Plenary sitting

A9-0163/2021

12.5.2021

REPORT

on promoting gender equality in science, technology, engineering and mathematics (STEM) education and careers
(2019/2164(INI))

Committee on Women's Rights and Gender Equality

Rapporteur: Susana Solís Pérez

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MOTION FOR A EUROPEAN PARLIAMENT RESOLUTION

on promoting gender equality in science, technology, engineering and mathematics (STEM) education and careers
(2019/2164(INI))

The European Parliament,

–   having regard to Articles 2 and 3(3) of the Treaty on European Union and Article 8 of the Treaty on the Functioning of the European Union,

–   having regard to Article 23 of the Charter of Fundamental Rights of the European Union,

–   having regard to the Commission communication of 10 June 2016 entitled 'A New Skills Agenda for Europe: Working together to strengthen human capital, employability and competitiveness' (COM(2016)0381),

–   having regard to the Commission communication of 5 March 2020 entitled 'A Union of Equality: Gender Equality Strategy 2020-2025' (COM(2020)0152),

–   having regard to the Commission communication of 1 July 2020 entitled 'European Skills Agenda for sustainable competitiveness, social fairness and resilience' (COM(2020)0274),

–   having regard to the Commission communication of 30 September 2020 entitled 'Digital Education Action Plan 2021-2027 – Resetting education and training for the digital age' (COM(2020)0624),

–   having regard to the study of the European Institute for Gender Equality of 10 August 2017 entitled 'Economic benefits of gender equality in the EU: How gender equality in STEM education leads to economic growth',

–   having regard to its resolution of 9 September 2015 on women's careers in science and universities, and glass ceilings encountered[1],

–   having regard to the strategic framework for European policy cooperation in education and training for 2020,

–   having regard to its resolution of 8 October 2015 on the application of Directive 2006/54/EC of the European Parliament and of the Council of 5 July 2006 on the implementation of the principle of equal opportunities and equal treatment of men and women in matters of employment and occupation[2],

–   having regard to its resolution of 28 April 2016 on gender equality and empowering

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[1] OJ C 316, 22.9.2017, p. 173.
[2] OJ C 349, 17.10.2017, p. 56.

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women in the digital age[3],

–   having regard to its resolution of 17 April 2018 on empowering women and girls through the digital sector[4],

–   having regard to its resolution of 21 January 2021 on closing the digital gender gap: women's participation in the digital economy[5],

–   having regard to the Council conclusions of 6 December 2018 on gender equality, youth and digitalisation,

–   having regard to the study entitled 'Education and employment of women in science, technology and the digital economy, including AI and its influence on gender equality' published by its Directorate-General for Internal Policies on 15 April 2020[6],

–   having regard to the study entitled 'Women in the Digital Age'[7],

–   having regard to the UN International Day of Women and Girls in Science, held on 11 February every year, which seeks to achieve full and equal access to and participation in science for women and girls, and further achieve gender equality and the empowerment of women and girls,

–   having regard to the 2030 Agenda for Sustainable Development, which entered into force in 2016, and in particular Sustainable Development Goal 5 on gender equality,

–   having regard to the Commission's 2020 Women in Digital Scoreboard,

–   having regard to the report of the European Institute for Gender Equality on the 2020 Gender Equality Index,

–   having regard to the UN Convention on the Elimination of All Forms of Discrimination against Women of 1979, in particular Article 11 thereof,

–   having regard to Rule 54 of its Rules of Procedure,

–   having regard to the report of the Committee on Women's Rights and Gender Equality (A9-0163/2021),

A.   whereas gender equality is a fundamental value and key objective of the EU and a basic precondition for the full enjoyment of human rights by women and girls that is essential for their empowerment, the development of their full potential and the achievement of a sustainable and inclusive society; whereas the discrimination faced by women

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[3] OJ C 66, 21.2.2018, p. 44.

[4] OJ C 390, 18.11.2019, p. 28.

[5] Texts adopted, P9_TA(2021)0026.

[6] Study – 'Education and employment of women in science, technology and the digital economy, including AI and its influence on gender equality', European Parliament, Directorate-General for Internal Policies, Policy Department C – Citizens' Rights and Constitutional Affairs, 15 April 2020.

[7] Study prepared by iclaves for the Directorate-General for Communications Networks, Content and Technology, European Commission.

