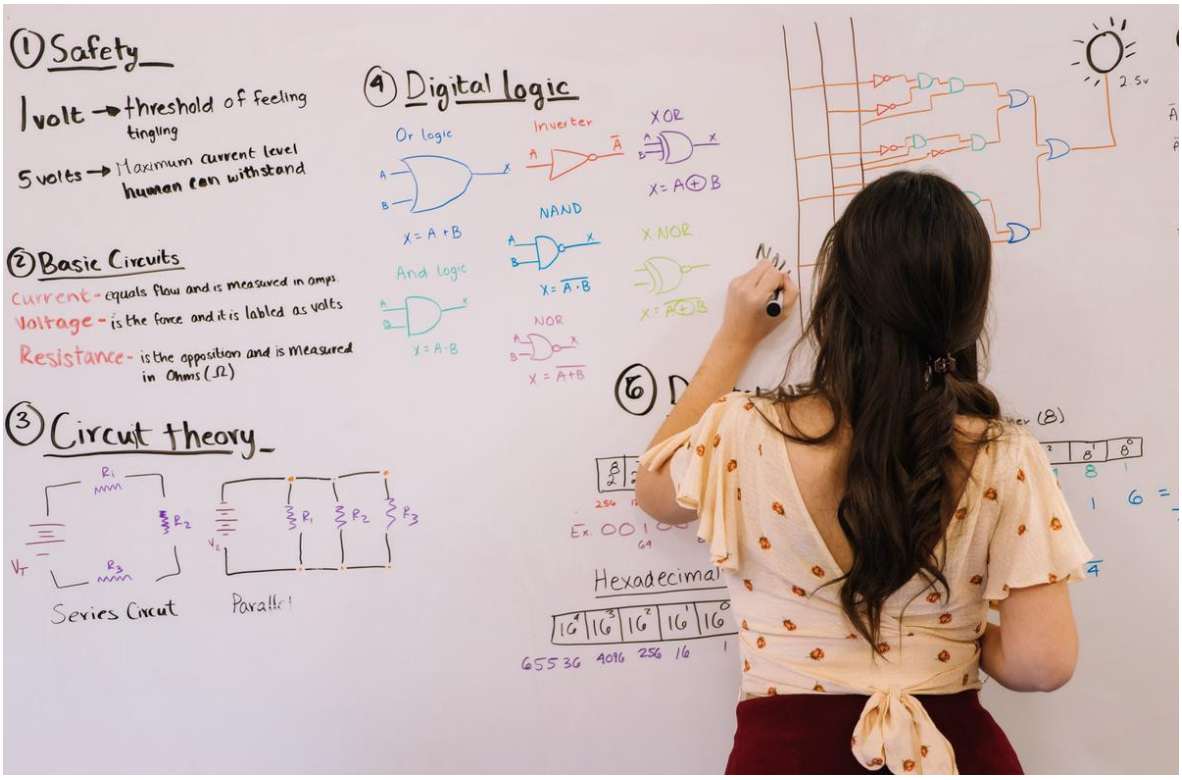
Female graduates in science, technology, engineering and mathematics at the tertiary level of education



Key points

- Females graduating at the tertiary level are vastly underrepresented in the three fields of STEM in both developed and developing regions, constituting slightly more than one-third (35%) of the world's STEM graduates.
- There is a severe gender disparity in graduates in STEM education in all parts of the world, and mostly to the disadvantage of women. Northern Africa and Western Asia is the one region where women are better represented among STEM graduates.
- Women make up the majority of graduates in fields related to education, health, arts and humanities and social sciences; men make up the majority of graduates in fields related to information technologies and engineering.
- Due to significant gains in enrolment in recent decades, gender parity has been achieved among students graduating in natural sciences, mathematics and statistics.

Background

Science, technology, engineering and mathematics (STEM) are key drivers of economic growth. They are also key to the achievement of the SDGs and to tackling the environmental, social and economic concerns facing the world today. Furthermore, they are critical to efforts to address the impact of climate change, increase food security, improve health care, manage limited freshwater resources and protect biodiversity.[1] If women are to play important roles in crafting solutions to improve lives and generate inclusive growth that benefits all, they need to be adequately represented in the next generation of STEM professionals.

