EUROPEAN POLICYBRIEF

STREAM IT
Streaming girls and women into STEAM education, innovation and research

SREAM IT
ST(R)E(A)M IT/STREAMING GIRLS AND WOMEN INTO STEAM EDUCATION, INNOVATION AND RESEARCH

The brief summarises the project's research results, plan for piloted interventions, and policy recommendations aimed at increasing girls' and women's participation in STEM fields, and promoting gender- and diversity-inclusive STEAM approaches aligned with EU strategies and frameworks.

30th June 2025

INTRODUCTION

This policy brief presents the preliminary outcomes and policy-relevant insights of the STREAM IT project. It aims to inform European policymakers about how the project: (1) builds on existing policy frameworks; (2) contributes to addressing gender inequalities in STEM (Science, Technology, Engineering, and Mathematics) education and career pathways; and (3) supports the integration of STEAM (Science, Technology, Engineering, Arts, and Mathematics) teaching methods and pedagogical innovation to foster more gender-balanced and diverse STEM education.

Promoting gender equality remains a key priority for the European Union. Over the past decades, the EU has launched several strategic initiatives and legislative frameworks to support this goal, including gender mainstreaming, targeted funding schemes, and specific measures to empower women. The EU also faces a persisting gender gap among STEM students and professionals, and it increasingly struggles to attract and retain STEM talent. Together, these trends weaken the EU's ability to compete in the global race for technology and maintain its strategic autonomy in key industrial sectors.

Two major policy communications addressing the gender relevance of STEM education are ***A Roadmap for Women's Rights*** and the ***STEM Education Strategic Plan***, which also provide direct context for the STREAM IT project. Both strategies emphasise the need to promote equal employment opportunities and ensure inclusive, high-quality education for girls and women.

This year, on 7 March, the European Commission adopted ***A Roadmap for Women's Rights***, a long-term vision for achieving gender equality within and external to the EU, which reaffirms the commitment to women's rights and sets the foundation for the ***post-2025 Gender Equality Strategy***. The roadmap establishes eight guiding principles, with which our project is broadly aligned. More specifically, the project directly builds on Principles 3, 4, 5, and 6: Equal pay and economic empowerment, Work-life balance and

care, Equal employment opportunities and adequate working conditions, and Quality and inclusive education. The STREAM IT project aligns with these principles by promoting women's economic empowerment through STEAM teaching and addressing the need to ensure that girls and women have access to high-quality education and training, free from discrimination and gender stereotypes.

Furthermore, the ***Union of Skills strategy*** states that improving STEM skills, attracting more women to STEM careers, and preparing citizens for green and digital transitions are top priorities. The mission of the STREAM IT project strongly resonates with the ***STEM Education Strategic Plan*** (as part of the Union of Skills strategy), mostly with the third objective of the Plan: 3. ADVANCE WOMEN IN STEM AND INSPIRE FUTURE INNOVATORS (LIFT barriers). This objective underscores the urgent need to address the persistent gender gap in STEM education and professions by "i) addressing gender stereotypes; ii) facilitating access to STEM education by targeting crucial age cohorts; and iii) promoting more institutionally supported mentorship programmes with role models." The STEM Education Strategic Plan supports these goals with specific targets: by 2030, 45% of students in medium-level VET should be in STEM (with at least 25% women); 32% of tertiary-level students should be in STEM (with 40% women); and ICT PhD enrolments should reach 5%, with at least 33% women. These aims directly align with the STREAM IT project's commitment to fostering gender-inclusive STEAM education and methodological innovation and increasing the presence of girls and women in STEM fields at all educational levels. As a core aim of our project, we want to deliver piloted practices and methodologies that make STEAM education more inclusive to diverse learners, especially young women.