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associated with gender, stereotypes and inequalities, combined with intersectional discrimination, has a plethora of harmful social and economic consequences, including the reduction of potential advantages for the public sector and businesses in research and innovation and for overall economic development; whereas raising the profile of women in science, technology, engineering and mathematics (STEM) and women's professional contributions can establish patterns of success to follow and ultimately lead to more inclusion, as well as enhancing the transformation of and innovation in our societies, for the benefit of the wider public; whereas eliminating the old patterns will promote gender equality; whereas women could play a vital role in filling shortages on the EU labour market;

B.   whereas the EU is facing an unparalleled shortage of women in STEM careers and education, not least given that women make up 52 % of the European population and 57.7 % of tertiary graduates in the EU[8], yet only account for 2 out of 5 scientists and engineers[9]; whereas women are under-represented at all levels in the digital sector in Europe, from students (32 % at bachelor's, master's or equivalent level) to top academic positions (15 %) in most scientific, engineering and management fields and at higher hierarchical levels, even in sectors where they comprise the majority, such as education; whereas gender stereotypes constitute a serious obstacle to equality between male and female students as early as education and further widen the gender gap in the STEM job sector, which represents a serious obstacle to equality between women and men; whereas the gap is largest in specialist skills and employment in ICT in the EU, where only 18 % are women[10], among STEM graduates, of whom only 36 % are women, and in the digital sector, where there are more than three times more men than women; whereas significant levels of gender segregation among STEM students and graduates lay the ground for future gender segregation in STEM-related careers; whereas very few teenage girls in the Member States (less than 3 %) express an interest in working as an ICT professional at the age of 30[11]; whereas it is particularly difficult for women from disadvantaged socioeconomic backgrounds to enter the STEM sector; whereas although there has been a positive trend in the involvement and interest of girls in STEM education, the percentages remain insufficient; whereas attitudes towards STEM do not differ between boys and girls through primary education, and in many cases girls often outperform boys in STEM and ICT-related tasks[12]; whereas gender differences in STEM subjects in higher education are not justified by academic performance, as girls and boys show similar levels of achievement in science and maths in secondary level education; whereas, however, girls fear that they will be less successful than boys in STEM-related careers and, as a result, women are less confident in their own digital skills; whereas social norms and gendered expectations about career choices, which are often reinforced through educational content and curricula, are two of the drivers of gender segregation in higher education;

C.   whereas women who major in STEM fields can struggle to find their place in the STEM

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[8] Eurostat, Tertiary education statistics, data extracted in September 2020.

[9] Eurostat, Human resources in science and technology, annual average data 2016-2020.

[10] European Commission, Women in Digital Scoreboard 2020.

[11] International Association for the Evaluation of Educational Achievement (IEA), International Computer and Information Literacy Study (ICILS) 2018.

[12] O'Dea, R. E., Lagisz, M., Jennions, M. D. et al., 'Gender differences in individual variation in academic grades fail to fit expected patterns for STEM', *Nature Communications* 9, 3777, 2018.

job sector and are less likely than their male counterparts to enter STEM occupations or remain in them as a result of the various barriers that exist, such as gender stereotypes, male-dominated workplaces, discrimination and prejudice, conscious and unconscious bias, sexual harassment, a negative working environment, and a lack of female role models and mentors; whereas reducing the gender gap in STEM education areas could reduce the skills gap, increase employment and the productivity of women and reduce professional segregation, which would ultimately foster economic growth through higher productivity and increased labour; whereas closing the gender gap in STEM careers would contribute to an increase in EU GDP per capita by 2.2 to 3.0 % by 2050[13]; whereas closing the gender gap in STEM careers would constitute a step towards gender equality and the fulfilment of women's and girls' human rights, and would have a positive impact in reducing the gender pay and gender pension gaps;

D.   whereas according to a survey by the EU Agency for Fundamental Rights[14], an estimated 55 % of women in the EU have faced sexual harassment since the age of 15 and 14 % of women have experienced cyber harassment since the age of 15; whereas many women have been the victims of new forms of cyber violence during the COVID-19 pandemic, such as online sexual and psychological harassment; whereas measures to address these new forms of sexual and psychological harassment are urgently needed; whereas high incidences of sexual harassment have been reported in STEM education facilities, including schools, universities and workplaces, which further excludes women from the sector;

E.   whereas the under-representation of women who work in innovative technologies, such as artificial intelligence (AI), is a matter of concern, as it can negatively affect the design, development and implementation of these technologies, causing the replication of existing discriminatory practices and stereotypes and the development of 'gender-biased algorithms'; whereas efforts to tackle gender bias, stereotypes and inequality in the digital sector are insufficient; whereas the gender gap persists across all digital technology domains, notably with regard to AI and cybersecurity, thereby solidifying a male-biased trajectory for the digital sector in the foreseeable future; whereas addressing these biases requires the development of clear ethics and transparency requirements; whereas incomplete and inaccurate data sets and the lack of gender-disaggregated data can distort the processing and reasoning of AI systems and further jeopardise the achievement of gender equality in society; whereas due consideration should also be given to the unique circumstances of Europe's small and medium-sized enterprises (SMEs) with particular regard to their size, ability to implement new requirements, and potential as a valuable source and contributor to enable girls, women and female leaders to promote gender equality in STEM education and careers;

F.   whereas new technologies that are biased in terms of gender, ethnicity, race, colour, language, religion or national or social origin are mainly caused by non-disaggregated data, a lack of situated knowledge and the failure to apply a gender perspective in research, which can have harmful consequences for women's health and well-being, especially those facing intersectional discrimination, and for the safety of products, and

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[13] European Institute for Gender Equality, *Economic benefits of gender equality in the EU: How gender equality in STEM education leads to economic growth*, 2017.

