of School. A life course perspective,* Applied Research Branch Strategic Policy Human Resources Development Canada.

Badescu, M. (2007), *Measuring investment efficiency in public education. Some cross-country comparative results*, JRC/CRELL Research Paper 5, EUR 22719 EN, Office for Official Publications of the European Communities, Luxembourg.

Badescu, M. (2006), *Measuring the outputs and outcomes of vocational training - towards a coherent framework for indicators,* JRC/CRELL Research Paper 2, EUR 22305 EN, Office for Official Publications of the European Communities, Luxembourg.

Badescu, M. (2006), *Measuring investment efficiency in education,* JRC/CRELL Research Paper 1. EUR 22304 EN, Office for Official Publications of the European Communities, Luxembourg.

Badescu, M. (2008), *Improving the scope of indicators for monitoring developments in vocational education and training in Europe,* JRC Scientifical and Technical Reports 23512 EN.

Barber, M. and Mourshed, M. (2007), *How the world's best-performing school systems come out on top*, McKinsey & Company.

Bassanini, A. et al. (2005), *Workplace training in Europe*, IZA Discussion paper, No. 1640.

Bauer, P. and Riphahn, R. T. (2005), *Timing of school tracking as a determinant of intergenerational transmission of education*, University of Basel.

Bezzina, C. and Vidoni, D. (2006), *Nurturing Learning Communities, a Guide to School-Based Professional Development,* JRC/CRELL Research Paper 3, EUR 22328 EN + handbook, Office for Official Publications of the European Communities, Luxembourg.

Blomert, L. (2007), *PROREAD: Explaining Low Literacy Levels by Profiling Poor Readers and their Support,* Study supported by the Lifelong Learning Programme of the European Commission, Universiteit Maastricht, Faculty of Psychology, Netherlands.

Blondin, C. (2007), *Pour le Multilinguisme Exploiter à l'école la diversité des contextes européens*, Study supported by the Lifelong Learning Programme of the European Commission, Université de Liège, Belgium.

Bologna follow up Group (2009) *Bologna process Stocktaking Report Leuven/Louvain-la-Neuve*

Bonnet. G. et al. (2006), *Final Report of the Learning to Learn Expert Group to the European Commission,* Directorate General Education And Culture A.6, European Commission, Paris/Brussels/Ispra.

Brunello, G. and Checchi, D. (2007), "School tracking and equality of opportunity", in *Economic Policy*, October 2007, pp. 781-861, Great-Britain.

Buk-Berge, E. (2006), "Missed opportunities: the IEA's study of civic education and civic education in Post-communist countries", in *Comparative Education,* Volume 42, No. 4, pp. 533-548.

Cardone, A. (2007), *Ulisse - Analysis and exchanges of good practices to retain students in the Education System,* Study supported by the Lifelong Learning Programme of the European Commission, University of Third Sector Pisa, Italy.

Castel, R. (2007), *La discrimination négative, Citoyens ou indigènes ?,* Editions du Seuil et La République des Idées.

CEDEFOP (European Centre for the Development of Vocational Training) (2008a), *Future skill needs in Europe: medium-term forecast.*

Centre International d'études pédagogiques (2008), Dossier: "Enseigner les langues: Un défi pour l'Europe", *Revue internationale d'éducation, Sèvres, No. 47*, Avril 2008.

Center for Labour Market studies (2009*), Left behind in America: the nation's dropout crisis,* Northeastern university in Boston and the alternative schools network in Chicago.

CILT, (2006) *Effects on the European Economy of Shortages of Foreign Language Skills in Enterprise.*

Collins, C., Kenway, J., and McLeod, J. (2000), *Factors Influencing the Educational Performance of Males and Females in School and their Initial Destinations after Leaving School,* Department of Education, Employment and Workplace Relations, Australian Government.

Commission du débat national sur l'avenir de l'école (2004), *Les Français et leur Ecole. Le miroir du débat,* Dunod, Paris.

Cooke, L.P. (2003), "A comparison of initial and early life course earnings of the German secondary education and training system" in *Economics of Education Review,* Volume 22, Issue 1, pp. 79-88.

Crane, J. (1991), "The Epidemic Theory of Ghettos and Neighborhood Effects on Dropping Out and Teenage Childbearing" in *The American Journal of Sociology*, Volume 96, No. 5, pp. 1226-1259.

CRELL (2009), *The transition to computer-based assessment-new approaches to skill assessment and implications for Large-Scale Testing.*

CRELL/OECD (2009), *Students with Disabilities, Learning Difficulties and Disadvantages in the Baltic States, South Eastern Europe and Malta: Educational Policies and Indicators.*

CRELL (2008a), *Schooling and earning differentials in European countries: evidences from EU SILC* (forthcoming).

CRELL (2008), *Higher education rankings: robustness issues and critical assessment.*

CRELL (2008), *Does Formal Education have an impact on Active Citizenship Behaviour?*

Cunha, F. and Heckman, J. J. (2005), *The Evolution of Cognitive and Noncognitive Skills over the Life Cycle of the Child,* presentation at the AEA Conference on 5th January 2007.

Damyanovic, U. and Fragoulis, H. (2004), *Achieving the Lisbon Goal: The Contribution of Vocational Education and Training Systems Country Report: Bulgaria,* CEDEFOP.
http://www.refernet.org.uk/documents/Country_Report_Bulgaria.pdf

De Broucker, P. (2005), *Without a Paddle: What to do. About Canada's Young Drop-outs,* Canadian Policy Research Networks Inc, Ottawa.

De la Fuente, A. (2006), *Education and economic growth: a quick review of the evidence and some policy guidelines,* Prime Minister's Office, Economic Council of Finland.

De la Fuente, A. and Ciccone, A. (2002), *Human Capital in a global and knowledge-based economy.* Final report for Directorate General Employment, European Commission.
http://europa.eu.int/comm/employment_social/publications/2003/ke4602775_en.pdf

Demunter, C. (2006), *How skilled are Europeans in using computers and the Internet? Statistics in Focus*, No. 17/2006, EUROSTAT.

Demunter, C. (2006), *E-skills measurement,* Paper submitted for the 10th meeting of the Working Party on Indicators for the Information Society (WPIIS), OECD, Paris, 3 and 4 May 2006.

Demeuse, M. (2003), *Validation et diffusion d'un système européen cohérent d'indicateurs d'équité en éducation (Phase II),* Université de Liège, Liège, Belgium.

Desjardins, R. (2008), "Researching the links between education and well-being", in *European Journal of Education*, Volume 43, Issue 1, pp. 23-35, March 2008.

Duru-Bellat M. (2004), *Social inequality at school and educational policies*, International Institute for Educational Planning, UNESCO.

Dutch Ministry of Education, Culture and Science (2005), *Onderwijsprofiel van Nederland. Analyse en samenvatting van Education at a Glance 2005.*
http://www.minocw.nl/documenten/brief2k-2005-doc-39856b.pdf

Dwyer, P. (1996), *Opting out: Early school leavers and the degeneration of youth policy.,* National Clearinghouse for Youth Studies, Tasmania.

Ecker, A. (2005), *Strukturen und Standards der Ausbildung von GeschichtslehrerInnen in Europa: eine vergleichende Studie (Structures and standards of initial training for history teachers in Europe)*, Universität Wien.

Editorial Projects in Education (EPE) Research Center (2007), *From cradle to career, Connecting American education from birth throughout adulthood,* Supplement to Education Week's Quality Counts 2007.

Eivers, E., Ryan, E. and Brinkley, A. (2000), *Characteristics of early school leavers: results of the research strand of the 8-15 year old early school leavers initiative,* Educational Research Centre, St. Patrick's College, Dublin.

Ellenbogen, S. and Chamberland, C. (1997), "The peer relations of dropouts: a comparative study of at-risk and not at-risk youth" in *Journal of Adolescence*, Volume 20, Issue 4, pp. 355-367.

Empirica (2006), *Benchmarking Access and Use of ICT in European Schools 2006: Final Report from Head Teacher and Classroom Teacher Surveys in 27 European Countries,* European Commission.
http://europa.eu.int/information_society/eeurope/i2010/benchmarking/index_en.htm

Euractiv (2008), *France seeks more ambitious EU globalisation strategy,* Paper published on Euractiv.com on the 17th April 2008.

European Agency for Development in Special Needs Education (2007), *Lisbon Declaration - Young People's Views on Inclusive Education*, Portuguese Ministry of Education.

European Agency for Development in Special Needs Education (2006), *Special Needs Education - Country Data 2006*.

European Agency for Development in Special Needs Education (2009), *Classification / categorisation systems in Agency member countries*, (unpublished discussion document).

