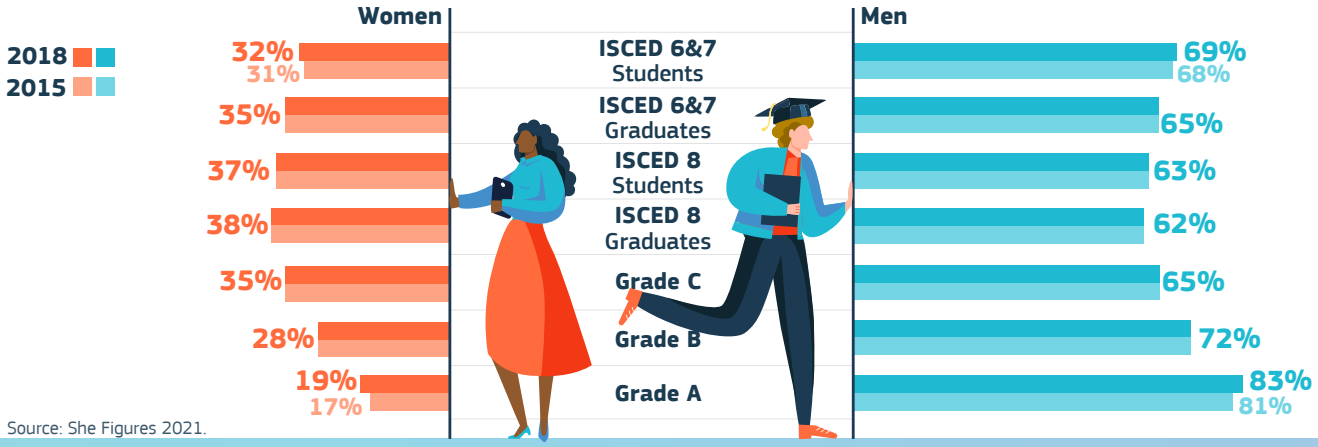
European Commission

EU support to strengthen gender equality in STEM

The gender gap in STEM

When considering all fields of study, women outnumber men in tertiary education (ISCED levels 5-7), and there is almost gender balance among doctoral graduates (ISCED level 8), yet large gender gaps persist across specific fields of study, particularly in **science, technology, engineering and mathematics (STEM)**. The She Figures 2021 report shows that less than a third of undergraduate students in science and engineering in the EU are women (31.3%), and while the proportion of women slightly increases among PhD graduates (38 %), the gender gap widens as seniority levels increase, with women holding only 17.9% of full Professorship positions (Grade A) in Engineering and Technology (Figure below).

Proportion (%) of women and men in a typical academic career in science and engineering, students and academic staff | EU-27



Source: She Figures 2021.

ISCED 6: Bachelor's or equivalent level. | **ISCED 7**: Master's or equivalent level. | **ISCED 8:** Doctoral or equivalent level. | **Grade C:** The first post into which a newly qualified PhD (ISCED 8) graduate would normally be recruited within the institutional or corporate system. | **Grade B:** All researchers working in positions that are not as senior as the top position (A) but more senior than the newly qualified PhD holders (C). | **Grade A:** The single highest grade at which research is normally conducted within the institutional or corporate system.

The roadmap towards gender equality in STEM

The commitment of education and R&I stakeholders, as well as national authorities in EU Member States and Associated Countries, is needed to strengthen women's participation in STEM. The European Strategy for Universities, adopted by the Commission in January 2022, sets the objective to address the underrepresentation of women in STEM, through a roadmap of activities spanning **across education and research policies:**

Research and Innovation

The European Education Area

Within the **European Education Area (EEA)**, the EU promotes life-long learning, spanning from early childhood education to adult learning and combining formal, non-formal and informal learning. Equity is a central dimension of the EEA. The Erasmus+ programme offers many opportunities for schools and higher education institutions to gender-inclusive STE(A)M[1] education, including through the development and implementation of STE(A)M higher education curricula and projects to promote girls' interest in STEM through interdisciplinary teaching. With the Digital Education Action Plan (2021-2027), the Commission supports initiatives to tackle the gender digital skills gap in education and training (Action 13). The main initiatives under this action are:

The Girls Go Circular project

a free online learning programme, has trained over 26 000 14-19 year old girls in 15 countries across Europe since 2020. The initiative holds the annual Women and Girls in STEM Forum to celebrate its success and the girls at the centre of it.