[14] EU Agency for Fundamental Rights, *Violence against women: an EU-wide survey*, 2014.

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can have a negative impact on women's personal and professional development[15];

G. whereas teachers and parents can entrench gender stereotypes by discouraging girls from choosing and pursuing STEM studies and careers; whereas gender stereotypes greatly influence subject choices; whereas cultural discouragement and the lack of awareness of female role models and the failure to promote them hinders and negatively affects girls' and women's opportunities in STEM studies, related careers and digital entrepreneurship, and leads to discrimination and fewer opportunities for women in the labour market; whereas emphasis should be placed on the factors that motivate girls and nurture their interest in STEM studies, related careers and digital entrepreneurship, such as promoting female role models, teacher mentors and peer group approval and developing creativity and practical experience;

H. whereas the COVID-19 crisis is likely to result in permanent changes to life in Europe and affect most aspects of people's lives, the way we perform our work and the way we study and learn, in which digitalisation will have a major role; whereas COVID-19 is also widening the digital gender gap[16] at a time when digital skills are needed more than ever to work, study or stay connected; whereas the rapid digital transformation offers many opportunities to change the gendered patterns of employment, but can also disproportionately affect women's employment in numerous fields; whereas women are forced to assume a higher share of obligations related to parenting or their families than their male counterparts and, as such, all proposed measures should take into account the possibility of successfully reconciling professional and family life for women so as to include men in these spheres; whereas the boundaries between professional and family life will become less distinct as a result of teleworking and women could have to bear the greatest burden of balancing a career with family care duties;

I. whereas there is a need to further promote policies aimed at increasing the participation of women in STEM and AI-related fields and to adopt a multi-level approach to address the gender gap across all levels of education and employment in the digital sector; whereas few Member States have included provisions on gender equality in the field of research and innovation and progress to mainstream gender into national research programmes has been slow;

J. whereas there is a need to promote and support greater entrepreneurship among women and develop an enabling environment in which women entrepreneurs can prosper and enterprise is encouraged; whereas the data on entrepreneurship in the STEM and ICT sector points to an even greater marginalisation of women; whereas the gender gap in start-ups and venture capital investment is similarly striking; whereas as girls tend to study fewer ICT and STEM subjects throughout secondary school and university, far fewer women end up working in these fields and becoming founders and owners of private companies and start-ups; whereas only 17 % of start-up founders are women; whereas on average, start-ups owned by women receive 23 % less funding than those run by men; whereas although women account for 30 % of all entrepreneurs in Europe,

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[15] Report of the Expert Group 'Innovation through Gender', *Gendered Innovations: How Gender Analysis Contributes to Research*, Directorate-General for Research and Innovation, European Commission, 2013.
[16] Organisation for Economic Co-operation and Development (OECD), *Bridging the digital gender divide: include, upskill, innovate*, 2018.

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they only receive 2 % of the non-bank financing available[17]; whereas this figure seems to have fallen to 1 % in the light of the pandemic;

General remarks

1.   Considers that in the light of the considerable gender pay gap in the EU, the fact that women are more likely to have low-wage, part-time and otherwise precarious jobs, the rising demand for STEM practitioners, and the importance of STEM‑related careers for the future of the European economy, increasing the share of women in the STEM sector is critical to fulfilling women's rights and potential and to building a more sustainable and inclusive economy and society through scientific, digital and technological innovation; highlights that high-level STEM skills are critical to the process of innovation in cutting-edge ICT areas such as AI and cybersecurity and will be increasingly important to the EU's competitiveness on global markets; underlines, therefore, that the full potential of women's skills, knowledge and qualifications in these fields can help to boost the European economy and support the goals defined in various EU policies, above all the European Green Deal and the Digital Agenda;

2.   Reiterates that the main goal should be to remove all barriers, in particular sociocultural, psychological and pedagogical barriers that restrict women's and girls' interests, preferences and choices, including gender stereotypes, gender discrimination and a combination of biological and social factors, notably that of motherhood with the most decisive periods in women's careers, without compromising women's freedom to make decisions; encourages the Member States to promote the participation of women and girls in STEM studies and careers in their relevant national or regional gender action plans or strategies by providing adequate incentives; considers that these action plans or strategies should, among other initiatives, aim to increase gender equality by focusing on the eradication of gender stereotypes, the facilitation of access to education and qualifications, a better work-life balance, equal opportunities, ensuring healthy and safe working and studying environments for women, non-discrimination in the labour market, raising awareness of gender bias and stereotypes across all STEM-relevant sectors, establishing mandatory pay transparency policies, implementing zero tolerance for sexual harassment, and increasing the visibility of female role models;

3.   Reiterates that gender stereotyping, cultural discouragement and a lack of awareness and of promotion of female role models hinders and negatively affects girls' and women's opportunities in STEM studies, in related careers and digital entrepreneurship, and can lead to discrimination and fewer opportunities for women in the labour market;