European Commission

European Commission (2008), *Report on equality between women and men,* DG for Employment, Social Affairs and Equal Opportunities, Com (2008)10.

European Commission, Joint Research Centre, (2009), *The transition to Computer-Based Assessment,* Luxembourg, EUR 23679 EN-2009.

European Commission (Forthcoming), *Key figures 2008,* Directorate-General for Research.

European Commission and CRELL (2009), *Measuring creativity OPOCE*, Luxembourg.
http://ec.europa.eu/education/lifelong-learning-policy/doc1427_en.htm

European Commission (2008a), *Improving competences for the 21st Century: An agenda for European Cooperation on schools*, COM (2008) 425.

European Commission (2008b), *The effectiveness and efficiency of public spending*, Economic Papers 301.

European Commission (2008c), *A rewarding challenge: how the multiplicity of languages could strengthen Europe*, proposals from the Group of Intellectuals for Intercultural Dialogue.
http://ec.europa.eu/education/policies/lang/languages_en.html

European Commission (2008d), GREEN PAPER: *Migration & mobility: challenges and opportunities for EU education systems* {SEC(2008) 2173}

European Commission (2008e) Report on equality between women and men.

European Commission (2007a), *Improving the Quality of Teacher Education,* Communication from the Commission, COM (2007) 392 final.

European Commission (2007b), *The European Research Area: New perspectives,* Commission Staff Working Document annexed to the Green Paper, SEC (2007) 412/2.

European Commission (2007c), *the 2008 up-date of the broad guidelines for the economic policies of the Member States and the Community and on the implementation of Member States' employment policies,* Recommendation for a Council recommendation, Commission's 2007 Annual Report, COM(2007) 803 final.

European Commission (2007d), *Report on the implementation of the Action Plan "Promoting language learning and linguistic diversity",* Commission Working Document, COM (2007) 554 final.

European Commission (2007e), *Framework for the European survey on language competences,* Communication from the Commission to the Council, COM (2007) 184 final.

European Commission (2007f), *Delivering lifelong learning for knowledge, creativity and innovation,* Draft 2008 joint progress report of the Council and the Commission on the implementation of the "Education & Training 2010 work programme", COM (2007) 703 final.

European Commission (2007g), *Employment in Europe.*

European Commission (2007h), *Action Plan on Adult learning - It is always a good time to learn*, Communication from the Commission, COM (2007) 558 final.

European Commission (2007i), *The Annual Progress Report,* Directorate-General of Education and Culture.

European Commission (2007j), *Commission Staff Working Document on youth employment in the EU*, SEC (2007) 1093 final.

European Commission (2007k), *Progress towards the Lisbon Objectives in Education and Training – Indicators and Benchmarks – 2007,* Commission Staff Working Document, SEC (2007) 1284.

European Commission (2007l), *Europe's demographic future: fact and figures on challenges and opportunities,* Directorate-General for Employment, Social Affairs and Equal Opportunities.

European Commission (2007)**,** *A coherent framework of indicators and benchmarks for monitoring progress towards the Lisbon objectives in education and training,* Communication from the Commission to the Council**,** COM (2007) 61 final.
http://eur-lex.europa.eu/LexUriServ/LexUriServ.do?uri=COM:2007:0061:FIN:EN:PDF

European Commission (2007), *Europe in the global research landscape,* Directorate-General for Research, Office for official publications of the European Communities, Luxembourg.

European Commission (2006a), *Efficiency and equity in European education and training systems,* Communication from the Commission to the Council and to the European Parliament, COM (2006) 481.

European Commission (2006b), *Modernising education and training: A vital contribution to prosperity and social cohesion in Europe*, 2006 Joint Interim Report of the Council and the Commission on progress under the Education & Training 2010 work programme, 2006/C 79/01.

European Commission (2006c), *Delivering on the Modernisation Agenda for Universities: Education, Research and Innovation,* COM (2006) 30 final of 25/01/06 and COM (2006) 208 final of 10/05/06.

European Commission (2006d), *The European Institute of Technology: further steps towards its creation,* Communication from the Commission, COM (2006) 276 final.

European Commission (2006e), *The Helsinki Communiqué on Enhanced European Cooperation in Vocational Education and Training*, Communiqué of the European Ministers of Vocational Education and Training, the European Social partners and the European Commission, Helsinki.

European Commission (2006f), *Employment in Europe.*

European Commission (2006g), *Adult learning: It is never too late to learn,* Communication from the Commission to the Council, COM (2006) 614 final.

European Commission (2006h), *Classification for Learning Activities – Manuals,* Eurostat, Luxembourg.

European Commission (2006), *PREMA : Promoting equality in maths achievement, General activities of observation, analysis and innovation, 2005 (Actions 6.1.2 and 6.2 of the Socrates Programme),* Interim Report, Socrates Programme, Directorate-General Education and Culture.

European Commission, (2006), *European Universities' research on the promotion of Enterprise Education (E.U.R.O.P.E.),* Directorate General Education and Culture.

European Commission (2006), *Progress Towards the common objectives in Education and Training Indicators and Benchmarks,* Commission Staff Working Paper.

European Commission (2006), *Working together for growth and jobs" Integrated guidelines for growth and jobs*, Communication to the Spring European Council, COM (2005) 141 final of 12.4.2005.

European Commission (2005a), *Mobilising the Brainpower of Europe: enabling universities to make their full contribution to the Lisbon Strategy,* Communication from the Commission, COM (2005) 152 final.
http://europa.eu.int/comm/education/policies/2010/doc/comuniv2005_en.pdf

European Commission (2005b), *Key Figures 2005*, Directorate General Research.

European Commission (2005c)**,** *The European Indicator of Language Competence,* Communication from the Commission to the European Parliament and the Council, COM (2005) 356 final.
http://europa.eu.int/comm/education/policies/lang/doc/com356_en.pdf

European Commission (2005), *A New Framework Strategy for Multilingualism,* Communication from the Commission to the Council, and to the European Parliament, the European Economic and Social Committee and the Committee of the Regions, COM(2005) 596 final.
http://europa.eu.int/comm/education/policies/lang/doc/com596_en.pdf

European Commission (2005), *Erasmus Networks now cover nine tenths of Europe's universities*, Press release 20th Oct 2005 IP/ 05/ 1313.

European Commission (2005), *Progress Towards the Common Objectives in Education and Training Indicators and Benchmarks,* Commission Staff Working Paper.

European Commission (2005), *Achieving of Lisbon goals. The contribution of VET,* Directorate General Education and Culture.

European Commission (2005), *Key Figures 2005 Towards a European Research Area Science, Technology and Innovation strengthening the foundations of the European research area. Support for the coherent development of policies*, DG Research, 2005 EUR 21264 EN.
ftp://ftp.cordis.lu/pub/indicators/docs/2004_1857_en_web.pdf

European Commission (2005), *Eurobarometer 63.4 Europeans and language.*
http://europa.eu.int/comm/public_opinion/archives/ebs/ebs_237.en.pdf

European Commission (2005), *Regions: Statistical yearbook 2005*, Data 1999-2003, Eurostat.

European Commission (2005), *A Mobility Strategy for the European Research Area and Researchers in the ERA: one profession, multiple careers,* European Commission staff working document, Implementation Report 2004, SEC (2005) 474.
http://europa.eu.int/comm/research/fp6/mariecurie-actions/pdf/sec_en.pdf

European Commission (2004a), *A Mobility Strategy for the European Research Area*, Second Implementation Report, SEC (2004)412 of 1st April 2004.

European Commission (2004), *Education & Training 2010: the success of the Lisbon strategy hinges on urgent reforms*, Joint Interim Report of the Council and the Commission, 6905/04 EDUC 43, COM (2003) 685 F.
http://europa.eu.int/comm/education/policies/2010/doc/jir_council_final.pdf

European Commission**,** (2004), *New Indicators on Education and Training,* Commission Staff Working Paper, SEC (2004) 1524.
http://europa.eu.int/comm/education/policies/2010/doc/indicators_en.pdf

European Commission (2004), *Progress towards the Common Objectives in Education and Training. Indicators and Benchmarks,* Commission Staff Working Paper, SEC (2004) 73.
http://europa.eu.int/comm/education/policies/2010/doc/progress_towards_common_objectives_en.pdf

European Commission (2004), *Facing the Challenge: The Lisbon Strategy for Growth and Employment,* Report from the High-Level Group chaired by Wim Kok, Brussels.
http://europa.eu.int/comm/education/policies/2010/doc/kok_en.pdf

European Commission (2004), *Public Finances in the EMU*.

