Gender, Race, Social Class, and Information Technology

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INTRODUCTION

The issue of the underrepresentation of women in the information technology (IT) workforce has been the subject of a number of studies, and the gender gap was an issue when the digital divide dominated discourse about women's and minority groups' use of the Internet. However, a broader view is needed. That perspective would include the relation of women and IT in the communities in which they live as well as the larger society. The information society that has emerged includes the United States (U.S.) and the globalized economy of which it is an integral part.

Women and minorities, such as African Americans and Latinos, are underrepresented in computer science (CS) and other IT positions in the U.S. In addition, while they are no longer numerically underrepresented in access to computers and the Internet, as of 2000 (Gorski, 2001), they continue to enjoy fewer benefits available through the medium than white boys and men. The following article explores the diversity within women from the perspectives of race, ethnicity and social class in North America, mainly the U.S.

The technology gender and racial gap persists in education and in the IT workforce. A broader and deeper look at women's positions in relation to the increasingly techno-centric society reveals that women may have reached equality in access, but not in academic study and job opportunities.

BACKGROUND

Linebarger (2003) pointed out three traditional digital divide constructs: "family socioeconomic status," "location of access to new technologies" and "gender/race" for school-age children. Inequities tend to appear along both social class and gender lines, with male students and students from high socioeconomic status backgrounds well positioned to outpace female students and students from lower socioeconomic backgrounds in terms of computer skills and knowledge (Lockard, Abrams, & Many, 1987).

Equality in Access, but No Equity in IT Jobs

The gender digital divide refers to the gap in access rates between men and women (Gorsky, 2001). Based on this traditional gender digital divide definition, the gender digital divide gap has narrowed to reach "access equality." In 2002, 83% of American family households owned a computer (Corporation for Public Broadcasting, 2004). About the same proportion of adult men and women had access to home computers. The digital connectedness of American families was increased through home computer ownership. In 2001, 59% of American people had connections at home. By the end of 2000, women surpassed men to become a majority of the U.S. online population (Gorski, 2001).

The societal race and gender gaps in the U.S. as a whole have narrowed in the past 10 years, but in the IT field, the gender gap generally appears to be wider at all levels of employment. Overall growth in these IT occupations was so strong during the decade of the 1990s that women working in IT continued to increase through the year 1996. According to D'Agostino (2003), in 1996, women occupied 41% of jobs in the IT field. The ITAA (2003) recorded a decline to 34.9% by 2002.

The situation is worse in highly professional positions, such as computer programmers and com-

Table1. Representation of women in various IT jobs in 2002

Information Technology Occupations	% Men	% Women
Computer systems analysis and scientists	72.2 %	27.8 %
Operations and systems researchers and analysts	51.3 %	48.7 %
Computer programmers	74.4 %	25.6 %
Computer operators	53.2 %	46.8 %
Data entry keyers	18.3 %	81.8 %
Total IT occupations	65 %	35 %

puter systems analysts, where women tend to lag far behind men. Table 1 shows how women are over represented in lower IT positions, while there are few women in professional CS fields.

However, the potential exists for this situation to change. Kvasny (2003) reports that minority women in low-income communities perceive IT as a means of escaping poverty, while highly educated, middle-class and professional women regard IT as offering fewer opportunities for advancement. Kvasny suggests that IT and gender studies recognize the diversity within women.

Gains in Access, but Loss in CS Major

The problem of underrepresentation of women in IT starts from the math and science pipeline at school. Through high school, girls are less likely than boys to enroll in CS classes, and the disparity increases in programming courses.

The American Association of University Women (AAUW) commissioned early studies on the gender gap in education (1992, 1998). The first study noted the barriers faced by children from lower socioeconomic status. It also pointed out that African American girls had fewer interactions with teachers, even though they tried to initiate such interactions. By the latter AAUW study, the issue of technology had emerged. The report noted that a gender gap had begun to appear in CS classes. Girls made up only a small proportion of students in such classes, and the gap widened between grades eight and eleven. The study reported that boys exhibited a higher degree of self-confidence about computer skills than girls.

According to the National Council for Research on Women (2002), by the eighth grade, Latinas score higher in math than their male peers; and by 12th grade they do better in science than Latinos, but they are outperformed by their male peers on the math SATs.

A more alarming situation is the trend of fewer women entering the field of CS. Between 1985 and 2002, women went from earning 36% of the CS bachelor's degrees (D'Agostino, 2003) to only 20% in 2002 (Taulbee, 2004). Even when women choose CS as their major, their relative (compared to men) lack of preparation for the coursework and male-dominated classroom climate forces them to drop out of the program (Margolis, 2003).

Table 3 shows the distribution of bachelor's degrees in CS by the race/ethnicity of the recipients for 2001. Analysis of the figures from a gender perspective reveals some interesting patterns. One is that the gender gap is greater among white women than women from underrepresented minorities. Generally, African American and Native American women and Latinas earn more than their share of science and bachelor's degrees than men in their respective groups (National Council on Research for Women, 2002).

White women earned 22% of the CS bachelor's degrees conferred on white males and females, while underrepresented minority women earned 41%

Table 2. Computer science degrees by gender

	Bachelor's	Master's	PhDs
Male	80.6%	73.6%	83.2%
Female	19.4%	26.4%	16.8%

Table 3. Bachelor's degrees in computer science degrees by race/ethnicity and sex of recipients 2001

Race/Ethnicity	Male	Female
White, non-Hispanic	18,479 (78%)	5,296 (22%)
Under represented Minorities	3,892 (59%)	2,663 (41%)
Black, non-Hispanic	2,182 (53%)	1,906 (47%)
Hispanic	1,519 (69%)	680 (31%)
American Indian or Alaskan Native	191 (71%)	77 (29%)
U.S. Citizens and Permanent Residents, Unknown Race/Ethnicity	1,492 (73%)	549 (27%)
U.S. Citizens and Permanent Residents, Total	28,013 (73%)	10,517 (27%)

Source: Taulbee, 2003