4.   Reaffirms the importance of integrating the awareness of gender bias across all relevant sectors, including in the initial and continuous training of teachers; highlights the need to address structural barriers, such as socio-economic disadvantage and hostile working environments and working conditions for women, which hinder girls and women from entering a predominantly male-dominated field, and the need to increase the visibility of hitherto undervalued role models in order to inspire women and girls; calls on the Commission to introduce and support awareness-raising campaigns and other programmes and initiatives to reduce these barriers in the academic world; stresses that gender equality measures such as the removal of gender stereotypes in education,

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[17] European Commission and European Investment Bank, *Funding women entrepreneurs: How to empower growth*, 2018.

awareness-raising, the promotion of STEM subjects for girls and women and careers guidance to encourage girls to consider studying in male-dominated fields would lead to a higher number of women graduating in STEM subjects;

5. Calls on the Member States to combat gendered labour market segmentation in STEM careers by investing in formal, informal and non-formal education, lifelong learning and vocational training for women to ensure their access to high-quality employment and opportunities to reskill and upskill for future labour market demand and prevent a vicious circle of gender segregation of labour; calls on the Commission and the Member States to devise policy measures that fully incorporate the gender dimension through awareness-raising campaigns, training, school curricula and, in particular, careers guidance, in order to promote entrepreneurship, STEM subjects and digital education for girls from an early age with a view to combating existing educational stereotypes and ensuring that more women enter developing and well‑paid sectors; emphasises the need to involve the media, including social media, to encourage the use of inclusive language and to avoid stereotypes that lead to the formation of opinions against girls' participation and interest in STEM education; calls for STEM facilities to be improved and equal access to them to be guaranteed; calls for specific scholarships for girls and women who wish to pursue a career in the STEM sector;

6. Calls on the Commission and the Member States to take specific account of the situation of women and girls from disadvantaged socioeconomic backgrounds, such as those with disabilities or those living in outermost regions or rural areas, women in poverty, single mothers, students in precarious situations, migrant women and Roma women, and to ensure their full access to and inclusion in digital education and STEM careers in order to prevent the digital divide from widening; calls on the Commission and the Member States to pay careful attention to intersectional discrimination and bias due to ethnicity, religion, sexual orientation, age or disability when devising their action plans; calls on the Commission and the Member States to collect comparable, harmonised data to track the progress of women from different socioeconomic backgrounds or racial and ethnic origins through all educational levels, including with regard to their career choices and development, focusing on inequalities in the STEM and digital sectors, which will help to monitor the impact of policies and enable stakeholders to identify shortcomings and their root causes; calls on the Commission to cooperate with the Member States to broaden the indicators used for the Women in Digital Scoreboard so that they include information and data on women in STEM education and careers and to develop a toolkit that includes methodologies, indicators and frameworks to produce more precise data and improve the use of existing information;

7. Calls on the Member States to offer their full support for the Commission's initiatives to raise awareness of digital opportunities, such as the 'no women, no panel' approach, the EU Code Week, the Digital Skills and Jobs Coalitions, the EU Prize for Women Innovators, the Europe-wide #SaferInternet4EU initiatives and the Skills Agenda for Europe;

Education

8. Welcomes the Digital Education Action Plan 2021-2027 and its action to 'Encourage women's participation in STEM', and hopes that it will help to develop more attractive and creative ways to encourage girls to pursue STEM studies, as well as boost women's

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self-confidence in their digital skills; stresses that girls only go on to account for 36 % of STEM graduates[18] despite outperforming boys in digital literacy[19]; highlights that girls who assimilate gender stereotypes have lower levels of self-efficacy and less confidence in their ability than boys and that self-efficacy has a considerable impact on both STEM education outcomes and aspirations for STEM careers; stresses that girls appear to lose interest in STEM subjects with age, which suggests that interventions are needed as early as pre-school and primary school in order to sustain girls' interest in these fields and fight harmful stereotypes on gender roles for both girls and boys; calls on the Commission and the Member States to create new channels to connect with girls and ensure that digital education reaches them all, and to recognise and invest in teachers as the drivers of cultural change given their potential to boost the continuing participation of girls in science at school; suggests that these endeavours should be stepped up with the development of common guidelines for the Member States with the aim of improving the knowledge and skills of those starting secondary education; calls for the efficient use of EU funds, programmes and strategies including Erasmus+, the European Social Fund Plus (ESF+) and the Digital Europe Programme in order to actively encourage girls to undertake studies in ICT and STEM subjects and to provide effective support for lifelong learning and training in STEM sectors; calls for gender equality to be duly incorporated in the future EU youth strategy and policies;