European Commission (2004), *Achieving the Lisbon goal: the contribution of VET***.**
http://europa.eu.int/comm/education/policies/2010/studies/maastricht_en.pdf

European Commission (2004), *Special Eurobarometer 216 "Vocational Training".*

European Commission (2004), *Implementation of the education and training 2010 work programme, Working group "languages", Progress report 2004*, EXP LG/13/2004, Directorate General Education and Culture.
http://europa.eu.int/comm/education/policies/2010/doc/lang2004.pdf

European Commission (2004), *Implementation of the education and training 2010 work programme, Working group "Mobility and European co-operation", Progress Report,* Nov 2004, Directorate General Education and Culture.
http://europa.eu.int/comm/education/policies/2010/doc/mob2004.pdf

European Commission, (2003/2004), *Student and teacher mobility 2003/2004 –Overview of the National Agencies' final reports 2003/2004*.

European Commission (2003a), *The role of the universities in the Europe of knowledge,* Communication from the Commission, COM (2003) 58 final.
http://europa.eu/eur-lex/en/com/cnc/2003/com2003_0058en01.pdf

European Commission (2003b), *Third European Report on Science and Technology Indicators 2003*, Directorate General Research.

European Commission (2003c), *Key Figures 2003-2004. Towards a European Research Area: Science, Technology and Innovation***,** Directorate General Research.
http://europa.eu.int/comm/research/era/pdf/indicators/benchmarking2003_en.pdf

European Commission (2003), *A single framework for the transparency of qualifications and competences (Europass),* Proposal for a decision of the European Parliament and of the Council, COM (2003) 796 F.

http://europa.eu.int/eur-lex/en/com/pdf/2003/com2003_0796en01.pdf

European Commission (2003), *Promoting Language Learning and Linguistic Diversity: an Action Plan 2004 – 2006,* Communication from the Commission to the Council, the European Parliament, the Economic and Social Committee and the Committee of the Regions, COM (2003) 449 F.
http://www.europa.eu.int/comm/education/doc/official/keydoc/actlang/act_lang_en.pdf

European Commission (2003), *Implementation of the education and training 2010 work programme, Working group "Improving the education of teachers and trainers", Progress Report,* Nov 2003, Directorate General Education and Culture.
http://europa.eu.int/comm/education/policies/2010/doc/working-group-report_en.pdf

European Commission (2003), *Implementation of the education and training 2010 work programme, Working group "Improving foreign language learning", Progress Report,* Nov 2003, Directorate General Education and Culture.
http://europa.eu.int/comm/education/policies/2010/doc/language-learning_en.pdf

European Commission (2003), *Implementation of the education and training 2010 work programme, Working group "ICT in education and training", Progress Report,* Nov 2003, Directorate General Education and Culture.
http://europa.eu.int/comm/education/policies/2010/doc/it-technologies_en.pdf

European Commission (2003), *Third European Report on Science and Technology indicators.*

European Commission, (2003), *EUROPEAN ECONOMY: The EU Economy 2003 Review,* No. 6/2003, Directorate General Economic and Financial Affairs, Office for Official Publications of the European Communities, Luxembourg.
http://europa.eu.int/comm/economy_finance/publications/european_economy/2003/ee603en.pdf

European Commission (2003), *Young People's Social Origin, Educational Attainment and Labour Market Outcomes in Europe,* Eurostat.

European Commission (2002/2003), *Student and teacher mobility 2002/2003 – Overview of the National Agencies' final reports.*

European Commission (2002a), *eEurope 2005: An information society for all,* Communication from the Commission, COM (2002) 263 final.

European Commission (2002b), *Detailed Work Programme on the follow-up of the objectives of education and training systems in Europe*, adopted by the Education Council and the Commission on 14th February 2002, OJ C 142.
http://europa.eu.int/eur-lex/pri/en/oj/dat/2002/c_142/c_14220020614en00010022.pdf

European Commission (2002), *European benchmarks in education and training: follow-up to the Lisbon European Council*, Communication from the Commission to the Council, COM (2002) 629 F.
http://europa.eu.int/comm/education/policies/2010/doc/bench_ed_trai_en.pdf

European Commission (2001a), *Making a European Area of Lifelong Learning a Reality,* COM (2001) 678 final, Brussels.

European Commission (2001), *A Mobility Strategy for the European Research Area,* Communication from the Commission to the Council and the European Parliament: COM (2001) 331 final.
http://europa.eu.int/eur-lex/en/com/cnc/2001/com2001_0331en01.pdf

European Commission (2001), *The e-Learning Action Plan: designing tomorrow's education,* Communication from the Commission to the Council and the European Parliament: COM (2001) 172 F.
http://europa.eu.int/eur-lex/en/com/cnc/2001/com2001_0172en01.pdf

European Council/Council

European Council (2008a), *Presidency Conclusions*, 13-14 March 2008.

Council (2008b), *Delivering lifelong learning for knowledge, creativity and innovation,* Joint progress report of the Council and the Commission on the implementation of the 'Education and Training 2010' work programme.

Council (2007a), *A coherent framework of indicators and benchmarks for monitoring progress towards the Lisbon objectives in education and training,* Council conclusions of 25th May 2007, 2007/C 1083/07.

http://register.consilium.europa.eu/pdf/en/07/st10/st10083.en07.pdf

Council (2007b), *Improving the Quality of Teacher Education* Council Conclusions of the 15th November 2007, Official Journal C 300, 12.12.2007, pp. 6–9.

Council Conclusions on a coherent framework of indicators and benchmarks for monitoring progress towards the Lisbon objectives in education and training (2007), 2802nd EDUCATION, YOUTH and CULTURE Council meeting.
http://www.consilium.europa.eu/ueDocs/cms_Data/docs/pressData/en/educ/94290.pdf

Council (2009), *An updated framework for European cooperation in education and training 2010-2020,* 9845/09.
http://www.arqa-vet.at/fileadmin/download_files/ET2020_engl..pdf

Council (2006a), *Key competences for lifelong learning*, Recommendation of the European Parliament and of the Council of 18th December 2006, 2006/962/EC.

Council (2006b), *Efficiency and equity in European education and training systems* Conclusions of the Council and the Representatives of the Governments of the Member States, meeting within the Council, 2006/C 298/03.

Council (2006c) Decision No.1720/2006/EC of the European Parliament and of the Council of 15th November 2006 establishing *an action programme in the field of lifelong learning.*

Council (2006d), *Further European cooperation in quality assurance in higher education* Recommendation of the European Parliament and of the Council of 15 February 2006, OJ L 64, pp.60-62.

Council (2005a), *Transnational mobility within the Community for education and training purposes - European Quality Charter for Mobility,* Recommendation of the European Parliament and of the Council, 2005/0179 (COD).
http://europa.eu.int/eur-lex/lex/LexUriServ/site/en/com/2005/com2005_0450en01.pdf

European Council (2005b), *Presidency Conclusions*, Brussels.

Council (2005c), *New indicator in education and training,* Council Conclusions of 24th May 2005, 2005/C 141/04.
http://europa.eu.int/eur-lex/lex/LexUriServ/site/en/oj/2005/c_141/c_14120050610en00070008.pdf

Council (2005d), *Guidelines for the employment policies of the Member States,* Decision No. 2005/600/EC of 12th July 2005, OJ L 205/21.

Council (2003a), *Reference Levels of European Average Performance in Education and Training (Benchmarks),* Council conclusions of 5/6th May 2003, 2003/C 134/02.
http://europa.eu.int/eur-lex/pri/en/oj/dat/2003/c_134/c_13420030607en00030004.pdf

Council (2003b), Decision No 2318/2003/EC of the European Parliament and of the Council of 5 December 2003 adopting *A multi-annual programme (2004 to 2006) for the effective integration of information and communication technologies (ICT) in education and training systems in Europe (eLearning Programme)*, OJ L 345 of 31st December 2003.

Council (2003c), Decision No 2317/2003/EC of the European Parliament and of the Council of 5 December 2003 establishing *a programme for the enhancement of quality in higher education and the promotion of intercultural understanding through cooperation with third countries (Erasmus Mundus)* (2004 to 2008) OJ L 345 of 31st December 2003

Council (2003), *Realising the European Higher Education Area,* Communiqué from the Conference of Ministers responsible for higher education, Berlin, 19th September 2003.
http://www.bmbf.de/pub/communique_bologna-berlin_2003.pdf

European Council (2003), *Presidency Conclusions*, Brussels, 20/21st March 2003.
http://ue.eu.int/ueDocs/cms_Data/docs/pressData/en/ec/75136.pdf

Council (2002a), Council Resolution on *lifelong learning* of 27th June 2002, Official Journal C163/01 of 9.7.2002.