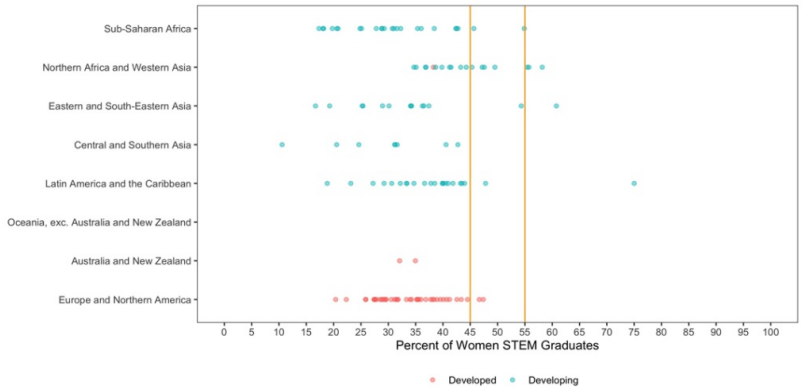
Female graduates in STEM at the tertiary level are vastly underrepresented in both developed and developing regions

Gender differences in STEM graduates at the tertiary level are evident in both developed and developing regions of the world. According to data available on the share of female STEM graduates for 131 countries for the period 2010–2019 (see figure I): slightly more than one-third (35%) of the world's STEM graduates were women (unweighted average); women represented less than 30% of STEM graduates in 37 countries; and only 11 countries achieved gender parity in the proportion of STEM graduates (defined as a share of between 45% and 55% of either sex). In four countries, however, significantly more women than men graduated in STEM.

In 45 countries with data, almost all in Northern America and Europe, the proportion of women among STEM graduates at the tertiary level was less than 45%, with the exception of Albania and North Macedonia, which, with 47% of female graduates in STEM education, achieved gender parity.

The situation was similar among 86 countries with data in developing regions. In nearly 9 out of 10 developing countries, the proportion of women graduates in STEM at the tertiary level was less than 45%, although in three countries and one territory (Algeria, Myanmar, Oman and Sint Maartin) women were more likely than men to graduate in fields related to STEM. Women's share was within the range of parity in five countries in Northern Africa and Western Asia (Morocco, Qatar, the Sudan, the Syrian Arab Republic and Tunisia) and in four other countries (Benin, Brunei Darussalam, the Gambia and Peru).

Figure I: Share of female STEM graduates at the tertiary level of education by region: 2010–2019 (latest available) (Percentage)



Source: UNESCO Institute for Statistics, Database for the Sustainable Development Goals (accessed April 2020) (http://uis.unesco.org/).

All regions of the world display severe gender disparities in STEM, mostly to the disadvantage of women

In half of the countries with data in sub-Saharan Africa (24 countries), women accounted for less than 30% of STEM graduates at the tertiary level. Benin and the Gambia were the only countries in the region to report gender parity. No country (out of eight with data) in Central Asia and Southern Asia reported gender parity, and in three of those countries women represented less than 30% of STEM graduates. Half of the countries in Eastern Asia and South-Eastern Asia displayed moderate male predominance (with a 30% to 45% share of female graduates in STEM education).

In the Latin America and the Caribbean region, the proportions of women among STEM graduates covered a significant range, from 19% in Chile to 75% in Sint Maarten, and in 7 out of 10 countries in the region there was a moderate male predominance (30% to 45% female). Out of 23 countries with data, only one country, Peru, has achieved gender parity among STEM graduates.

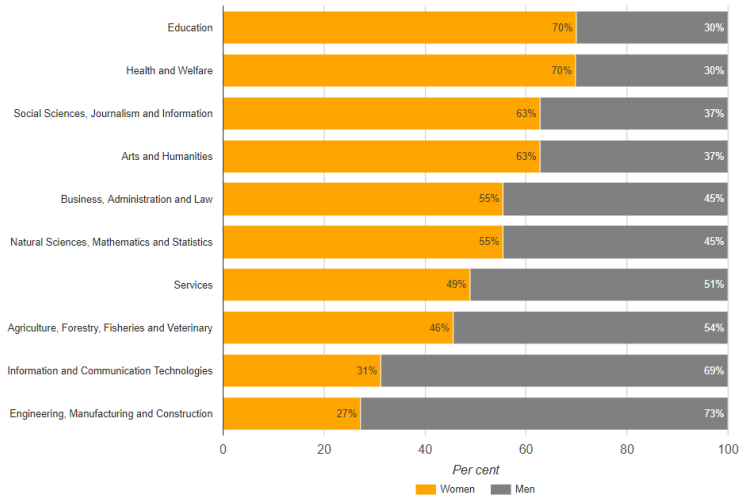
Women were more prominently represented among STEM graduates in Northern Africa and Western Asia, where their share among STEM graduates ranged from 35% in Turkey to 58% in Algeria. Women were also more likely than men to graduate in fields related to STEM in Oman and Tunisia.