9. Stresses that high-quality, inclusive and non-discriminatory digital education must play a substantial role in increasing the participation of girls and women in ICT and STEM-related fields and eliminating the digital gender gap; emphasises that digital education must create better digital inclusion and digital literacy and ensure the equal participation of girls and women in the digital age; underlines the importance of ensuring gender mainstreaming in STEM education at all levels, including in extra-curricular, informal and non-formal education, as well as for teaching staff; calls, therefore, for specific age-appropriate strategies; encourages the Member States to promote computer science education in national curricula and calls on educational bodies to integrate the subjects of robotics, coding, ICT and programming at an earlier stage of pre-school and primary education in order to encourage girls and female students to take up mathematics, coding, ICT classes and science subjects at school;

10. Recognises the role of schools and teachers in eliminating the gender gap in STEM education and highlights the role of education in promoting the presence of girls in STEM-related courses and in establishing benchmarks to monitor female recruitment and retention; calls on the Member States to invest in developing the skills of primary and secondary STEM teachers to help them to understand and address unconscious preconceptions in their teaching practices and assessments and to engage all learners equally; emphasises the need for the Member States to involve the entire teaching profession in STEM movements and to engage teachers as agents of change; proposes that equality plans be drawn up by educational establishments to promote gender balance among teachers; calls for STEM curricula and educational materials to be strengthened in order to better promote equal participation in STEM; calls for better careers guidance and for new and creative ways to inspire female students to consider a STEM career path; highlights the need, in this regard, to strengthen the capacity of teachers and careers advisers to encourage girls who show an interest in STEM to

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[18] European Commission, *She Figures 2018*.
[19] International Computer and Information Literacy Study (ICILS) 2018.

pursue a career in it, as a better awareness of stereotypes and gender disparities in STEM enables educators and careers advisers to understand the barriers faced by their students, ensure equal participation in STEM classes and promote STEM careers to female students;

11. Highlights the fact that male teachers and other male staff dominate STEM-related studies in schools, universities and workplaces, leading to an absence of female role models and limited guidance and mentoring opportunities; encourages gender mainstreaming in primary, secondary and tertiary education through gender-sensitive educational content, teacher training and curricula, and urges the committees and institutions involved in recruitment to promote a gender balance to avoid the 'outsider effect'; emphasises the need for investment in education and training with gender-sensitive recruitment and selection processes across educational sectors, especially in STEM and emerging digital sectors, where women are under-represented; calls on the Commission and the Member States to find more attractive and creative ways to showcase female role models with successful careers in ICT and STEM in order to boost girls' self confidence in digital skills and encourage them to pursue ICT and STEM-related studies;

12. Stresses the need to address financial education, including simulations of financial practices, and its relationship with the gender pension gap; highlights that teaching younger women about subjects like the gender pay gap will pave the way for a future filled with financially confident women;

13. Notes that every girl should be able take advantage of greater access to world-class digital learning solutions and have the tools and motivations to engage with digital technologies as users and creators; calls on the Member States to take into account ongoing concerns about the risk of the further spread of COVID-19 and to tackle the lack of ICT equipment and connectivity for vulnerable students from socioeconomically disadvantaged backgrounds, such as girls in rural areas or areas that are difficult to reach, and to develop tools to ensure full access to and the smooth functioning of digital education; emphasises the need for special funding programmes for schools in rural areas, which are increasingly finding themselves without the funding for advanced technologies that many urban school districts take for granted; calls, in addition, for better support for educators in rural school systems to help them teach STEM curricula, with particular regard to training, tools and infrastructure;

14. Underlines the importance of developing networks for women STEM professionals for large-scale communication campaigns to help transform perceptions of women in STEM and for women in STEM to connect with girls through careers support, skills training and networking; commends the various educational initiatives designed to support girls and promote women in the digital economy, including the use of viral social media stories, professional networks organised by women, for women, and initiatives by tech companies; calls on the Commission and the Member States to set up mentoring schemes with female role models in STEM within all levels of education; calls on the Commission to adopt a targeted gender approach in the rollout of traineeships for digital opportunities to give young women from different backgrounds the chance to get hands-on digital, ICT and STEM experience in fields that are in demand on the labour market, and strongly encourages the promotion of internships in STEM businesses during education; encourages the Member States to create initiatives

to support girls' school-to-work transition, such as careers guidance at school, apprenticeships and work experience programmes, with a view to supporting girls' future aspirations and creating pathways for them to transition into the STEM workforce;

15. Notes that in its conclusions of May 2015 on the European Research Area Roadmap for 2015-2020, the Council – to no avail – called on the Commission and the Member States to start translating national equality legislation into effective action in order to combat gender imbalances in research institutions and decision-making bodies and integrate the gender dimension better into research and development policies, programmes and projects; recognises the Commission's objective to encourage the participation of women in STEM with the European Institute of Innovation and Technology and support the EU STEM Coalition to develop higher education curricula which attract women to engineering and ICT; regrets the fact that unequal access for women to research positions, funding and publishing still persists, including an unadjusted gender pay gap in science and academia, despite legal provisions on equal treatment and non-discrimination on the labour market, including on equal pay, being in place in the EU and Member States;