Council (2002b), *Detailed work programme on the follow-up of the objectives of Education and training systems in Europe,* OJ 2002/C 142/01.

European Council (2002c), *Presidency Conclusions*, Barcelona, 15/16th March 2002.
http://ue.eu.int/ueDocs/cms_Data/docs/pressData/en/ec/71025.pdf

Council (2001a), *European cooperation in quality evaluation in school education,* Recommendation of the European Council and of the Parliament of 12th February 2001, 2001/166/EC.

European Council (2001b), *Presidency Conclusions*, Stockholm, 23/24th March 2001.

Council (2001), *The concrete future objectives of education and training systems,* Report from the Education Council to the European Council, 5680/01 EDUC 23.
http://europa.eu.int/comm/education/policies/2010/doc/rep_fut_obj_en.pdf

Council (2001), *European co-operation in quality evaluation in school education,* Recommendation of the European Parliament and of the Council of 12th February 2001, 2001/166/EC.

European Council (2001), *Presidency Conclusions*, Laeken, 14/15th December 2001.
http://ue.eu.int/ueDocs/cms_Data/docs/pressData/en/ec/68827.pdf

Council (2001), *Concrete future objectives of education and training systems,* Education Council report to the European Council, 2001/C 204/03.

Council (2001), Council Resolution, OJ 2001/C367/01.
http://ue.eu.int/ueDocs/cms_Data/docs/pressdata/en/intm/ACF1FC6.html

European Council (2000a), *Presidency Conclusions*, Lisbon, 23/24th March 2000.
http://ue.eu.int/ueDocs/cms_Data/docs/pressData/en/ec/00100-r1.en0.htm

Council (1995), *Improving and Diversifying language learning and teaching within the education systems of the European Union,* Council Resolution, Official number 6123/95 of 31st March 1995.
http://ue.eu.int/ueDocs/cms_Data/docs/pressdata/en/educ/009a0002.htm

Council (2008), *Background paper on promoting creativity and innovation in education & training-Presentation and discussion.*

European Parliament (2002), *Statistics on Student Mobility within the European Union*, Directorate General Research, Working Paper, Education and Culture series – EDUC 112 EN. Final report to the European Parliament prepared by Kassel University, October 2002.

European Training Foundation (2000) *Vocational education and training against social exclusion*, Torino.

Eurostat (2009), *Significant country differences in adult learning,* Statistics in Focus 44/2009.
http://epp.eurostat.ec.europa.eu/cache/ITY_OFFPUB/KS-SF-09-044/EN/KS-SF-09-044-EN.PDF

EURYDICE (Forthcoming), *Gender Differences in Educational Outcomes: Study of the measures taken and the current situation in Europe.*

EURYDICE (Forthcoming), *Responsibilities and teacher autonomy,* Working document for the conference 'Promoting creativity and innovation – School's response to the challenges of future societies, 9-10 April 2008, Brdo pri Kranji, Slovenia.

EURYDICE (2009), *Higher education in Europe 2009: Developments in the Bologna Process.*

EURYDICE (2009), *Early childhood education and care in Europe: tackling social and cultural inequalities.*

EURYDICE (2009), *Integrating immigrant children into schools in Europe.*

EURYDICE (2009), *Key data on education in Europe.*

EURYDICE (2008), *Key Data on Teaching Languages at School in Europe.*

EURYDICE (2008), *Higher Education Governance in Europe. Policies, structures, funding and academic staff.*

EURYDICE (2007a), *School autonomy in Europe. Policies and Measures,* Comparative Study.

EURYDICE (2007), *Decision-making advisory, operational and regulatory bodies in higher education / Volume 5, European glossary on education,* National terms.

EURYDICE (2007), *Focus on the structure of higher education in Europe. National trends in the Bologna Process – 2006/07 Edition*, Comparative study.

EURYDICE (2007), *Focus on the structure of higher education in Europe. National trends in the Bologna Process – 2006/07 Edition*, Country descriptions.

EURYDICE (2007), *Key data on higher education in Europe – 2007 Edition,* Indicators and Figures.

EURYDICE (2007), *Structures of education, vocational training and adult education systems in Europe – 2007 Edition,* Country descriptions.

EURYDICE (2007), *Non-vocational adult education in Europe. Executive summary of national information in Eurybase,* Comparative study.

EURYDICE (2007), *Specific educational measures to promote all forms of giftedness at school in Europe,* Comparative study.

EURYDICE (2006/2007), *Focus on the structure of higher education in Europe. National trends in the Bologna Process - 2006/07 Edition.*

EURYDICE (2006), *Content and language integrated learning (CLIL) at school in Europe – 2006.*

EURYDICE (2006), *National summary sheets on education systems in Europe and ongoing reforms - 2006 Edition.*

EURYDICE (2006), *Organisation of school time in Europe. Primary and general secondary education - 2006/07 school year.*

EURYDICE (2006), *Pointers to active citizenship in education policies*.

EURYDICE (2006), *Quality Assurance in Teacher Education in Europe – 2006.*

EURYDICE (2006), *Science teaching in Schools in Europe. Policies and research,* Comparative study.

EURYDICE (2006), *TESE - Thesaurus for Education Systems in Europe - 2006 Edition.*

EURYDICE (2005a), *Key data on Education in Europe 2005.*

EURYDICE (2005b), *Key data on teaching languages at schools in Europe*.

EURYDICE (2004), *Key Data on Information and Communication Technology in Schools in Europe – 2004 Edition.*

EURYDICE (2002/2004), *The teaching profession in Europe. Profile, trends and concerns*.

- Report I: *Initial training and transition to working life*. General lower secondary education. Key topics in education in Europe, volume 3 (Brussels, 2002).
- Report II: *Supply and demand*. General lower secondary education. Key topics in education in Europe, volume 3 (Brussels, 2002).
- Report III: *Working conditions and pay.* General lower secondary education. Key topics in education in Europe, volume 3 (Brussels, 2003).
- Report IV: *Keeping teaching attractive for the 21st century.* Key topics in education in Europe, volume 3 (Brussels, 2004).

EURYDICE (2003a), *Working conditions and pay.*

EURYDICE (2002a), *Initial training and transition to working life.*

Eurostat (2009) "Significant country differences in adult learning, Statistics in Focus 44/2009

Fergusson, B. et al. (2005), *Early School Leavers: Understanding the Lived Reality of Student Disengagement from Secondary School,* final report, Toronto.

Forsyth, A. and Furlong, A. (2005), *Socioeconomic disadvantage and access to higher education*, The Policy Press, University of Glasgow.

Frandji, D. (2007), *EUROPEP - Comparaison des politiques d'éducation prioritaire en Europe. Evaluation, conditions de réussite,* Study supported by the Lifelong Learning Programme of the European Commission, National Institute of Educational Research, Lyon, France.

Garbe, C. (2007), *ADORE - Teaching Struggling Adolescent Readers. A comparative study of good practices in European Countries,* Study supported by the Lifelong Learning Programme of the European Commission, University Lüneburg, Germany.

Gatt. S. et al. (2005), *The School to Work Transition of Young People in Malta*, Employment and Training Cooperation, Malta.

Genda, Yuji (2005), "The NEET3 problem in Japan", *Social Science Japan*, September 2005

GERESE (European Group of Research on Equity of the Education Systems) (2005), *Equity of the European Educational Systems*, Study co-financed by the EU Socrates programme, Liège.

Gregg, P and Wadsworth, J (1998), "Unemployment and Non-employment: Unpacking Economic Inactivity", *Economic Report, 12(6).*London, Employment Policy Institute.

GRID (Growing Interest in the development of teaching Science), Pôle Universitaire Européen de Lorraine, France.

Gros, D. (2006a), "Employment and Competitiveness – The Key Role of Education"*, CEPS Policy Brief No. 93*/ February 2006.

Guerrieri, P. and Padoan, P. C. (eds.) (2007), "Modelling ICT as a general purpose technology, Evaluation models and tools for assessment of innovation and sustainable development at EU level"*, Collegium, no.35, Spring 2007*, Special Edition, College of Europe.

Gundlach, E., Wößmann, L., Gmelin, J. (2001), "The Decline of Schooling Productivity in OECD Countries" in *Economic Journal*, Volume 111, Issue 471, pp. C135-147

Haahr, J.H., Kibak Nielsen, T., Eggert Hansen, M., and Teglgaard Jakobsen, S. (2005), *Explaining Student Performance Evidence from the international PISA, TIMSS and PIRLS surveys.* Danish Technological Institute, Århus.
http://www.danishtechnology.dk/_root/media/19176%5FFinal%20report%20web%20version.pdf

Hall, J. and Matthews, E. (2008), "The measurement of progress and the role of education", in *European Journal of Education*, Volume 43, Issue 1, pp. 11-22, March 2008.

