

# Promoting Gender Equality in Cybersecurity through Education and Mentorship

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## ABSTRACT

The rapid advancement of technology has resulted in greater interest in cybersecurity as a professional ICT field. However, a shortage of professionals persists, largely due to the underrepresentation of women. This study examines the challenges women face when pursuing cybersecurity careers, emphasizing the impact of external influences. It recommends specific actions such as structured mentorship programs, targeted educational seminars and workshops, company-education partnerships, salary transparency, and improved workplace environments to encourage women's participation. Additionally, the study highlights the critical role of peer support from fellow women active in cybersecurity and related IT fields, emphasizing community-building as essential for sustainable gender equality.

## CCS CONCEPTS

Security and privacy → Social aspects of security and privacy;  
Social and professional topics → Gender; Social and professional topics → Computing education; Social and professional topics → Employment issues; Social and professional topics → Professional topics

## KEYWORDS

Cybersecurity, gender equality, diversity, computing education, women in computing

## 1 Introduction

The surge in importance of cybersecurity has not diminished the ever-present obstacles related to gender equality and the underrepresentation of women in this field. Despite global progress and increased representation of women across various fields, this issue remains a major setback, limiting potential advancements in cybersecurity as a crucial societal factor. This imbalance deprives the field of talent and weakens its capacity to address new threats.

Therefore, it is critical to recognize and address the obstacles women face through consistent and purposeful educational initiatives. This approach enables the education and preparation of both existing professionals and aspiring female candidates aiming to enter this critical field. The following sections specifically

discuss the different aspects affecting women in cybersecurity, aiming to promote an equal and inclusive environment. The paper achieves this by identifying persistent obstacles and suggesting feasible, practical solutions beneficial to all stakeholders involved.

## 2 Challenges of gender equality in cybersecurity

The field of cybersecurity continuously grows in relevance, impact, and prestige, and is stereotypically considered a male-dominated field. Involvement of women in cybersecurity is a question of equality and equity in terms of prospects for success, recognition, and earning potential. [1]

Education is the entry point to a cybersecurity career, but women often lack encouragement, confidence, and a sense of belonging. Without enough visible representation of women in this field, women interested in cybersecurity are diverted from aiming for positions.[2] Figure 1 shows how the newer generation in the workforce drastically improved regarding race inclusivity, while the gender gap stays consistent through generations. [3]

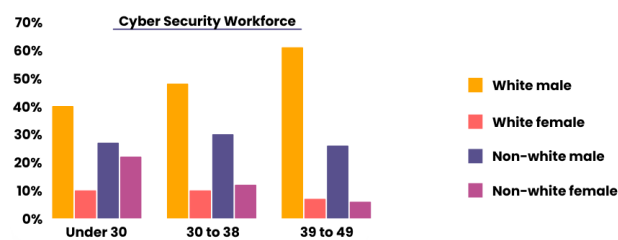


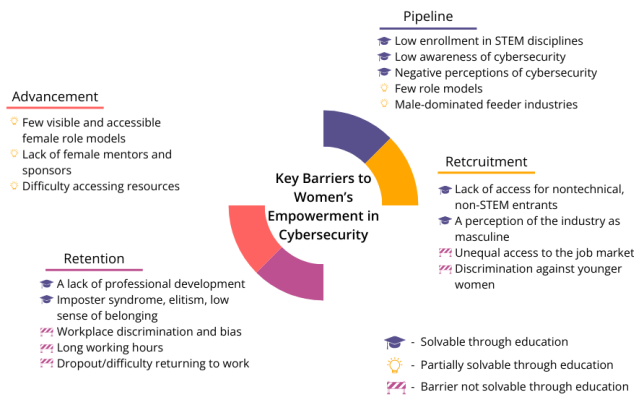
Figure 1: Cybersecurity workforce [3]

We can observe that, although the gap in employment is still observable, the newer generation has bridged the gap significantly, with the percentages slowly but surely, evening out in the category of employees under thirty years of age, with white females still making up only 10% of the total workforce.

Gender bias is one of the cardinal issues in cybersecurity. Despite the qualifications, women are underestimated and undervalued, leading to limited career advancements and poor hiring practices. Gender bias, including assumptions about men's superior technical capabilities, limits women's opportunities. These circumstances mean that women have difficulties reaching

their preferred positions and even getting into this field, resulting in a significant number of prospective women being steered away from various opportunities [4].

The differences in the number of women in this field, as well as the gender pay gap, have various sources. This creates barriers at every step. Luckily, these barriers can be overcome through implementing changes in education. Figure 2 lists out general overview of barriers for women in cybersecurity [5], showing that, even though women encounter many obstacles, more than half can be solved through purposeful education.



**Figure 2: Key barriers to women's empowerment in Cybersecurity [5]**

### 3 Addressing the challenges of gender equality

Addressing gender inequality also improves cybersecurity effectiveness. Gender-diverse teams offer a broader range of experiences, problem-solving methods, and different perspectives on objectives, all necessary given today's increasingly complex cyberattacks. Research consistently demonstrates that gender-diverse cybersecurity teams typically prove to be more effective, efficient, and innovative [6].

The optimal approach to introducing more women into the field of cybersecurity involves companies partnering with educational institutions to deliver more knowledge and familiarize all aspiring women with the current status of this industry, thus encouraging them to carve their career paths in cybersecurity. Additionally, organizing different seminars and workshops is crucial for sparking greater interest among aspiring individuals. Proven programs such as the WiCyS Mentor/Mentee initiative and the ITU Women in Cyber workshops have effectively increased confidence and career interest among women pursuing cybersecurity [7, 8]. Along with these activities, highlighting successful women within the cybersecurity field can significantly boost the confidence and interest of other women considering cybersecurity as their career.

It is also vital to provide quality mentoring from expert senior staff, offering an opportunity for women to become more advanced and experienced. The work environment should actively promote gender diversity through targeted campaigns, providing flexibility to balance both family and work responsibilities. Additionally, workplaces must proactively eliminate prejudice, stereotyping, and

gender bias, thereby explicitly promoting equality in every segment of the field.

Furthermore, it is essential to enforce equal salaries for men and women occupying the same positions, performing identical tasks, and bearing similar workloads. Transparent salary practices have proven effective in significantly reducing gender-based pay disparities, clearly recognizing and respecting women's contributions and skills in cybersecurity roles [9].

One of the most critical steps to ensure gender equality in cybersecurity is for women to actively support each other. Without mutual support and belief, other initiatives may risk becoming ineffective attempts to realize gender equality. Building strong community networks among women has shown a clear positive impact on retention rates and job satisfaction, significantly encouraging more young women to join the cybersecurity field [7].

## 4 Overview/Summary

Improving gender equality in cybersecurity requires extensive societal engagement. Structured educational initiatives, targeted mentorship programs, organized conferences, and highlighting the achievements of women in cybersecurity are effective measures for achieving greater gender equality. Additionally, active participation and mutual support among women within the cybersecurity field significantly encourage more women to join and advance. Therefore, effectively addressing the challenges women face in cybersecurity requires a comprehensive approach explicitly merging structured education, mentorship, encouragement, and broader societal engagement.

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