16. Highlights the number of cases of sexual harassment suffered by female STEM students in tertiary education and calls on the Member States and educational institutions to enact zero tolerance policies for sexual harassment, to agree on strict codes of conduct and protocols, to create safe and private reporting channels for women and girls, and to report all cases of sexual harassment to the relevant authorities; calls on the Commission, the Member States and educational institutions to adopt preventive measures and adequate sanctions for the perpetrators of sexual harassment in order to tackle sexual harassment in schools and STEM educational facilities;

17. Emphasises the need to include gender-responsive STEM learning and career opportunities in national development plans and policies for the education sector, ICT and science;

Careers

18. Regrets the fact that women face disproportionately more obstacles in their careers than men owing to the lack of a proper work-life balance and an increase in unpaid care work in most households; notes that the COVID-19 pandemic has further aggravated the situation of women, who have had to balance overtime remote working while caring for children and doing unpaid care work; laments the particularly negative impact of the 'always on' culture on the work-life balance of workers with caring responsibilities, who tend to be women; urges public and private institutions to ensure that telework takes into consideration the obstacles in maintaining a better work-life balance and respects the right to disconnect, and to adopt family-friendly policies; urges the Member States to establish adequate measures to guarantee zero tolerance policies for sexual harassment, better maternity leave, significantly more and longer paternity leave, and paid and non-transferable parental leave that will allow women and men to take time off to care for their children, and to combat the norm of the woman being the parent to take a career break in order to overcome a major barrier to women advancing their careers, as well as ensuring flexible working hours, on-site childcare facilities and telework; urges the Member States to fully transpose and implement the Work-Life Balance

Directive[20] and calls on the Commission to monitor it effectively; calls on the Commission and the Member States to fully assess the causes and factors that lead to a high drop-out rate from STEM careers among women, to formulate recommendations for action to prevent this, if necessary, and to develop mechanisms and programmes to involve women and girls in education, training and employment initiatives and adopt adequate policies and measures to this end; emphasises that COVID-19 is opening a new chapter in the world of work, education, governance and everyday life and has highlighted the particular importance of digital literacy and skills and the need for new conditions on teleworking, which have shown a significant gender divide during the pandemic and ensuing lockdowns; highlights the urgent need to promote gender balance in the digital sector given how people and companies use ICT and other digital technologies to work and interact in the new digital society;

19. Deems it of the utmost importance to have more female role models and to increase the number of women in leadership positions in the STEM sector; stresses that the declining percentage of women in higher positions has an adverse effect on the recruitment of women, which further reduces the odds of women being appointed to higher positions; regrets the fact that women are under-represented in leadership positions in STEM careers and highlights the urgent need to promote gender equality at all levels of decision-making in business and management; underlines that gender diversity on boards and in decision-making positions improves business performance as a result of a broader spectrum of knowledge, attitudes and experience; deplores the existence of both horizontal and vertical gender segregation in the hierarchies of universities and schools in Europe; draws attention to the fact that women are particularly under-represented in top academic and decision-making positions in academic institutions and universities, indicating the existence of a glass ceiling – invisible barriers of prejudice preventing women from reaching positions of responsibility; urges the Council and the Member States to adopt the proposed Women on Boards Directive and to establish targets for gender balance on decision-making bodies;

20. Regrets the fact that the gender pay gap remains a reality and is even more pronounced in male-dominated sectors, such as ICT and technological companies[21]; calls on all actors to practice pay transparency; urges the Council to unblock the proposed directive on implementing the principle of equal treatment between persons irrespective of religion or belief, disability, age or sexual orientation, which aims to extend protection against discrimination through a horizontal approach;

21. Calls on all the relevant stakeholders to address discrimination in their hiring practices and to introduce quotas to promote the inclusion of women, especially women from diverse racial and ethnic backgrounds, women with disabilities and LGBTI+ people;

22. Encourages the establishment of an inclusive dialogue with the relevant stakeholders, such as private companies, non-governmental organisations, professional orders and institutes, state institutions, regional and local authorities, policymakers and civil society representatives, in order to coordinate and tackle the missing links to promote women in STEM; stresses that in view of the paramount importance of fighting cultural

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[20] OJ L 188, 12.7.2019, p. 79.

[21] Lambrecht, A. and Tucker, C. E., 'Algorithmic bias? An empirical study into apparent gender-based discrimination in the display of STEM career ads', *Management Science*, Vol. 65, No 7, 2019, p. 2970.