Haller, M. (2005-2007), *ACT "Active Citizenship Training"*, Study supported by the Lifelong Learning Programme of the European Commission, Pedagogic Seminary of the Georg August University of Göttingen, Germany.

Hanushek, E. A. (2005), *Economic outcomes and school quality,* International Academy of Education (IAE) and the International Institute for Educational Planning (IIEP), Brussels and Paris.
http://www.unesco.org/iiep/PDF/Hanushek_web.pdf

Hanushek, E. A. (2004), *Economic Analysis of School Quality,* Paper prepared for the *Education for All Global Monitoring Report.*

Hanushek, E. A. (2003), "The failure of input-based schooling policies", in *The Economic Journal*, No. 133 (February), pp. F64-F98, Royal Economic Society.

Hanushek, E. A. (2002), "Evidence, politics and the class size debate", in Mishel. L & R. Rothstein (ed) *The class size debate*, Economic Policy Institute, Washington.

Hanushek, E. A. and Kimko, D. D. (2000), "Schooling, Labor-Force Quality, and the Growth of Nations", in *The American Economic Review*, Volume 90, No. 5, pp.1184-1208.

Hassid J. (2007), *E.U.R.O.P.E. - European Universities' Research On the Promotion of Enterprise Education,* Study supported by the Lifelong Learning Programme of the European Commission, University of Piraeus, Greece.

Hassid J. (2007), *E.U.R.O.P.E. E.A.C. - European Universities' Research On the Promotion of Enterprise Education - Extended Awareness Campaign,* Study supported by the Lifelong Learning Programme of the European Commission, University of Piraeus, Greece.

D'Hombres, B.,Rocco, L., Suhrcke, M. and McKee, M. (2007), *Does social capital determine health? Evidence from transition countries,* JRC/CRELL Scientific and Technical Reports, 22732 EN.

Hoskins, B., Villalba, E., Van Nijlen, D. and Barber, C. (2008), *Measuring civic competence in Europe, A composite indicator based on IEA Civic Education Study 1999 for 14 years old in School,* JRC/CRELL Scientific and Technical Reports, EUR 23210 EN 2008.

Hoskins, B. (2006a), *Framework for the development of indicators on active citizenship*, JRC/CRELL report.

Hoskins, B., Jesinghaus, J., Mascherini, M., Munda, G., Nardo, M., Saisana, M., Van Nijlen, D., Vidoni D. and Villalba, E. (2006b), *Measuring Active Citizenship in Europe,* CRELL Research Paper 4, EUR 22530 EN.

Huisman, P. W., and Noorlander, N. W. (2007), *Preventing drop-out and discrimination in the Netherlands*, Paper presented at the ELA Conference, Potsdam.

The ICT Impact Report (2006), *A review of studies of ICT impact on schools in Europe*, European School net. http://ec.europa.eu/education/doc/reports/doc/ictimpact.pdf

International Centre for Higher Education Research, INCHER-Kassel (2006), *The professional value of Erasmus mobility*, Final report.

Institut National de Recherche Pédagogiques (INRP) (2007), *"EuroPEP", Pour une comparaison des politiques d'Education prioritaires en Europe,* Rapport scientifique intermédiaire.

Janosz, M., Leblanc, M., Boulerice, B. and Tremblay, R.E. (1997), "Disentangling the weight of school drop-out predictors: a test on two longitudinal samples", *Journal of Youth and Adolescence*, 26, pp. 733-762.

Joseph H. (2006), *EUROPE – European Universities' Research on the Promotion of Enterprise Education.*

Kaiser, F., Vossensteyn, H., and Koelman, J. (2001), *Public funding of higher education. A comparative study of funding mechanisms in ten countries,* CHEPS-Higher education monitor, Center for Higher Education Policy Studies, Enschede.

Kelo, M., Teichler, U. and Wächter, B. (2006), *EURODATA, Student mobility in European higher Education*, ACA-publication, Lemmens Verlags- & Mediengesellschaft, Bonn.

Kelly, D.D., *TeMCU : Teacher Training for the Multicultural Classroom at University*, Universidad de Granada, Spain.

Ken, Y-N. (2006), "NEETs aren't so neat", on www.whatjapanthinks.com, 5th February 2006. http://whatjapanthinks.com/2006/02/05/neets-arent-so-neat/

Kikis-Papadakis, K. (2007), *PREMA " Promoting Quality in Maths Achievement",* Study supported by the Lifelong Learning Programme of the European Commission, Foundation for Research and Technology, Greece.

Kleiner, B., Carver, P., Hagedom, M. and Chapman, C. (2005), *Participation in Adult Education for Work-Related Reasons: 2002-03,* Statistical Analytical report, Washington.

Kok, W. (2004), *Facing the Challenge: The Lisbon strategy for growth and employment,* High Level Group, Office for Official Publications of the European Communities, Luxembourg.

Kollias, A. and Kikis, K. (2005), *Pedagogic Innovations with the use of ICTS, From wider visions and policy reforms to school culture,* Future Learning 3, Publicacions I Edicions de la Universitat de Barcelona.

Kritikos, E. and Ching, C. (2005), *Study on Access to Education and Training, Basic Skills and Early School Leavers,* Lot 3: Early School Leavers. Draft Final Report for European Commission Directorate-General Education and Culture, London.

Krueger, A. B. (2002), "Understanding the magnitude and effect of class size on student achievement", in Mishel. L and R. Rothstein (eds), *The class size debate*, Economic Policy Institute, Washington.

Kutnick, P. (2007), *RELATIONAL Approaches in Early Education,* Study supported by the Lifelong Learning Programme of the European Commission, University of Brighton, United Kingdom.

Kyriazopoulou, M. (Editor) (In Press) *Inclusive Education and Classroom Practice - Indicators for Inclusive Education in Europe,* European Agency for Development in Special Needs Education.

Lambrakis Research Foundation, *VALUE SCOUT "Value Schools and Citizenship Observatory for Culture and Sport",* Greece.

Lanzendorf, U., Teichler, U. and Murdoch, J. (2005), *Study on Student mobility in Secondary and Tertiary-level Education and in Vocational Training (NATMOB)*, Centre for Research on Higher Education and Work, Kassel and European Institute of Education and Social Policy, Paris.

Law, N., Pelgrum, W. and Plomp, T. (eds) (2008), *Pedagogy and ICT use in school around the world: Findings from the IEA SITES 2006 study,* p. 189, Hong Kong.

Layard, R and Psacharopoulos, G. (1974), "The screening hypothesis and the returns to education", *Journal of Political Economy*, Volume 82, Issue No.5, pp.985-998, University of Chicago Press.

Levy, F. and Murnane, R. J. (2005a), *The New Division of Labor: How Computerized Work and Globalization Shape Human Skill Demand,* Princeton University Press.

London Economics (2005), *The returns to various types of Investment in Education and Training,* Final report to European Commission Directorate-General Education and Culture, London.

Lopez Romito (2007), F.-S., *RE D'INVESTIGORA ARIS,* Study supported by the Lifelong Learning Programme of the European Commission, Fondo Formacion Centro SLL, Spain.

Lynch K., and Baker, J. (2005), "Equality in education, An equality of condition perspective", in *Theory and Research in Education,* vol. 3, pp.131-164

Marks, G. N. and Fleming N. (1999), *Early school leaving in Australia*, ACER LSAY research report no. 11, Melbourne.

Miller. P. and Volker, P. (1987), "The youth labour market in Australia", *The Economic Record*, Volume 63, Issue 182, pp.203-219.

Miroiu, A. (project manager) (2006), *OBSER ERASMUS*, project financed by the Socrates programme, National School of Political Studies and Public Administration, Romania.

Morgan, M. (2000), *School and part-time work in Dublin: Survey, analysis and recommendations,* Dublin Employment Pact Policy Paper No. 4, pp. 1- 40.

Morrisson, C. and Murtin, F. (2007) *Education inequalities and the Kuznets curves: a global perspective since 1870,* Working paper No. 2007 – 12, Paris School of Economics, Paris-Jourdan Sciences Economics Laboratoire d'Economie Appliquée – INRA.

Mueller et al. (2002), *Indicators on school-to-work transition in Europe. Evaluation and analyses of the LFS 2000 ad-hoc module data on school-to-work transitions*, Mannheim Centre for European Social Research, Germany.

National Center for Education Statistics (2007), *Digest of Education Statistics*, Institute of Education Sciences (IES), US Department of Education.

