

# Analyzing Gender Segregation in Computing

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## INTRODUCTION

Gender appears to be a fundamental category for ordering and classifying social relations in the world (Evans, 1994). The first thing we are told about a newborn is whether it is a boy or a girl. Gender as defined by Acker, (1992, p. 250) is a “patterned, socially produced distinction between female and male, feminine and masculine” and is a key concept for understanding the degree of male and female participation in any field, including information systems. This review aims at developing an understanding of some of the reasons that underlie (a) the gender segregation that exists within the broad, interrelated fields of computing (information systems (IS), information technology (IT), and computer science (CS)) and (b) the declining levels of female participation in the computing industry across the continents. The three computing disciplines (IS, IT, CS) and the computing profession clearly appear gender segregated, with a male dominance at all levels. As Booth (1999) noted, while one of the first software ever written for a machine was produced by a woman—Ada Lovelace in 1840, it is a male, Charles Babbage—the inventor of the difference calculating machine—that is generally accepted as the founding father of computing. Booth concludes: “And that, in microcosm, has been how the IT industry developed over the next 160 years—a combination of rapid technical advances leading to skills crisis while half the nation’s workforce has been routinely overlooked” (p. 47).

## BACKGROUND: THE GENDER DIVIDE

Even if recent data and trends show a slightly improved scenario, the number of women in comput-

ing still remains a minority. Women participation rates in the IT sector have fluctuated somewhere between 19% and 22% during the 1990s (Robertson, Newell, Swan, Mathiassen, & Bjerknes, 2001), whereas since the early 1990s the overall female participation rate in the labor force has never fallen below 45% (Panteli, Stack, Atkinson, & Ramsay, 1999).

Women continue to be segregated both horizontally and vertically, both in academia and business. In terms of horizontal segregation, women are found working much more often in what are considered to be “softer” aspects of this profession, for example, in sales, marketing and support functions such as help desk and customer service. These areas require superior interpersonal skills and women tend to be gender-stereotyped as almost naturally having such skills (Wilson, 1999). Men continue to dominate in technical areas such as analysts/programmers (Panteli et al., 1999). In terms of vertical segregation, computing is still dominated by men and the imbalance is more striking on the higher levels of the corporate hierarchy (Candee, 1997). Candee provides a number of examples to illustrate this vertical segregation. For example, in the Society of Information Management (SIM), a U.S. organization of senior IT executives, only 195 of its 2700 members were women in 1997. This segregation is reflected in continued wage differential (Panteli et al., 1999) as the average compensation does not rise equally. According to a CRN (2004) salary survey, solution providers handed out bigger raises to male managers than to their female counterparts. In 2003, wages grew an average 7.7% to U.S. \$101,000 for men, while compensation for female managers grew an average of 2% to U.S. \$87,900. Nevertheless, the gender gap among IT managers was found to be smaller than in most U.S. industries. The govern-

ment accounting office (GAO) reported that women in 2000 were being paid 80 cents for every dollar men were paid for similar positions, a gap that has remained relatively steady over the past two decades (CRN, 2004). In contrast, solution providers were paying their female managers 87 cents for every dollar paid to the male managers. The 2004 CRN report also noted that while large IT companies tend to pay better than their smaller counterparts, when it comes to raises, smaller companies tend to be more generous.

Male dominance in the business areas of computing is similarly reflected in academia both in teaching and student enrollment levels. In the teaching area, for example, in the 1998 European Conference on Information Systems (ECIS), only 35 of the 300 participants were women. Female students enrollment rates in computer science courses across the U.S. and Europe at all levels (undergraduate, Masters, and PhD) declined quite dramatically throughout 1980s and 1990s (Lander & Adam, 1997; Panteli et al., 1999). The number of women enrolling in computing courses fell from a high of 28% in 1978, to 13% in 1995, and down to 9% in 1998 (Booth, 1999). In other words, the computing discipline continues to mainly attract men to educational courses and, subsequently, to more senior technical positions in this industry.

This situation is distinctive of the computing field and appears to be the core of the problem. While female participation in computing is at a decline in many other academic fields, women representation in other disciplines has steadily increased and is becoming more reflective of overall population patterns. For example, in the UK, the number of women across all academic disciplines constitutes almost one-half of the undergraduate population (Robertson et al., 2001). Many traditionally male dominated academic disciplines—such as medicine and veterinary sciences—are witnessing significant increases in female participation rates (Grundy, 1996).

In view of the previously mentioned findings, and in an attempt to better understand the reasons of this “gender divide,” it is worthwhile to examine the specifics of gender segregation in computing.

## **ANALYZING GENDER SEGREGATION IN COMPUTING: A REVIEW OF KEY ISSUES**

The gender-based segregation in IT could be considered a reflection of the broader pattern of horizontal and vertical segregation that exists in society, rather than anything specific to computing. This presumption frees the professional community from any responsibility to take action to promote change. If we are to encourage women to enter the field of computer science, information technology, and management information systems, we should focus on promoting a debate within the field to stimulate the necessary changes. Understanding the drivers and key examples of gender segregation is a pre-requisite to initiating a dialogue.

### **Techno-Hazing (or Overt Gender Bias)**

In some cases, the segregation of men and women within the computing profession is a result of blatant/overt gender bias. For example, DiDio (1997) interviewed a number of women in Silicon Valley and found numerous examples of women still grappling with problems of being assigned manual tasks, whereas their male colleagues with similar backgrounds were given a “choice” of assignments. DiDio coined the term “techno-hazing” to describe this phenomenon of gender bias. Techno-hazing refers to the bias that results from the assumption that women cannot be technically competent; and even when qualified, they are given lower complexity jobs or are supervised more closely. When blatant discrimination is visible, there is room for fairly direct actions, such as legislations. Many companies and Universities already have Equal Opportunities Policies that attempt to go further than simply complying with the legislation. For example, many Universities require employees across the organization to take sexual harassment and sensitivity classes (and they require that all employees be certified in such courses).

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