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and social stereotypes against women's abilities and roles in the STEM sector, targeted measures should be adopted to promote gender equality such as gender mainstreaming legislation or policies such as financial incentives or other measures in order to increase girls' participation in STEM education and careers; calls for incentives to be provided to companies that support female role models, mentoring programmes and career paths, and for the visibility of women to be increased; recognises the essential role played by certain CEOs and senior management people in closing the digital gender gap by developing corporate policies aimed at combating digital gender-related stereotypes, promoting role models, motivating women to explore STEM studies, stimulating the reskilling or upskilling of women, promoting mentoring schemes, and improving the image of ICT jobs; calls on the Commission and the Member States to further engage with all ICT, digital, telecoms, media, audiovisual and technological business partners to promote an inclusive and gender-balanced working culture and environment, including by introducing measures such as awareness campaigns to promote gender equality in the private STEM sectors and public-private partnerships to facilitate access to the STEM labour market for recently graduated students, with the promotion of apprenticeship schemes and internships for girls and young women to enhance their transition to the labour market, through such initiatives as mentorships and scholarships for disadvantaged girls, and with public-private partnerships between education systems, governments and companies that work in emerging technologies, such as 3D technologies, AI, nanotechnology, robotics and gene therapy, and to share information and good practices across the Member States to this end;

23. Highlights the relationship between the gender gap and the pension gap; calls on the Member States, therefore, to tackle and reduce these and to take further steps to ensure that women can get adequate access to education, the chance to attain economic independence and career progression opportunities;

Digital sector

24. Regrets the fact that the gender gap exists across all digital technology domains, but is especially concerned about the gender gap in innovative technologies, such as the AI and cybersecurity domains, where the average worldwide female presence stands at 12 % and 20 % respectively[22]; proposes that more attention and support should be devoted to sparsely populated and particularly rural areas, where this situation is getting worse;

25. Stresses that the quality of the data sets used is paramount for the performance of AI technologies, that AI must not reinforce gender inequalities and stereotypes by transforming bias and prejudices from the analogue to the digital sphere on the basis of algorithms, and that AI can contribute significantly to promoting gender equality, provided that an appropriate legal framework is developed and conscious and unconscious biases are eliminated; highlights that one of AI's most critical weaknesses relates to certain types of bias such as gender, age, disability, religion, racial or ethnic origin, social background or sexual orientation as a result of a homogeneous workforce; notes that intersectional types of discrimination leave women marginalised from

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[22] Sax, L. J., Kanny, M. A., Jacobs, J. A. et al., 'Understanding the Changing Dynamics of the Gender Gap in Undergraduate Engineering Majors: 1971-2011', *Research in Higher Education*, Vol. 57, No 5, 2016; Shade, L. R., 'Missing in action: Gender in Canada's digital economy agenda', *Signs: Journal of Women in Culture and Society*, Vol. 39, No 4, 2014, pp. 887-896.

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emerging technologies, such as women of colour owing to errors in facial recognition technology; emphasises the need for diverse teams of developers and engineers to work alongside key societal actors to prevent gender and cultural biases from being inadvertently included in AI algorithms, systems and applications; supports the creation of educational curricula and public-awareness activities concerning the societal, legal and ethical impact of AI; calls on the Commission and the Member States to take all possible measures to prevent such biases and to ensure the full protection of fundamental rights; stresses that human oversight infrastructure must be developed before AI technologies are rolled out in high-risk sectors, notably health, and must include gender equality experts;

26. Recognises that AI, if it is free of underlying biases, can be a powerful tool to overcome gender inequalities and stereotypes through the development of unbiased, ethical-by-design algorithms that contribute to overall fairness and well-being; stresses the importance of a common European approach with regard to the ethical aspects of AI; stresses, in addition, that EU AI policy and legislation must respect European values, EU Treaties and laws, and the principles of the European Pillar of Social Rights;

27. Calls for all AI and automation to be socially responsible and designed in such a way as to enable us to overcome inequalities including gender discrimination and to address the challenges faced by women such as unpaid care work, the gender pay gap, cyberbullying, gender-based violence and sexual harassment, trafficking, violations of sexual and reproductive rights, and under-representation in leadership positions; calls for AI and automation to contribute to the enhancement of women's health and economic prosperity, equality of opportunities, workers' and social rights, quality education, the protection of children, cultural and linguistic diversity, gender equality, digital literacy, innovation and creativity, including access to finance, higher education and flexible work opportunities; calls on the Commission to help Member States' competent authorities to devote particular attention to new forms of gender-based violence such as cyber harassment and cyberstalking[23] and to carry out ongoing evaluations and address these issues more effectively;

Entrepreneurship and access to finance

28. Regrets the fact that women are under-represented in innovation-driven business start-ups and highlights the gender biases and systemic disadvantages that exist in social structures, particularly those at the intersection of STEM and entrepreneurship; considers it of the utmost importance to have more female role models and to increase the number of women in leadership positions in the STEM sector; calls on the Commission and the Member States to enact policies to support and unleash the entrepreneurial potential of women, who remain an untapped source of economic growth, innovation and job creation, to provide more and better information about entrepreneurship as an attractive career option, especially for young women in school, and to implement public policies that promote female entrepreneurship; considers that the COVID-19 recovery represents a significant opportunity to advance women entrepreneurs to enable them to rebuild our economies and societies; underlines that a genuine COVID-19 recovery will only be a success if a greener, fairer and more gender-equal Europe is attained and adequate gender mainstreaming of EU recovery

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[23] EU Agency for Fundamental Rights, *Violence against women: an EU-wide survey*, 2014, p. 87.