'ESTEAM Fests' (Entrepreneurship, Science, Technology, Engineering, Arts and Mathematics)

offer hybrid workshops, where girls and women of all ages come together to improve their digital and entrepreneurial competences. By 2024, 11 ESTEAM Fests will be organised in 19 Member States.

The European Research Area

Gender equality is a priority for the **European Research Area** since 2012. To foster gender equality in research and innovation (R&I), the European Commission is championing an **institutional change** approach through the implementation of **Gender Equality Plans** (GEPs) at R&I organisations. GEPs have become an eligibility criterion for all public bodies, higher education institutions and research organisations, applying to Horizon Europe. Through successive Framework Programmes, the Commission has funded so far over 200 research organisations to implement their own GEP. Further efforts to support gender equality and inclusiveness in R&I are developed together with Member States and stakeholders under the ERA Policy Agenda 2022-2024 Action 5.

The European Commission mobilised projects and stakeholders to pave the way towards greater participation of women and girls in STEM:

Several **Horizon 2020 and Horizon Europe funded projects**, aimed at fostering structural change in R&I organisations and bridging the gender gap in STEM, as highlighted in a Cordis leaflet.

Three **Horizon Europe projects** aim at developing a roadmap for STE(A)M education in Europe.

A 2022 R&I Days session '**Stream the STE(A)M: gender equality 4 studies and careers**' discussed how a STEAM approach can foster gender equality in STEM.

The **EU Prize for Women Innovators**, including three prizes awarded to the most promising young innovators under the age of 35 in the Rising Innovators Category.

A **Coordination and Support Action** under the Horizon Europe Cluster 2 2023 Work Programme on 'Cultural and creative approaches for gender-responsive STE(A)M education'.

Towards a manifesto for gender-inclusive STE(A)M education and careers

The roadmap to address the underrepresentation of women in STEM includes a **manifesto from STE(A)M-oriented universities on gender-inclusive STE(A)M education and careers**. To support the preparatory work on the manifesto, the European Commission consulted stakeholders through a public survey between October and November 2022 and a participatory workshop in December on what is needed to advance gender equality in STEM. While stressing the key role of **national authorities**, the following principles and suggested actions for stakeholders emerged from this consultation.

[1] The STEAM approach refers to the inclusion of arts, social sciences and the humanities in STEM education, as a transdisciplinary, inclusive, future-oriented approach to learning.

Emerging principles to foster gender equality in STEM

Equality and Inclusion

Closing the gender gap in STEM is not only vital for meeting the skills demand in a fast-changing labour market and tackling challenges like the twin green and digital transition, but also to achieve a society based on equal opportunities, equal treatment and social justice. Education institutions and R&I organisations should strive towards **equality and inclusion** of women, including from disadvantaged backgrounds, and foster **gender-balance and diversity in decision-making and leadership** in the STEM fields.

Holistic approach

The gender gap in STEM needs to be addressed holistically, throughout the whole education, research and innovation system. Collaboration between all actors from **primary, secondary and higher education, to R&I organisations and businesses** is vital to make STEM studies and careers more attractive, gender-equal and inclusive, at all levels, including top management.

Institutional change

Stereotypes and unconscious biases, structural barriers, such as difficult work-life balance, discrimination in recruitment, promotion and funding procedures, harassment and gender-based violence can hinder women, especially those from disadvantaged backgrounds, from pursuing STEM studies and careers. Decision-makers in education institutions and R&I organisations have a responsibility to create a **gender-equal, safe and inclusive organisational culture**, where the needs of diverse people in different life circumstances are met.