National Youth Council of Ireland, *Submission to the NESF Project Team on Early School Leaving*, Report nr 24. National economic and social Forum.
http://www.youth.ie/download/esl.pdf

NESSE (2009), *Early childhood education and care.*
http://www.nesse.fr/nesse/activities/reports/ecec-report-pdf

NESSE (2008), *Education and Migration.*

Network of Education Policy Centers, *School Dropouts: Different Faces in Different Countries,* Monitoring Initiative of the Network of Education Policy Centers, OSI Education Conference, Budapest, July 2005.

Nikolaou, V and Stavropoulos, P. (2006), *Analytical report on lifelong learning,* OECD.
www.oecd.org/edu/eag2006

Nonnon, E. and Goigoux, R. (Coordinators) (2007), "Travail de l'enseignant, travail de l'élève dans l'apprentissage initial de la lecture", *Repères,* No. 36/2007, Institut national de recherche pédagogique, France.

Norwegian Ministry of Education and Research (2007), *Education – From Kindergarten to Adult Education.*

OECD (2009), *Creating Effective Teaching and Learning Environment: First Results from TALIS.*

OECD (2009), *Students with Disabilities, Learning Difficulties and Disadvantages in the Baltic States, South Eastern Europe and Malta: Educational Policies and Indicators.*

OECD (2008a), *Improving School Leadership.*

OECD (2007a), *Education at a Glance.*

OECD (2007b), *PISA 2006, Science Competencies For Tomorrow World.*

OECD (2007c), *Students with Disabilities, Learning Difficulties and Disadvantages. Policies, Statistics and Indicators..*

OECD (2006a), *Starting Well or Losing their Way? The position of Youth in the Labour Market in OECD countries'*, OECD Social, Employment and Migration Working Papers.
http://www.oecd.org/dataoecd/0/30/37805131.pdf

OECD (2006), *Are Students Ready for a Technology-Rich World? What PISA Studies Tell us?*, Paris.

OECD (2005a), *Teachers Matter.*

OECD (2005b), *Students with Disabilities, Difficulties and Disadvantages : Statistics and Indicators,* Paris.

OECD (2005), *Promoting Adult Learning*, Paris.

OECD, *Education at a Glance***,** issues 1998-2006.

OECD (2004a), *Equity in Education – Students with Disabilities, Difficulties, and Disadvantages: Statistics and Indicators*, Paris.

OECD (2004), *The OECD summary indicator of the stringency for Employment Protection Legislation.*

OECD (2004), *Completing the Foundation for Lifelong Learning - An OECD Survey of Upper Secondary Schools*, Paris.

OECD (2004), *Learning for Tomorrow's World: New OECD PISA results,* Paris.

OECD (2004), *Teachers Matter: Attracting, Developing and Retaining Effective Teachers*, Paris.

OECD (2003a), *Education Policy Analysis*, Paris.

OECD (2003), *Society at a glance,* OECD Social Indicators, Paris.

OECD (2001), *Knowledge and Skills for Life – First Results from PISA 2000*, Paris.

OECD (2001), *Starting Strong: Early Childhood Education and Care,* Paris.

OECD (2000), *Special Needs Education – Statistics and Indicators*, Paris.

OECD (1999), *Inclusive Education at Work*, Paris.

Oosterbeek H. and Webbink (2007), D. "Wage effects of an extra year of basic vocational education" in *Economics of Education Review*, Volume 26, Issue 4, pp. 408–419.

Otero, M.S. and McCoshan, A. (2005), *Study on Access to Education and Training, Final Report for the European Commission*, London.
http://europa.eu.int/comm/education/doc/reports/doc/earlyleave.pdf

Plumper T., and Schneider, C. (2007), "Too much to die, too little to live: unemployment, higher education policies and university budgets in Germany", *Journal of European Public Policy 14(4),* 631-653.

Punie, Y., Zinnabauer, D., and Cabrera, M. (2006), *A Review of Impact of ICT on Learning.* Working Paper prepared for Directorate-General Education and Culture, Institute for Prospective Technological Studies, Joint Research Centre.

Rawls, J. (1971), *A Theory of Justice*, Oxford University press.
Raymond, C. (2007), *GRID Growing Interest in the development of teaching Science*, Study supported by the Lifelong Learning Programme of the European Commission, Pôle Universitaire Européen de Lorraine, France.

Relational Approaches in Early Education, project funded by the EU, University of Brighton, United Kingdom.

Roemer J. E. (1996), *Theories of Distributive Justice,* Harvard University Press, Cambridge.

Ross, A. (2007), *EPASI in Europe - Charting Educational Policies to Address Social Inequalities in Europe,* Study supported by the Lifelong Learning Programme of the European Commission, Institute for Policy Studies in Education (IPSE), London, United Kingdom.

Rumberger, R. W. and Lamb, S. P. (1998), "The Early Employment and Further Education Experiences of High School Drop-outs: A Comparative Study of the United States and Australia", in *Economics of Education Review*, 2003, vol. 22, issue 4, pp. 353-366.

Rumberger, R. W. (1995), "Dropping out of middle school: a multi-level analysis of students and schools", in *American Journal of Educational Research*, Issue 32, pp. 583-625.

Saisana M., D'Hombres B. (2008), *Higher Education Rankings: Robustness Issues and Critical Assessment,* JRC Scientific and Technical Reports 23487 EN.

Sammons, P., Sylva, K., Melhuish, E., Siraj-Blatchford, I., Taggart, B., and Elliot, K. (2002), *Measuring the Impact of Pre-Schooling on Children's Cognitive Progress over the Pre-School Period,* Technical Paper 8a, Institute of Education / Department for Education and Skills, London.

Scheerens, J. (2007), *INFCIV - The development of active citizenship on the basis of informal learning at school,* Study supported by the Lifelong Learning Programme of the European Commission, University Twente, Netherlands.

Schütz, G., Ursprung, H.W., Wößmann, L. (2005), *Education Policy and Equality of Opportunity*, CESifo Working Paper 1518, Munich.

Schwarzenberger, A. (ed.) (2008), *Public/private funding of higher education: a social balance,* Hochscul Informations System GmbH, Germany.

Sen, A. (1982), "Quelle égalité ?", in *Ethique et Economie et autres essais*, Paris, 1993, pp.189-213, trad. Fr of "Equality of what ?", in *Choice, Welfare and Measurment*, Cambridge, The Mit Press, pp. 353-369.

Singh, A. (2007), *Human Capital Risk in Life Cycle Economics,* Washington University in St. Louis.

Soriano, V., Grunberger, A. and Kyriazopoulou, M., (2009), *Multicultural Diversity and Special Needs Education.* Odense: European Agency for Development in Special Needs Education.
http://www.european-agency.org/agency-projects/indicators-for-inclusive-education/indicators-documents/Indicators-EN.pdf

Statistics Canada (2005), *Provincial drop-out rates – Trends and consequences.*
http://www.statcan.gc.ca/bsolc/olc-cel/olc-cel?lang=eng&catno=81-004-X20050048984

Statistical Bureau of China (2006)*, Statistical Yearbook of China 2006*, Beijing.

Statistical First Release (SFR) (2007), *Participation in Education, Training and Employment by 16-18 Year Olds in England,* Department for Children, Schools and Families (DCSF), United Kingdom.

Steiner, M. and Steiner, P.M. (2006), *Dropout und Ubergangsprobleme. Ausmaß und soziale Merkmale jugendlicher Problemgruppen*, Research report, Institute for Advanced Studies.

TALE "Telling About Learning Experience", Project financed by the Socrates Programme, Universität Erlangen-Nürnberg, Dr. Jürgen Grossmann, Germany.

TEAM-in-Europe: Teacher Education Addressing Multiculturalism in Europe, Project financed by the Socrates Programme, London Metropolitan University, Prof. Alistair Ross, United Kingdom.

Tinklin, T., Croxford, L., Ducklin, A., and Frame, B. (2003), "Inclusion: a gender perspective" in *Policy Futures in Education*, Volume 1, Issue 4, pp.640-652.

Toossi, M. (2005), "Employment Outlook 2004-14, Labor force projections to 2014: retiring boomers", in *Monthly Labor Review,* November 2005, pp. 25-44.

Traag, T. and Van der Velden, R.K.W. (2006), *Early school-leaving in lower secondary education. The role of student,-family and school factors.*

UNESCO (1997), *International Standard Classification of Education – ISCED*.
http://www.unesco.org/education/nfsunesco/doc/isced_1997.htm

UNICEF-Innocenti report card (2008), *The child care transition.*
http://www.unicef.ca/portal/Secure/Community/502/WCM/HELP/take_action/Advocacy/rc8.pdf

UNICEF (2007), *Child poverty in perspective: An overview of child well-being in rich countries,* Innocenti Report Card 7, UNICEF Innocenti Research Centre, Florence, Italy.