Women make up the majority of graduates in fields related to education, health, the arts and humanities and social sciences: men make up the majority of graduates in fields related to information technologies and engineering

Significant gender differences emerge among the fields of study pursued by women and men in tertiary education. Female graduates comprise the vast majority of graduates (over 60%) in education, health and welfare, social sciences, journalism and information, and arts and humanities (see figure II), and are particularly prominent in education and health and welfare (70% of graduates). Moreover, gender parity (female share in the range of 45% to 55%) has been achieved among students graduating in natural sciences, mathematics and statistics, as a result of significant gains in enrolment in tertiary education in recent decades.

In contrast, male graduates are the vast majority in two of the three STEM-related fields: information and communication technologies; and engineering, manufacturing and construction. Men were more than twice as likely to graduate in information technologies, and almost three times as likely to graduate in engineering, manufacturing and construction. This pattern is consistent, with women constituting only slightly more than one-third of the world's STEM graduates, indicating that, despite enjoying better access to tertiary education than ever before, women continue to face challenges in participating in STEM-related fields of study (see figure II).

Figure II: Proportion of female and male tertiary graduates by field of study (global average): 2010–2019 (latest available) (Percentage)



Source: Source: UNESCO Institute for Statistics, Database for the Sustainable Development Goals (accessed April 2020) (http://uis.unesco.org/).

Sources

- UNESCO, Cracking the code: girls' and women's education in science, technology, engineering and mathematics (STEM), Paris, 2017.
- United Nations Educational, Scientific and Cultural Organization (UNESCO), Measuring Gender Equality in Science and Engineering: the SAGA Toolkit, SAGA Working Paper 2, Paris, 2017.

Related stories and further reading

- Women's gross enrolment ratio in tertiary education.
- Women in research and development

About the data

Definitions

The acronym STEM, which stands for science, technology, engineering and mathematics, is a term used to group together these three fields of knowledge and study and to refer to the formal education and qualifications individuals acquire through their training in those fields.[2] Among the 11 broad fields of study specified in the International Standard Classification of Education (ISCED),[3] STEM education encompasses: "Natural sciences and mathematics"; "Information and communication technology"; and "Engineering, manufacturing and construction". To be qualified in STEM, individuals must have an academic degree at the tertiary level of education, that is, between level 5 and level 8, as classified under ISCED,[4] in one of these three fields.

- **Proportion of tertiary graduates by field of study**: Number of graduates expressed as a percentage of the total number of graduates in the given field of study.
- **Female share of STEM graduates at the tertiary education level**: Number of female graduates in the fields of science, technology, engineering and mathematics expressed as a percentage of the total number of graduates in these fields of education.

Coverage

Female and male graduates of STEM programmes at the tertiary level of education.

Availability

Data are available for 131 countries, corresponding to the period 2010–2019 (the latest available year),[5] and by regional groupings under the Sustainable Development Goals (SDGs) indicators framework.[6]

Footnotes

1. UNESCO, Cracking the code: girls' and women's education in science, technology, engineering and mathematics (STEM), Paris, 2017.

2. United Nations Educational, Scientific and Cultural Organization (UNESCO), Measuring Gender Equality in Science and Engineering: the SAGA Toolkit, SAGA Working Paper 2, Paris, 2017.

3. UNESCO, International Standard Classification of Education: Fields of Education and Training 2013 (ISCED-F 2013), Paris, 2014.

4. International Standard Classification of Education (ISCED): levels of education at the tertiary level consist of: level 5: short-cycle tertiary education; level 6: Bachelor's degree or equivalent level; level 7: Master's degree or equivalent level; and level 8: Doctoral degree or equivalent level.

5. UNESCO, UNESCO Institute for Statistics Database for the Sustainable Development Goals (accessed April 2020).

6. Regional groupings under the Sustainable Development Goals (SDGs) indicators framework.