The STREAM IT project supports the development and implementation of a ***European Manifesto for gender-inclusive STE(A)M education and careers***, as part of a core activity under the ***European Strategy for Universities***. The European Strategy for Universities reflects the EU's commitment to strengthening the participation of women and girls in STEM studies and careers. In this context, it emphasises the importance of the STEAM approach in supporting more inclusive and engaging educational pathways. As stated in the strategy document, the stakeholders and the Member States are encouraged to "Address the underrepresentation of women in STEM fields through a roadmap that includes a manifesto from STE(A)M-oriented universities on gender-inclusive STE(A)M education" (page 8). In this process, blending STEM disciplines with the arts, humanities, and social sciences offers a promising way to make STEM subjects and careers more appealing to a broader and more diverse range of learners, especially girls. This approach helps contextualise STEM within the wider educational, cultural, and social landscape, factors that are often critical in sparking interest and motivation among underrepresented groups, such as girls. The Strategy outlines a roadmap of activities to tackle gender inequalities, including the creation of a Manifesto for gender-inclusive STE(A)M education and careers. This roadmap calls for action from STEAM-oriented universities and other key actors to address the underrepresentation of women in STEM. To support the preparation of the Manifesto, the European Commission conducted a public stakeholder survey in October-November 2022 and hosted a participatory workshop in December 2022 to identify the key priorities and actions needed to advance gender equality in STEM. The outcomes of this process are summarised in the accompanying Factsheet. STREAM IT contributes to this effort through the co-creation of a STEAM Roadmap, engaging stakeholders in policy dialogue webinars and collaborative processes to promote the Manifesto's principles and support its implementation.

The STREAM IT project operates within this evolving policy landscape, contributing both evidence and tested practices to ongoing European efforts to foster inclusive, future-ready education. By leveraging synergies between Horizon Europe, the European Education Area, and the European Strategy for Universities, STREAM IT helps shape a unified response to Europe's persistent gender gaps in STEM and the need for more diverse talent in science-related fields. Through its focus on pedagogical innovation, stakeholder engagement, and co-creation of policy tools like the STEAM Roadmap, the project complements wider EU objectives, ensuring that science education becomes more attractive, relevant, and accessible to a broader demographic. In particular, the integration of arts and creative approaches within STEM teaching offers a way to not only dismantle gender stereotypes but also connect science with social, cultural, and

real-world contexts. This aligns with calls for more open schooling, interdisciplinary learning, and the mainstreaming of STEAM approaches across formal and informal education channels.

Evidence and Analysis

The findings of the STREAM IT project are based on comprehensive cross-country research aimed at collecting and analysing existing knowledge, evaluating the outcomes of previously implemented initiatives, and generating new evidence on the barriers and enabling factors that shape the opportunities of girls and young women in STEM fields. This evidence base was developed during the first 10 months of the project and is presented in the following key deliverables:

- D2.1: Research Report on Previous and Running Initiatives and European Projects on STEAM Education and Gender Equality
- D2.3: Research Report on Obstacles and Supports for Gender Equality and Inclusiveness in STEM Education and Research & Innovation

Together, these reports provide the basis for understanding the persistent and systemic challenges that continue to hinder the full and equal participation of girls and women in STEAM education and careers. Overcoming these challenges requires coordinated, multi-level action across education systems, institutional structures, and policy frameworks, both at the national and EU levels. In particular, the findings highlight the following critical issues:

1. Structural and Cultural Barriers Are Deep-Rooted and Multi-Level

Research shows that the gender gap in STEAM is reinforced by structural inequalities and deeply embedded societal norms. Interviews with 97 female STEAM students across 15 European countries (D2.3) revealed experiences of subtle exclusion, lack of belonging, and persistent stereotypes that continue to define STEAM as a male-dominated field in many of its subdomains. This "hidden curriculum" is often reinforced by unwelcoming academic environments, discriminatory behaviours, limited visibility of female role models, and a lack of dedicated resources to support girls and women in pursuing academic or professional careers in STEM. Expert interviews further highlighted the absence of formal, gender-responsive institutional policies, particularly in higher education, where support is often ad hoc or dependent on individual initiative rather than systemic action. Perhaps we should add to the list the representation of young women in STEM careers as male-dominated ones that are not only unwelcoming but also align with the neoliberal ideal of the worker who has no (child)care tasks and can dedicate their time exclusively and uninterrupted to their paid work. That is, women are aware of the challenges of combining paid and unpaid work in male-dominated professions.

