

<b>Indicator (definition)</b>	<b>Science and technology graduates:</b> Tertiary graduates in science and technology per 1000 of population aged 20-29 years (total and by gender).
<b>Eurostat Unit</b>	Education, science and culture statistics
<b>Other Commission DGs</b>	Education and Culture DG
<b>European Statistical System Working Group (WG)</b>	WG on Education and training statistics (ETS)
<b>Date</b>	December 2010

**1. Overall assessment of accuracy and comparability** (Description of quality grades under the following link: [http://circa.europa.eu/Public/irc/dsis/structind/library?l=/general\\_information/quality\\_profiles/annex\\_enpdf/EN\\_1.0\\_&a=d](http://circa.europa.eu/Public/irc/dsis/structind/library?l=/general_information/quality_profiles/annex_enpdf/EN_1.0_&a=d))

A     
  B     
  C     
  Indicator to be Developed

Data is collected from reliable sources applying high standards with regard to the methodology. The comparability over time and across countries is restricted because of differences in the educational structures and different reference periods.

### 2. Objective and relevance of the indicator:

The indicator "Tertiary graduates in science and technology" includes new tertiary graduates in a calendar year from both public and private institutions completing graduate and post graduate studies compared to an age group that corresponds to the typical graduation age in most countries. It does not correspond to the number of graduates in these fields who are available in the labour market in this specific year. The levels and fields of education and training used follow the 1997 version of the International Standard Classification of Education (ISCED97) and the Eurostat Manual of fields of education and training (1999).

The European Council has set two objectives to be reached by 2010: to bring an increase of at least 15% in the number of graduates in these fields and to correct the imbalance between women and men. This indicator is measuring the trends towards these two objectives.

The science and technology graduates' indicator includes new tertiary graduates obtaining their degree or diploma during a calendar or academic year from both public and private institutions after completing tertiary level of education (graduate and post graduate studies) compared to an age group that corresponds to the typical graduation age in most countries and according to the national requirements for a successful completion.

Following the conclusions reached in Lisbon in 2000, the ministers of education have set a number of major objectives to be achieved by 2010 in education and training among which is to improve the quality and effectiveness of EU education and training systems. An important sub objective is to increase the recruitment to scientific and technical studies. Europe needs an adequate throughput of mathematics and scientific specialists in order to maintain its competitiveness.

### Restriction of the indicator's relevance and other characteristics which may lead to restrictions in using it in monitoring and reporting

### 3. Data availability:

(**t<sub>1</sub>**: earliest reference year available; **t<sub>2</sub>**: latest reference year available in December 2010)

	Member States	Candidate and Acceding Countries	US and Japan	EEA-EFTA
t <sub>1</sub>	1998: BG, CZ, DK, DE, EE, IE, ES, FR, IT, LV, LT, LU, HU, MT, NL, AT, PL, PT, RO, SI, SK, FI, SE, UK 1999: CY 2000: BE 2004: EL	1998: IS, MK 1999: TR 2003: HR	1998: JP, US	1998: NO 2002: CH 2003: LI
t <sub>2</sub>	2008: All Member States	2008: IS, HR, MK, TR	2008: JP, US	2008: LI, NO, CH

*Comments (including information on time series): No data available for EL (2006), FR (2002, 2004), LU (1999, 2001-2007), MT (2004), TR (2004).*

*A bias has been developed for countries with a high rate of foreign students and also for countries like LU and CY, where a high rate of students go abroad for higher education.*

#### 4. Overall accuracy

High



Data are collected according to the concepts and definitions of the UOE (UNESCO/OECD/EUROSTAT) data collection on education statistics.

This indicator is based on tertiary graduates in the broad fields of science, mathematics and computing, and Engineering, manufacturing and construction and on population statistics (20-29 year olds). Tertiary education is defined in the ISCED97 (International Standard Classification of Education) classification.

UNESCO, OECD and Eurostat send out the UOE questionnaires in April/May of Y+1 with deadline for delivering data in September, where Y is the reference year. Results are compiled on the basis of national mainly administrative sources, reported by Ministries of Education and/or National Statistical Offices. The national data collections on graduates are in most countries extractions from administrative registers. Data are collected through data collection tables and electronic questionnaires that are returned by countries to a unique e-mail address. The international organisations process and verify the data after their reception.

ISCED is the basis for international education statistics. ISCED97 is the framework for the compilation and presentation of national and international education statistics and indicators and it provides a sound basis for statistical comparisons between different education systems.

For the calculation of the indicator, the number of graduates in the fields of science, mathematics and computing and engineering, manufacturing and construction (ISCED field of education broad groups 4 and 5) is divided by the population aged 20-29 and then multiplying by 1000. All graduates in these fields at ISCED 5A and 5B, first and second degrees, and ISCED 6 are included in the numerator. The population data in the denominator refers to 1<sup>st</sup> of January.

The validation of statistical data is shared between Eurostat and OECD. The initial verification is based on common agreed checking rules.

Restricted

(sources, errors, methodology, etc.)



#### 5. Comparability across countries

High



Restricted



Even though data is coming from administrative records, on the basis of commonly agreed definitions, the comparability is restricted across countries because of the differences in the national education structures. Due to the changes in the higher educational systems occurred in many countries in the last years the comparability over time and across countries is difficult to implement.

#### 6. Comparability over time

High



Restricted



The comparability over time is limited.

The revision in 2005 became effective in the reference year 2004 for graduate data. Data on graduates by fields of education and training were changed in the reference year 2004 to include data on graduations by fields of education and training, that is, graduates who awarded more than one degree in different fields should be reported in each of the fields (in previous years, these graduates should be reported only once and prorated over the fields). More than one graduation within the same field (broad field or narrow field) should however be reported only once.

Nevertheless, the change affected only few countries and is negligible.

However, changes in the degree structure and problems with the reference periods make comparisons of relative number of graduates difficult and limit the comparability.

**7. Development perspective for improving the quality of this indicator (including as far as possible an indication of the burden on Member States and respondents.)**

Continuous improvements related to harmonisation given that the different degree structures in countries make comparisons to some extent difficult. Challenges comprise the ISCED consistency over countries to improve comparability and accuracy of the indicator. This harmonisation exercise will be improved once the Bologna process will be fully implemented in all Member States.

**8. Contribution to the coherence of the set/potential to qualify for an integrated policy analysis**

'Science and technology graduates' is an education and training output indicator. Links can be established with other indicators which have the objective to assess the improvements of the quality and effectiveness of education and training systems in the EU. These indicators include the 'Youth Education attainment level (total, male, females)', 'Public expenditure in education' etc. It should be also linked to 'Science and technology graduates employed in Science and technology' in order to get a full view of the later employability of graduates.

**Relevant European legislation**

The joint UIS/OECD/Eurostat (UOE) data collection on education statistics is carried out in gentlemen's agreement (a Council/EP framework regulation covering statistics on lifelong learning will come into effect during spring 2008)

Council Conclusions on a strategic framework for European cooperation in education and training ("ET 2020") (OJ No C 119/2) of 28 May 2009

Council Regulation (CE) No 322/97 of 17 February 1997 (OJ No L 52/1) and Council Regulation (EURATOM, EEC) no 1588/90 of 11 June 1990 on the transmission of the data subject to statistical confidentiality to the Statistical Office of the European Communities (OJ No L 151/ 1)

REGULATION (EC) No 452/2008 OF THE EUROPEAN PARLIAMENT AND OF THE COUNCIL of 23 April 2008

Eurostat, Manual of fields of education and training (1999)