Representation of girls in STEM in the European Union: Understanding the causes and implications

Despite decades of policy efforts and educational reforms, the representation of girls and women in STEM (Science, Technology, Engineering, and Mathematics) fields within the European Union remains disproportionately low, especially in certain disciplines and at advanced educational and career stages. According to **Eurostat**, women accounted for just **32.8 % of tertiary graduates in STEM fields in the EU in 2021**, indicating persistent under-representation despite incremental increases over recent years.

A closer examination reveals that this imbalance is both systemic and multifaceted. The **European Commission's "She Figures" data** indicate that while women constitute nearly half of all doctoral graduates overall, their presence varies markedly across STEM sub-disciplines — with as few as **22 % of ICT doctoral graduates being women**. This disparity suggests that the issue is not rooted solely in general educational attainment but in the specific cultures, structures, and expectations surrounding distinct STEM fields.

One of the principal explanatory factors is **societal and cultural stereotypes** that shape perceptions of STEM from an early age. Numerous EU analyses highlight that girls often exhibit as high or even higher academic performance in mathematics and science during compulsory schooling, yet they are less likely than boys to pursue these subjects at higher levels of education. The **NESET report on the gender gap in STEM education** elaborates that these choices are influenced by entrenched gender norms, self-efficacy beliefs, and perceived competencies — with girls reporting lower confidence in STEM abilities even when academic performance is comparable. These findings align with broader educational research showing that confidence and identity, not just ability, play a key role in subject selection and persistence.

Institutional factors also contribute significantly. Curricula and teaching practices that fail to integrate gender-inclusive pedagogies can reinforce traditional role expectations and overlook the diverse interests of learners. Furthermore, the scarcity of **female role models in STEM careers** — from university faculty to industry leaders — limits the visibility of alternative pathways for girls, thereby perpetuating a cycle of under-representation. The European Commission's analytical reports emphasize the need for educational reforms that include mentorship programmes, inclusive teaching practices, and early exposure to real-world STEM activities to counteract these barriers.

Economic and labour-market dynamics compound these educational influences. Women are notably under-represented not just in STEM education but also in the workforce, particularly in **ICT and engineering sectors where structural shortages of skilled professionals persist**. For

example, only about **19 % of ICT specialists in the EU are women**, highlighting a stark gender gap at the intersection of digital technologies and labour demand. Addressing these workforce disparities is critical, not only for gender equity but also for enhancing Europe's competitiveness in innovation-driven sectors.

Overall, the gender gap in STEM reflects a complex interplay of **societal stereotypes, educational practices, institutional cultures, and labour-market structures**. Addressing this gap requires coordinated action across policy, education, and industry, from early schooling to professional development.

Initiatives such as the **ST3AM project** aim to tackle these challenges directly by promoting inclusive, gender-sensitive STEM education and promoting interest in STEAM (Science, Technology, Engineering, Arts, and Mathematics) among girls from an early age. By integrating hands-on learning, mentorship opportunities, and role-model visibility, ST3AM seeks to empower young women to pursue and sustain careers in STEM fields, helping to close the gender gap while cultivating a new generation of innovators across Europe.