Intersectionality

Not all women are the same, and some may face multiple disadvantages in their education and workplace due to intersecting social characteristics, such as ethnicity, (dis)ability, socio-economic status, sexual orientation, age, geographic location or migration background. Education institutions and R&I organisations should adopt an **intersectional perspective** when developing policies and actions to attract and retain talent in STEM fields.

An interdisciplinary STEAM approach

Tackling the twin transition requires diverse talent with a **multidisciplinary set of skills**. Education institutions and R&I organisations can build a collaborative, interdisciplinary education and research environment by promoting a **STE(A)M** approach to learning, and the integration of **gender and intersectional perspectives into R&I content**. This helps develop transversal competences, make scientific and technological innovation more beneficial to everyone in society, and make STEM studies and careers more appealing to a diverse group of learners.

Suggested key actions for stakeholders

Pre-primary, primary and secondary education organisations

- Dismantle gender biases in teaching of STEM subjects, by providing training and awareness raising to teachers and decision-makers.
- Promote innovative teaching and learning methods through a STE(A)M approach and help teachers build capacity through gender-sensitive learning materials and training.
- Engage with parents and the local community through the whole school approach to raise STEM self-efficacy and STEM outcome beliefs[2] among girls and expose them to role models, including from similar age groups and communities.
- Introduce primary and secondary school students to scientific and technological career paths through, e.g. career profiles, non-formal science education activities and interactions with education actors from higher education, the private sector, and civil society.

[2] STEM self-efficacy is related to the individual self-awareness of STEM skills and ability to perform highly in STEM subjects, while STEM outcome beliefs are individual beliefs in the chance to succeed in STEM subjects and careers. Both are often influenced by parents' and teachers' support or pressure.

Higher Education Institutions and Research Performing Organisations

- Integrate interdisciplinary approaches in STEM curricula, programme development, & research practices to increase the societal relevance of R&I and raise the appeal of scientific research.
- Reach out to potential women candidates from diverse backgrounds through communication activities, such as open days, to encourage their application to STE(A)M studies.
- Support institutional change through the implementation of inclusive Gender Equality Plans, policies and programmes aimed at fostering an inclusive learning environment and better working conditions.
- Collaborate with businesses to facilitate cross-sectoral mobility and create traineeship and other learning opportunities, specifically for women from diverse backgrounds.
- Recognise interdisciplinary skills and roles, such as mentorship and teaching, in evaluation criteria for academic recruitment and promotion to create a multidisciplinary education and research environment.
- Provide gender-sensitive training for mentors and supervisors to act responsibly and adequately support women students and professionals in their career development.

Research Funding Organisations

- Identify inequalities in the allocation of research funding and address these e.g. as part of a gender gap analysis or the monitoring of a Gender Equality Plan.
- Provide targeted funding, such as grants and fellowship programmes for women researchers & innovators, with attention to disadvantaged backgrounds, throughout different careers stages.
- Increase the societal relevance and benefit of R&I outputs by supporting the integration of gender and intersectional perspectives in research funding.
- Consider gender balance among research teams in evaluation criteria for allocating research funding.

Innovative businesses in science, technology and engineering

- Promote gender-responsive innovation in the development of new products & services to support scientific excellence and inclusive innovation.
- Foster an inclusive work culture through awareness-raising on unconscious biases, improved work-life balance and dedicated resources to support diversity and inclusion, including in top management.
- Support inclusive recruitment and career development through e.g. gender-responsive language in job descriptions and mentorship programmes.
- Collaborate with education institutions to inform women and girls at different education levels about STE(A)M careers, attract them to traineeship and graduate schemes and expose them to role models.

Next steps

Building on this, a Coordination and Support Action (CSA) under the Horizon Europe 'Widening Participation and Strengthening the European Research Area' (WIDERA) 2023 Work Programme will support the development and implementation of an EU manifesto for gender-inclusive STE(A)M education and careers.

@EUScienceInnov #EUResearchArea
#GenderEquality #UnionOfEquality

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