UNICEF (2005), *Children and Disability in Transition in CEE/CIS and the Baltic States.*
http://www.unicef.org/ceecis/Disability-eng.pdf

UNICEF - Innocenti Insight (2004) Children and Disability in Transition in CEE/CIS and the Baltic States.

United States General Accounting Office (GAO) (2002), *School dropouts. Education Could Play a Stronger Role in Identifying and Disseminating Promising Prevention Strategies.*

Vallet, L.-A. (2005), *What can we do to improve the education of children from disadvantaged backgrounds ?*, Quantitative Sociology Laboratory, Centre for Research in Economics and Statistics, Mixed Research Unit 2773 of CRNS & INSEE.

Van Deth, J., Montero, J., and Westholm, A. (2007), *Citizenship and Involvement in European Democracies: A Comparative Analysis*, Routledge, London.

Van Raan, A.J.F. (2005), *Challenges in Ranking of Universities*, Invited paper for the First International Conference on World Class Universities, Shanghai Jiao Tong University, Shanghai, June 16-18, 2005.

Vidoni, D., C. Bezzina, D. Gabelli and L. Grassetti, *The role of school leadership on student achievement: Evidence from TIMSS 2003*, JRC Scientific and Technical Reports, EUR 23072 EN.

Villalba, E., *On Creativity: Towards an understanding of creativity ant its measurements.* JRC Scientific and Technical Reports 23561 EN.

Walzer, M. (1983), *Spheres of Justice*, Basic Books, New York.

Watkins, A. (ed) (2009), *Special Needs Education - Country Data 2008*. Odense: European Agency for Development in Special Needs Education.

Watkins, A. (ed.) (2007), *Assessment in Inclusive Settings: Key Issues for Policy and Practice,* European Documentation Centre.

Watkins, K. and als. (2006), *Summary, Human development report 2006, Beyond scarcity : Power, poverty and the global water crisis,* United Nations Development Programme, New York, USA.

Wilson, R. A. (2007), *Trends in employment creation in Europe,* Warwick Institute for Employment Research.

Wolter S.C., Schweri, J. and S. Müehlemann (2006), "Why Some Firms Train Apprentices and Many Others Do Not" in *German Economic Review*, Volume 7, Issue 8, pp. 249-264.

Wößmann, L. (2005), "Educational Production in Europe", in *Economic Policy*, Volume 20, Issue No. 43, pp. 445-504.

Wößmann, L. and West, M. (2005), "Class-size effects in school systems around the world: Evidence from between-grade variation in TIMSS", in *European Economic Review*, Volume 50, Issue No. 3, pp. 695-736.

World Health Organisation (2001), *International Classification of Functioning, Disability and Health.*

Wright A. and als. (2005), *Millennium Development Goals, Progress and Prospects in Europe and Central Asia,* The International Bank for Reconstruction and Development/The World Bank.

YOUTRAIN *"New Challenges of Youth Training in the Knowledge Society",* University of Barcelona, Dr. Jesús Gómez Alonso, Spain.

NOTES

[1] Council conclusions of 12 May 2009 on a strategic framework for European cooperation in education and training ('ET 2020') See http://eur-lex.europa.eu/LexUriServ/LexUriServ.do?uri=OJ:C:2009:119:0002:0010:EN:PDF

[2] See Council Conclusions on "Reference Levels of European Average Performance in Education and Training (Benchmarks)" http://ec.europa.eu/education/policies/2010/doc/after-council-meeting_en.pdf

[3] Council Conclusions of 2009 op cit.

[4] The trend is difficult to construct due to low levels of comparability of data between 2003 and 2005.

[5] The section below is partly based on the recently published Key Data on Education in Europe 2009. More detailed information is available in this publication.

[6] Projections of upper secondary (ISECD 3) and of future university populations (ISCED 5) are not included. Demographic developments are of less immediate importance at these levels, since the intake of students are also impacted by changes in participation patterns.

[7] Data presented and analysed only covers the educational institutions as they are defined in the joint Unesco-OECD-Eurostat (UOE) data collection. Although some information about other types of public investment on training (e.g. for the unemployed) do exist, it will not be discussed here.

[8] Calculated based on current prices.

[9] See evidence for Germany for example: Plumper T., and Schneider, C. (2007), Too much to die, too little to live: unemployment, higher education policies and university budgets in Germany, Journal of European Public Policy 14(4), 631-653)

[10] http://www.universityworldnews.com/article.php?story=20090220085540843

[11] 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.

[12] 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. 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. When the NER is compared with the GER the difference between the two ratios highlights the incidence of under-aged and over-aged enrolment.

[13] 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.

[14] 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.

[15] For countries where data exists, the participation figures based on the Adult Education Survey results are in general higher than the LFS results due to differences in the reference period (one year in the AES as opposed to four weeks each quarter in the LFS) and in the coverage of lifelong learning activities in each survey.

[16] Data for 2003 or 2004 are break in series for many 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.

[17] This includes over 300.000 students with" unknown citizenship".

[18] Growth is however overstated by a growth in the attribution 'unknown nationality' in the UK. Without this category growth amounted on to average 8.8% per year.

[19] 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).

[20] Belgium-FR: 85%, Denmark: 85%, Greece: 85%, Estonia: 83%, Ireland: 90% (by 2013), Latvia: 85%, Malta: 65%, Hungary: 86%, Lithuania: 90%, Netherlands: 85%, Poland: 90% (2008), Portugal : 65%, Romania: 75%, Slovenia: 85% (for 25-64 year olds), UK-England: 85% (of 19 year olds), UK: 90% (by 2015)

[21] US upper secondary attainment rates are probably overstated.

[22] See PISA 2006 http://www.oecd.org/document/2/0,3343,en_32252351_32236191_39718850_1_1_1_1,00.html

[23] 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.

[24] This demand for indicators on teachers' professional development was part of a wider framework of 16 core indicators for monitoring progress towards the Lisbon objectives identified by the Council.

[25] EU/OECD Teachers Professional Development Brussels/Paris (2009)

[26] The initial report was released on 16 June 2009 in Brussels at a press conference hosted by the European Commission. The report is available on: http://www.oecd.org/document/54/0,3343,en_2649_39263231_42980662_1_1_1_1,00&&en-USS_01DBC.html. The thematic report on teachers' professional development – a joint report by the European Commission and the OECD will be released later in 2009.

[27] In Spain some 18% is missing on this variable, which is much higher than in other countries (< 10%, on average 7%). It seems that in Spain non-participation is coded as missing rather than zero days.

[28] No imputations are made; countries with missing data are excluded from the calculations.

[29] Technical briefing for the Informal Meeting of Ministers for Education Prague, 22-23 March 2009 based on evidences collected by the Centre for Research on Lifelong Learning-CRELL and the European Expert Network on the Economics of Education (EENEE)

[30] Cedefop briefing note March 2009

[31] See the annex for a more detailed presentation of the weights and indicators.

[32] The six THE indicators for ranking of universities
- International staff
- international students
- citation per faculty
- teachers to student ratio
- recruiter review
- academic review

[33] The ARWU ranking by broad subject field (see Annex table 2.2) 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.

[34] 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.

[35] Michaela Saisana and Beatrice d'Hombres two researchers at CRELL (*'Higher education Rankings: Robustness and Critical Assessment*', Saisana/d'Hombres 2008)

[36] Flexicurity promotes a combination of flexible labour markets and a high level of employment and income security and it is thus seen to be the answer to the EU's dilemma of how to maintain and improve competitiveness whilst preserving the European social model. Flexicurity can be defined, more precisely, as a policy strategy to enhance, at the same time and in a deliberate way, the flexibility of labour markets, work organisations and labour relations on the one hand, and security – employment security and income security – on the other.

[37] For an analysis of school to work transition patterns please see European Commission, 2007k.

[38] It should be underlined that 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.

[39] 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.

[40] See also European Economy 2006 –chapter 4 for a full exposition of these arguments.

[41] Total number of persons in employment, in resident production units irrespective of the place of residence of the employed person (ESA 95 concept, domestic scope). Estimates in employment from national accounts may differ from results of the labour force survey (see the following Eurostat note for more information: http://epp.eurostat.ec.europa.eu/portal/page/portal/national_accounts/documents/employment/LFS-ESA.PDF)

[42] European Commission, “Economic Forecast Spring 2009”, European Economy, 3. May 2009.

[43] Calculations are based on LFS. It concerns only the resident population against usual employment growth figures based on the domestic employment concept.

[44] European Central Bank, *Monthly Bulletin*, June 2009.