2. Institutional Support Is Inconsistent and Underdeveloped

Despite increasing awareness of gender issues in STEM, findings from 85 expert interviews indicate that many institutions still lack comprehensive strategies and accountability mechanisms to promote gender equality. While some progress is visible, structural commitment remains limited, with most gender-related actions implemented through isolated programs or voluntary efforts. Particularly concerning is the lack of top-down initiatives to embed gender sensitivity in curricula, teacher training, or leadership accountability frameworks. Although many institutions acknowledged the existence of Gender Equality Plans (GEPs) required under Horizon Europe, knowledge of their implementation and relevance was often superficial, highlighting the need for improved dissemination, capacity-building, and policy support.

It is also important to highlight that many education professionals, teachers, and decision makers remain reluctant to acknowledge the structural nature of the disadvantages faced by girls and women in STEM. A persistent belief prevails that the underrepresentation of girls is primarily the result of individual

preferences and, therefore, lies beyond the reach of policy intervention. Additionally, the growing influence of anti-gender movements cannot be overlooked. These movements contribute to the perception among some stakeholders that sustained efforts to improve women's participation in STEM reflect the agenda of a so-called "global gender lobby," rather than a response to systemic inequalities.

3. Gender-Sensitive Education Remains Marginal

Although EU policy frameworks emphasise the modernisation of education, the practical implementation of gender- and diversity-sensitive pedagogies remains fragmented. STREAM IT findings indicate that gender mainstreaming is inconsistently integrated into teacher training, and many educators feel ill-equipped to challenge stereotypes or support diverse learners. Interview data presented in Deliverable D2.1 reveal that many impactful STEAM initiatives depend on short-term funding and are led by individual champions or NGOs, rather than being institutionalised in mainstream educational systems. The findings underscore the urgent need for stronger coordination, systematic evaluation practices, and a long-term sustainability framework for gender-equal education across Europe.

4. Early and Experiential Engagement Is Crucial

Both research reports and already existing scientific literature stress the importance of early exposure to STEAM subjects, particularly when combined with real-life applications, hands-on learning, and content that resonates with girls' interests. Projects that integrate creativity, social relevance, and interdisciplinary approaches have proven particularly effective. Moreover, the presence of inspiring and approachable role models, as well as structured mentoring opportunities, plays a vital role in dismantling stereotypes and enhancing the confidence and self-efficacy of young girls and women in STEAM. These findings reinforce the need to strengthen educator capacities in delivering inclusive teaching and to advance policies that promote institutional accountability for gender and diversity in STEAM education.

5. Gender-Inclusive STEAM Practices

To effectively address the gender imbalance in STEAM fields, the European Commission should support the systematic adoption of evidence-based, gender-sensitive educational toolkits, such as those to be developed by the STREAM IT project. STREAM IT offers a scalable and adaptable suite of interventions, including talent development programmes, hands-on activities at science centres, and structured mentoring schemes, targeted at girls from the upper levels of primary and secondary education through to higher education. These resources are going to be co-designed with educators, grounded in European best practices, and piloted across diverse socio-cultural contexts in 12 countries. Their strength lies in the combination of localised implementation and structured exposure to female role models, experiential STEAM learning, and science communication training.

To drive systemic change, it is recommended that the Commission:

- Integrate such toolkits into national curricula and teacher training systems.
- Allocate dedicated funding for their local adaptation and implementation.
- Encourage cross-border institutional collaboration to scale successful models across Member States.