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funds is secured, while also ensuring that women reap the full benefits in terms of employment and entrepreneurship in sectors where they have traditionally been and continue to be significantly under-represented, including digital, AI, ICT and STEM;

29. Considers the under-representation of women in charge of investment decisions at venture capital firms to constitute a major source of the persistent funding gap for women-driven start-ups and enterprises;

30 Calls on the Commission and the Member States to increase financing opportunities to loans and equity finance for women start-up entrepreneurs and innovators through EU funds and programmes, to facilitate women's access to existing funds, to create dedicated funds, and to seek new and innovative ways to support women financially and help them to overcome the barriers they face; calls for the European Investment Bank to also be included with regard to access to microfinance; recognises the need for awareness-raising and information campaigns about EU funding possibilities to provide tailored support to women business owners and women entrepreneurs; calls for the European Business Angels Network and European Network of Mentors for Women Entrepreneurs to be further expanded, including by promoting gatherings of women innovators, tech professionals and investors to stimulate and boost innovation and funding for women-led ventures;

31. Welcomes the Commission's initiative establishing the EU Prize for Women Innovators, which is awarded every year to European women who have founded a successful company and brought an innovation to market; calls on the Commission and the Member States to find additional ways to encourage more women to start up their own companies and to celebrate inspiring female leaders in innovation;

32. Calls on the Commission and the Member States to implement the Declaration of Commitment on Women in Digital adopted in April 2019 and to develop concrete actions to promote gender equality in the STEM sector, including the creation of the European Girls in ICT and STEM day; calls on the Commission to monitor and report on Member States' efforts and actions and to ensure the exchange of information and good practices;

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33. Instructs its President to forward this resolution to the Council and the Commission.

INFORMATION ON ADOPTION IN COMMITTEE RESPONSIBLE

Date adopted	22.4.2021	
Result of final vote	+: 26 −: 1 0: 4	
Members present for the final vote	Simona Baldassarre, Robert Biedroń, Vilija Blinkevičiūtė, Annika Bruna, Maria da Graça Carvalho, Margarita de la Pisa Carrión, Rosa Estaràs Ferragut, Frances Fitzgerald, Cindy Franssen, Heléne Fritzon, Lina Gálvez Muñoz, Arba Kokalari, Alice Kuhnke, Elżbieta Katarzyna Łukacijewska, Karen Melchior, Andżelika Anna Możdżanowska, Maria Noichl, Sandra Pereira, Pina Picierno, Sirpa Pietikäinen, Samira Rafaela, Evelyn Regner, Diana Riba i Giner, Sylwia Spurek, Jessica Stegrud, Hilde Vautmans, Elissavet Vozemberg-Vrionidi, Chrysoula Zacharopoulou, Marco Zullo	
Substitutes present for the final vote	Elena Kountoura, Susana Solís Pérez	

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INFORMATION ON ADOPTION IN COMMITTEE RESPONSIBLE

Date adopted	22.4.2021
Result of final vote	+: 26 −: 1 0: 4
Members present for the final vote	Simona Baldassarre, Robert Biedroń, Vilija Blinkevičiūtė, Annika Bruna, Maria da Graça Carvalho, Margarita de la Pisa Carrión, Rosa Estaràs Ferragut, Frances Fitzgerald, Cindy Franssen, Heléne Fritzon, Lina Gálvez Muñoz, Arba Kokalari, Alice Kuhnke, Elżbieta Katarzyna Łukacijewska, Karen Melchior, Andżelika Anna Możdżanowska, Maria Noichl, Sandra Pereira, Pina Picierno, Sirpa Pietikäinen, Samira Rafaela, Evelyn Regner, Diana Riba i Giner, Sylwia Spurek, Jessica Stegrud, Hilde Vautmans, Elissavet Vozemberg-Vrionidi, Chrysoula Zacharopoulou, Marco Zullo
Substitutes present for the final vote	Elena Kountoura, Susana Solís Pérez

FINAL VOTE BY ROLL CALL IN COMMITTEE RESPONSIBLE

26	+
PPE	Maria da Graça Carvalho, Rosa Estaràs Ferragut, Frances Fitzgerald, Cindy Franssen, Arba Kokalari, Elżbieta Katarzyna Łukacijewska, Sirpa Pietikäinen, Elissavet Vozemberg-Vrionidi
Renew	Karen Melchior, Samira Rafaela, Susana Solís Pérez, Hilde Vautmans, Chrysoula Zacharopoulou, Marco Zullo
S&D	Robert Biedroń, Vilija Blinkevičiūtė, Heléne Fritzon, Lina Gálvez Muñoz, Maria Noichl, Pina Picierno, Evelyn Regner
The Left	Elena Kountoura, Sandra Pereira
Verts/ALE	Alice Kuhnke, Diana Riba i Giner, Sylwia Spurek

1	-
ECR	Margarita de la Pisa Carrión

4	0
ECR	Andżelika Anna Możdżanowska, Jessica Stegrud
ID	Simona Baldassarre, Annika Bruna

Key to symbols:
+ : in favour
- : against
0 : abstention

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