[45] According to the ECB “it is inherent to the nature of temporary emplpoyment to be more exposed to economic fluctuations” (ECD monthly bulletin, June 2009). Holmlund and Storrie (2002) find that the Swedish recession had triggered an initial decline in temporary employed followed by a sharp rise from the through to the end of the recession

[46] See evidence in UK and France for example: Fondeur Y. and Minni C. "L'emploi des jeunes au coeur des dynamiques du marché du travail", *Economie et statistiques*, 2004, n°378-379; Freeman R and Wise D, eds., *The Youth Labor Market Problem: Its Nature, Causes, and Consequences*, 1982, University of Chicago.

[47] Gregg, P and Wadsworth, J (1998) "*Unemployment and Non-employment: Unpacking Economic Inactivity*", Economic Report, 12:6. London: Employment Policy Institute.

[48] See the analysis of a longitudinal survey in the UK: Lisa Kahn, "The Long-Term Labor Market Consequences of Graduating from College in a Bad Economy", 2006. See also: Louis Chauvel, *Les destins des générations*, Presses Universitaires de France, 1998

[49] 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. However, the current economic crisis may postpone the attainment of these projections.

[50] The description of the graphical display is from the same publication

[51] Spring European Council conclusions (2008) included the following invitation: In view of increasing skills shortages in a number of sectors, it invites the Commission to present a comprehensive assessment of the future skills requirements in Europe up to 2020, taking account of the impacts of technological change and ageing populations, and to propose steps to anticipate future needs

[52] Cedefop is the European Centre for the Development of Vocational Training http://www.cedefop.europa.eu/default.asp

[53] '*New Skills for New Jobs' Anticipating and matching labour market and skills needs'*, SEC(2008) 3058/2, Commission Staff document accompanying the Communication from the Commission to the European Parliament, the Council, The European Economic and Social Committee of the Regions, Brussels,

[54] See also Levy, F. and R. J. Murnane, 2005a", which presents a theoretical framework for understanding changes to skill demands.

[55] The European Council in Barcelona set the target: to provide childcare by 2010 to at least 90% of children between 3 years old and the mandatory school age.

[56] It is the ratio between the number of children between 4 years old and the age for starting compulsory primary school, including pupils attending pre-primary school (ISCED 0) and primary school (ISCED 1) if not compulsory, and the total number of children in the corresponding ages. The age range varies depending on national education systems.

[57] In 2009 Eurostat refined the calculation method for this indicator. Therefore, values could differ from those published in the 2008 Progress Report.

[58] E.g., in some countries sample size for the Labour Force Survey is so small and early leavers from education and training are so few that conclusions on levels and trends should be considered with caution.

[59] It should be considered that the actual size of this disadvantaged group can be small, where the share of early leavers in the whole population is quite low, as in Poland.

[60] They are defined as 16 - 24 years old who are not enrolled in school and have not earned a high school credential (diploma or equivalency credential).

[61] They are defined as 20-24 years old that are neither attending school nor have a high school diploma

[62] The agreed operational definition of a segregated setting is the following: 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.

[63] The OECD conceptual framework is described in detail in the report "*Progress towards the Lisbon objectives in education and training – Indicators and benchmarks 2008*".

[64] These countries are: Malta, Estonia, Latvia, Lithuania, Slovenia, Romania, Bulgaria, Croatia and Macedonia.

[65] AES is a new survey, carried out in co-operation between European countries and Eurostat, aiming at complementing data on LLL coming from the Labour Force Survey, currently used for the EU benchmark (see par. I.1) with more information on characteristics of formal, non-formal and informal adult learning. It should be repeated every 5 years. First results were published by Eurostat (Statistics in Focus, 44/2009).

[66] Levels of adult participation in LLL and related indicators as calculated from AES data differ from those deriving from the LFS due to methodological reasons, mainly the different reference period (one year in AES, 4 weeks in LFS).

[67] 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.

[68] No data for the US in 2006, but an increase in low performers from 17.9 in 2000 to 19.4 in 2003.

[69] Malta and Cyprus did not participate in PISA 2006.

[70] The gap between the 10th and the 90th percentile is 208 points among the Finnish pupils. Estonia, Spain, Denmark and Slovenia have less than 230 points difference. Bulgaria (303 points), Czech Republic (286 points) and Belgium (283 points).

[71] OECD underlines that because figures are derived from samples it is not possible to rank the performance of a country among the participating countries. A range of ranks within the 95% likelihood have been constructed.

[72] Council Conclusions on the strategic framework for European cooperation in education and training (12 May 2009); http://www.consilium.europa.eu/uedocs/cms_data/docs/pressdata/en/educ/107622.pdf

[73] The full report "Key data on Teaching Languages at School in Europe", 2008 edition could be found at: http://eacea.ec.europa.eu/education/eurydice/key_data_en.php

[74] Communication from the Commission to the European Parliament, the Council, the European Economic and Social Committee and the Committee of the Regions - *Europe's Digital Competitiveness Report : main achievements of the i2010 strategy 2005-2009* {SEC(2009) 1060} {SEC(2009) 1103} {SEC(2009) 1104}

[75] 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.

[76] Several Member States do not have sufficiently large sample on immigrant pupils to provide results. 13 Member States are reported in the PISA study

[77] Also country of origin and family background can be factors affecting migrants' risk of being early leavers.

[78] President Barroso's message addressed to participants of the International Conference "Can creativity be measured?" – Brussels, 28-29 May 2009. In European Commission and CRELL (2009) " Measuring creativity" OPOCE, Luxembourg

[79] See Villalba, E. (2008): *On creativity: Towards and understanding of creativity and its measurements*. JRC Scientific and Technical Reports. EUR23561. OPOCE, Luxembourg. At: http://crell.jrc.ec.europa.eu/Publications/CRELL%20Research%20Papers/EVillalba_creativity_EUR_web.pdf and http://crell.jrc.ec.europa.eu/CreativityConference/CRELL_PROGRAMME.pdf

[80] See http://www.proinno-europe.eu/admin/uploaded_documents/EIS2008_Final_report-pv.pdf

[81] This performance is increasing towards the EU average over time with the exception of Croatia and Lithuania

[82] Hollanders, H. and Van Cruisen, A. (2009): *Design, Creativity and Innovation: A Scoreboard Approach*. In European Commission and CRELL (2009) *Measuring creativity* OPOCE, Luxembourg

[83] A recent study for the European Commission establishes a rationale for including indicators related to culture-based creativity into existing socio-economic indicator schemes such as the European Innovation Scoreboard with a view to highlight the socio-economic impacts that culture can have. In this way, it has been proposed a series of cultural based indicators concerning the potential establishment of a European Creativity Index (see annex IV.3).

[84] Kimpeler, S. and Georgieff, P. (2009*): The Roles of Creative Industries in Regional Innovation and Knowledge Transfer – The Case of Austria*. In European Commission and CRELL (2009) *Measuring creativity* OPOCE, Luxembourg

[85] Florida, R. (2002):*The rise of the creative class… and how it's transforming work, leisure, community and everyday life*. Basic Books, New York. See also Annex IV.4

[86] Hollanders, H. and Van Cruysen, A. (2009*): Design, Creativity and Innovation: A Scoreboard Approach*. . In European Commission and CRELL (2009) *Measuring creativity* OPOCE, Luxembourg

[87] European Commission and CRELL (2009):" *Measuring creativity*" OPOCE, Luxembourg. See

http://crell.jrc.ec.europa.eu/CreativityConference/CRELL_PROGRAMME.pdf

[88] 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.

[89] Chinese figures also include ISCED 4 and hence are somewhat overstated

[90] Recommendation of the European Parliament and of the Council of 18th December 2006 on key competences for lifelong learning.

[91] European Commission "Think small first" - A "*Small Business Act*" for Europe. COM(2008) 394

[92] idem

[93] Assessment of compliance with the entrepreneurship education objective in the context of the 2006 Spring Council conclusions. Brussels, November 27, 2007. See: http://ec.europa.eu/enterprise/entrepreneurship/support_measures/training_education/doc/edu2006.pdf

[94] See the following link: http://ec.europa.eu/enterprise/policies/sme/promoting-entrepreneurship/education-training-entrepreneurship/higher-education/index_en.htm

[95] Schmiemann, M. (2009). *Linking creativity and entrepreneurship: A description of the joint OECD/ Eurostat Entrepreneurship Indicators Programme*. In European Commission and CRELL (2009) Measuring creativity OPOCE, Luxembourg

[96] According to the Programme's report, *Measuring Entrepreneurship: A Digest of Indicators*, OECD. See: http://www.oecd.org/document/31/0,3343,en_2649_34233_41663647_1_1_1_1,00.html