POLICY IMPLICATIONS AND RECOMMENDATIONS

The STREAM IT project adopts the document elaborating a framework for the European Manifesto for Gender-Inclusive STE(A)M Education and Careers and aligns its research and actions with the roadmap for addressing the underrepresentation of women in STEM. Based on the cross-country research (D2.1 and D2.3) and the design and the first steps of piloting the inclusive educational interventions, the project identified the following policy actions that are essential to foster equality, institutional transformation, and inclusive innovation in STEAM education and research:

Equality and Inclusion

- Integrate STEM education early in primary school to raise interest among both girls and boys and foster inclusive learning environments.
- Move beyond symbolic actions/token initiatives and embed gender equality as a structural goal within education and research policy frameworks.
- Establish dedicated funding schemes and support structures for girls and women from underrepresented backgrounds, particularly during critical transition points such as secondary to tertiary education. This includes targeted scholarships and financial aid for girls pursuing STEM degrees, with a focus on those from disadvantaged groups.
- Implement structured mentoring programmes and networking opportunities to strengthen female students' sense of belonging and self-efficacy in STEM education and career pathways.
- Promote visibility of female role models to connect young women with professionals in STEAM fields.

Holistic Approach

- National and EU education strategies should promote sustained collaboration across primary and secondary schools, higher education institutions (HEIs), non-formal learning environments (e.g., science centres), and industry partners to create inclusive STEM pathways.
- Encourage schools to partner with science museums, STEM organisations, and research institutes to organise visits and shadowing opportunities, allowing students, especially girls, to interact with and learn from female STEM professionals.
- More projects like STREAM IT should be supported under Horizon Europe and Erasmus+ Programme and national recovery strategies as drivers for inclusive innovation and talent development.

Institutional Change

- Require higher education institutions to adopt and monitor Gender Equality Plans (GEPs), with specific objectives and actions for STEM faculties.
- Institutional policies must address the "hidden curriculum" by delivering training on unconscious bias, fostering inclusive and safe environments, and reducing feelings of isolation among female students in male-dominated disciplines.
- As teachers significantly influence girls' attitudes toward STEM, teacher training must include modules on gender-sensitive pedagogy, inclusive curriculum design, and bias-free classroom practices.
- Establish regional and national networks that enable educators to exchange good practices and share gender-inclusive teaching resources.
- Promote institutional and employer-level policies that support work-life balance (e.g., flexible schedules, parental leave), to improve access to and retention in STEM careers for women with caregiving responsibilities.

Intersectionality

- Gender equality measures in STEM must explicitly consider multiple, intersecting forms of disadvantage (e.g., ethnicity, socio-economic status, disability, rurality, migration background, first-generation students).
- Develop and implement monitoring frameworks that collect and analyse disaggregated data to inform inclusive policy responses addressing these intersectional barriers.

Interdisciplinary STEAM Approach

- Promote STEAM education approaches and models that integrate creativity, real-world challenges, and socially relevant themes, increasing their appeal to a wider and more diverse group of students, particularly girls.

- Focus on developing foundational skills that build girls' confidence and interest in STEM, such as problem-solving, critical thinking, research skills, and leadership, through engaging, hands-on programmes.
- Ensure that STEAM education, especially at younger ages, is not only informative but also enjoyable and interactive to spark lasting interest. Events and activities should be inclusive, inspiring, and entertaining.
- Allocate funding for curriculum development that embeds gender and diversity dimensions into science and technology education and research content.

Sustainability and Legacy

D2.1 Research report on previous and running initiatives and European projects on STEAM education and gender equality
D2.2 Best practices collection on STEAM approaches and tools
D2.3 Research Report on obstacles and supports for gender equality and inclusiveness in STEM education, R&I
D3.1 Toolkit for attracting young girls towards STEM education
D3.2 Toolkit for activities at science centres and museums
D3.3 Toolkit of mentoring programme at universities and science parks
D4.1 Best Practice Guide for STEM Educators of Gender- and diversity-inclusive non-formal teaching and training tools, methods and practices
D4.2 Toolkit for the establishment and maintenance of the National Inspiration Hubs
D5.1 Impact assessment of the hands-on activities and awareness raising campaigns
D5.4 European Roadmap for supporting the implementation of 'The European Manifesto for gender-inclusive STE(A)M education and careers'

Virtual Makerspace: https://virtualmakerspace.streamit-project.eu/
National Inspirational Hubs, as an example for Community of Practice: https://virtualmakerspace.streamit-project.eu/national-inspiration-hubs/

Research Parameters

The STREAM IT project aims to address persistent gender inequalities in STEM education and research and innovation (R&I) by advancing gender- and diversity-inclusive STEAM approaches across Europe. Its overarching goal is to foster the participation of girls and women in STEM by:

1. Identifying structural and cultural barriers through baseline research, impact assessment of three piloted educational streams, and feedback collection, knowledge generation via interactive dialogues with policymakers and key STEAM education stakeholders during webinars, in line with the project's specific objectives 1, 7, and 8.

