



GENDER INEQUALITY AND WOMEN IN STEM: BARRIERS AND SOLUTIONS

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INTRODUCTION

Despite various initiatives aimed at inclusion, gender disparity continues to persist across Science, Technology, Engineering, and Mathematics (STEM) fields, limiting opportunities and representation for women. Gender equity in STEM is significant to enhance multiple perspectives, spur innovation, and make sure technology brings advantages for all groups in society. Although women earn nearly half of all bachelor's degrees in STEM fields in the United States, they remain underrepresented in the workforce. Women hold only 34% of STEM jobs, and there is less representation in engineering (15%) and computer science (25%), as reported by the National Science Foundation (2020). This gap impacts innovation, economic development, and social advancement. This article examines structural, educational, and cultural constraints on women's participation in STEM and considers how to promote gender equality.

Constraints to Women's Participation in STEM

Implicit Bias and Stereotypes

Implicit bias strongly shapes how people perceive women's ability to work in STEM.

Early on in life, one identifies technical and analytical skills as male, so women question whether they can accomplish such work. Extensive research has demonstrated the stereotype threat effect, showing that negative stereotypes can hinder performance. For instance, reminders of gender discrimination before a math exam tend to lower women's performance, as studies have shown. These stereotypes not only disrupt academic success but also hiring results and professional development in STEM professions.

Educational And Institutional Challenges

Implicit biases and structural barriers cause gender disparities in STEM education.

Teachers and mentors can unwittingly set lower expectations for girls in math and science, not encouraging them to enroll in higher-level courses. To give an example, a study by Cimpian et al. (2016) found that teachers perceive boys to be inherently more mathematically gifted and thus provide them with lower encouragement and less access to higher-level problem-solving for girls. This contributes to the increase in the gap of higher education in STEM fields and career ambitions between males and females. A study in the Journal of Educational Psychology found that female students with female instructors in STEM fields were more likely to continue their studies, underscoring the importance of representation. Additionally, limited exposure to female role models in STEM careers reduces young women's aspirations to enter these fields.

Workplace Culture And Career Progression

Women in STEM face challenges beyond education, including workplace culture and career advancement obstacles.

Disciplines such as technology, engineering, and physics are characteristically gendered with strong imbalances in gender distribution and predominantly male environments that form the foundation for exclusionary cultures. The technology sector has come under fire specifically for upholding a 'bro culture' that dissuades women from entering and professionally developing. STEM work environments are largely male and defined by gendered hierarchies, gender differences in compensation, and limited access to mentorship. The "bro culture" prevalent in the tech world is exclusionary, discouraging women from staying in the profession. Moreover, work-

life balance practices are typically not sufficient, falling disproportionately on women with caregiving responsibilities. Thus, many women leave STEM careers at higher percentages than men, perpetuating the gender gap.

Strategies for Fostering Gender Equity in STEM

Encouraging Early STEM Engagement among Girls

Early introduction is paramount to closing the gender gap in STEM. Programs such as Girls Who Code and summer camps with a STEM focus have helped get girls on board with hands-on exposure and mentoring. Schools, too, can help bolster the process by introducing STEM-focused coursework and crafting inquiry-based learning spaces that foster active engagement by all students.

Closing Implicit Bias and Designing Inclusive Environments

Schools and workplaces need to implement training programs to eradicate implicit biases and foster inclusive cultures. Workshops for teachers, hiring managers, and peers can help foster cultures that actively respect and support women. Additionally, revising educational materials to include diverse role models in STEM can fight stereotypes and motivate future generations.

Boosting Mentorship and Networking Opportunities

Mentorship programs are at the core of supporting women in STEM. By providing students and professionals with seasoned mentors, mentorship programs provide tips, career counsel, and contacts. Institutions such as the Society of Women Engineers (SWE) and Women in Technology International (WITI) deliver major support to help women move forward in STEM careers.

Organizations can implement changes to improve the workplace.

Institutions and organizations must adopt fair pay practices, flexible scheduling of work, and transparent recruitment and promotion procedures. Google has been able to augment its numbers of female workers with unconscious bias training and targeted recruiting practices. We must implement equitable career progress and leadership strategies across genders to maintain the gains achieved.

Case Studies Demonstrating Progress

National Girls Collaborative Project (NGCP)

The NGCP convenes organizations, educators, and policymakers to foster young girls' engagement in STEM. Through hands-on activities and mentorship programs, it has greatly enhanced women's participation in STEM education and careers.

Corporate Initiatives: Google's Diversity Programs

Google has instituted policies to promote gender diversity, such as recruitment processes, leadership development initiatives, and company-wide inclusion training. These have resulted in a steady increase in female presence, especially in technical positions.

Cultural Influence: Hidden Figures and Media Portrayal

Hidden Figures-type movies have been crucial in raising awareness about women's contributions to STEM.

By showing the achievements of pioneering female scientists and engineers, such cultural depictions inspire young women to pursue STEM. Studies show that media exposure boosts female participation in STEM by providing relatable role models for young girls.

CONCLUSION

Gender disparity in STEM is a complex issue that requires systemic

change at multiple levels.

Addressing this problem is not only crucial for ensuring equal opportunity but also for advancing innovation and economic development. Through inclusive learning environments, embracing workplace reforms, and stimulating mentorship and representation, society can foster a more diverse and equitable STEM workforce. Encouraging women's participation in STEM is not just a moral imperative but a strategic imperative for global progress. Policymakers and teachers must first aim at prioritizing inclusive policies, merit scholarships, and mentoring programs to ensure women enjoy equal opportunities in the STEM field.