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ABSTRACT
This study explores the computer industry’s perception of women through the representation of women in computer advertisements and its consequential impact on women’s participation in the computing workforce. Despite significant advancements in combating societal biases, the computer industry continues to propagate gender-imbalanced portrayals in advertising. These portrayals potentially influence women’s educational pursuits and career paths in computing. Our study examines the implications of these portrayals and aims to contribute to the conversation on fostering a more equitable representation of women in the computing domain by highlighting these issues.

KEYWORDS
Gender inequality, Computer advertisements, Expert role

1 Introduction
As Aspray explains, women have historically encountered societal barriers, including cultural expectations, gender roles, and skepticism toward their capabilities [6]. Many institutional barriers also existed, particularly discriminatory admissions policies in educational institutions and workplace environments hostile to women [6]. These barriers’ impact in discouragement or complete prevention of many women from pursuing education and careers in computing should not be ignored.

Zotos et al. state that advertisers use the beliefs of consumers about gender roles to market their products [7]. In addition to this, research conducted by Zayer and Coleman reveals that advertising professional’s perceptions of gender portrayals influence their strategic and creative choices [3]. These findings not only indicate the significance of advertisements in the process of exploring societal perceptions and biases, but also highlight how much effect advertisements have on individual perspectives on gender roles. In addition to this, Gill argues that while on the surface the change in how ads portray women which come with modernity might seem to embrace feminist ideas better, they might be incorporating these themes in a superficial way [5]. Considering this detection, while appreciating the progress in the fight against gender inequality barriers worldwide, one should be aware of the fact that a common societal bias suggesting women cannot succeed in computing persist on the same level. About the reflections on the situation in the computing industry, Turner suggests that the industry has contributed to the idea that women cannot succeed in computing and reinforced the perception that it is a male-dominated field in several ways; such as portraying women less frequently, sometimes objectified in sexualized poses, and often with roles lacking technical know-how in computer advertisements [2]. Besides mirroring societal biases about women in computing, these portrayals may deepen gender inequality within the computing professions.

By examining the depiction of women in computer advertisements, this extended abstract seeks to understand how the computer industry portrayed women, and the impacts of these portrayals on women’s participation in the computing workforce and to explore fostering a more equitable representation for women.

2 Methodology
The research was initiated by the collection of data concerning the historical and current state of women in the computing field. An investigation into the portrayal of women in computer advertisements and its impact on women's participation in the computing workforce was conducted through the examination of studies that performed quantitative and qualitative content analysis on computer advertisements. Since most of the work related to our research area contains information on several minorities, the resources were narrowed down to achieve the specific data of women in computing advertisements. These resources are a book addressing the underrepresentation of women in computing, which served to broaden the understanding of the issue, and three meta-analytic studies on computer advertisements from various periods were utilized to observe the evolution of trends within computer advertisements.

3 Findings
Preliminary findings of our research indicate that the computer industry uses advertisements that contain a significant imbalance in gender representation. Analysis by Turner, on computer advertisements, between 1993-1996, from 170 different advertisers revealed that 10% featured women only, 51% men only, 22% mixed groups of men and women, and 17% primarily men’s hands handling hardware equipment, among those featuring people. Further analysis showed that most of the 83 pictures of women
were very small, and only 17 pictures showed women with, or in front of, computer equipment. Most were product demonstrators or help desk staff, and only one advertisement contained a woman seriously engaged with a computer, while the remainder used women sexually and decoratively [2]. As shown in Figure 1, the findings concerning the premillennial period revealed that the main problem with women’s portrayal in computer advertisements was that they were depicted significantly less than men.

Figure 1: Gender Distribution in Computer Advertisements between 1993-1996 from Turner

A 2006 study by Johnson et al., examined 517 computer ads across various magazines, and showcased that 48.4% featured females, while 51.6% depicted males. Moreover, they reported a decrease in sexualized portraits of women [4]. Similarly, a subsequent study conducted by Bolliger, analyzing 566 advertisements, reported that women were present in 49% of the ads, compared to 51% featuring men [1]. As can be seen in Figure 2 and Figure 3, the findings from recent research into computer advertisements seem to indicate progress in terms of a more uniform distribution between genders.

Figure 2: Gender Distribution in Computer Advertisements in 2006 from Johnson et al.

Figure 3: Gender Distribution in Computer Advertisements in 2008 from Bolliger

However, despite these findings suggesting a positive shift towards a more frequent representation of women in computer advertising and a notable decrease in hypersexualized depictions of women, the study unveiled a persistent issue: a continuing portrayal of women in passive roles. This portrayal subtly insinuates that women are less competent or independent in the computing field, highlighting an aspect of the problem that still requires attention and improvement for a more equitable representation. The study reported that while the advertisements that projected men in an expert role were 4.6% of all ads (with people), ones in which women were in an expert role was 1.5%, less than 3 times the percentage of men. Moreover, the study underscores that gendered advertisements not only influence individual self-perception and capabilities but also affect educational and career paths for women [4]. Thus, as shown in Figure 4, the focus of the problem with gendered computer advertisements should shift from quantity to quality.

Figure 4: Expert Role Distribution in Computer Advertisements in 2006 from Johnson et al.

4 Conclusion

The evidence presented in this extended abstract underscore a persistent and gendered portrayal in computer advertisements that not only reflects but also potentially exacerbates the biases of society and industry against women in the computing field. Despite an increase in the appearance percentage of women and a noted reduction in the objectification of women, the continuation of depicting women in passive or non-technical roles within computer advertisements suggests an ongoing challenge in dismantling stereotypes that contribute to the underrepresentation of women in computing fields. Our study highlights the necessity of further research on the topic, and critical need for a shift towards more equitable and diverse representations of women in computer industry advertisements. By doing so, we can challenge and change outdated stereotypes, encourage a more diverse demographic to pursue careers in computing, and ultimately contribute to a more inclusive and representative workforce for women in computing.

REFERENCES