2. Improving STEAM education by providing piloted, gender- and diversity-inclusive educational activities; supporting the professional development of educators through dedicated toolkits; and assisting HEIs and STEM education providers in embedding gender-sensitive practices, in line with the project's specific objectives 2, 3, 4, 5, 6, and 8.

3. Building sustainable support networks to help STEM education institutions become more gender-responsive and better equipped to foster skills and career development opportunities for all genders, with a particular focus on teenage girls and young women, in line with the project's specific objectives 3, 4, 5, 6, and 8.

4. Contributing to EU policy goals, particularly by supporting the implementation of the European Manifesto for gender-inclusive STE(A)M education and careers, in line with the project's specific objectives 7 and 8.

The project follows a three-stage methodological framework. In the initial phase, existing knowledge is synthesised and validated through meta-analyses and primary research, with a focus on institutional barriers, enabling conditions, and gender-based challenges in STEM education. The second phase focuses on co-creating and piloting inclusive educational interventions, including gender-responsive hands-on activities in science centres, the Nurturing Talent Programme for secondary school girls, and a mentoring scheme for university and PhD students. These are delivered through participatory methods and supported by the Co-creation Working Lab and National Inspiration Hubs. In the final phase, the developed tools and methodologies are revised and enhanced based on comprehensive impact assessments and policy dialogue webinars, ensuring scalability and long-term relevance.

PROJECT IDENTITY

PROJECT NAME

Streaming Girls and Women into STEAM Education, Innovation and Research (STREAM IT)

COORDINATOR

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CONSORTIUM

1. ADDSEN SRO – ADDSEN – Malacky, Slovakia
2. Association of Business Women – UPZ ABW – Beograd, Serbia
3. CESIE ETS – CESIE – Trappeto, Italy
4. EIT Food CLC North-East SP ZOO – EIT FOOD – Warszawa, Poland
5. Foundation For Management and Industrial Research Foundation Skopje – MIR – Skopje, North Macedonia
6. F6S Network Ireland Limited – F6S IE – Dublin, Ireland
7. Institut Mihajlo Pupin – IMP – Beograd, Serbia
8. Non-Governmental Organization Bureau of Research, Innovations and Technologies – NGO BRIT – Ivano-Frankivsk, Ukraine
9. Nők A Tudományban Egyesület – NATE – Budapest, Hungary
10. ReadLab Brussels – ReadLab Brussels – Brussels, Belgium
11. The Research Innovation and Development – ReadLab – Athens, Greece
12. Regionalna Agencija Za Predpriemachestvo I Inovacii-Varna – RAPIV – VARNA, Bulgaria
13. Sauletekio Slenio Mokslo Ir Technologiju Parkas – SUNRISE TECH – VILNIUS, Lithuania
14. Steinbeis 2i GMBH – Steinbeis – Stuttgart, Germany
15. STEM Ísland – STEM Ísland – Húsavík, Iceland
16. Tehnoloski Park Varazdin Doo Za Inkubaciju Inovativnih Tehnologijskihpoduzeca – VA TECHPARK – Varazdin, Croatia
17. Universitatea Babes Bolyai – UBB – Cluj Napoca, România
18. Universidad De Burgos – UBU – Burgos, Spain
19. Ustanova Hisa Eksperimentov – UHE – Ljubljana, Slovenia
20. Wonderfund AB – WONDERFUND – Malmö, Sweden

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FURTHER READING	D2.3 Research Report on obstacles and supports for gender equality and inclusiveness in STEM education, R&I D5.1 Impact assessment of the hands-on activities and awareness raising campaigns D5.4 European Roadmap for supporting the implementation of 'The European Manifesto for gender-inclusive STE(A)M education and careers'

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