Institutional Characteristics and Gender Choice in IT

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INTRODUCTION

While the issue of attracting women to information technology professions has been studied extensively since the 1970s, the gender gap in IT continues to be a significant social and economic problem (Thom, 2001). Numerous research studies have been conducted to understand the reasons for the gender gap in IT (Gurer & Camp, 2002; Sheard, Lowe, Nicholson, & Ceddia, 2003; von Hellens, Nielsen, & Beekhuyzen, 2004). Universities and colleges have developed a variety of programmatic efforts to apply gender gap research results, implementing strategies that increase female undergraduate enrollment in computer science programs (Wardle & Burton, 2002). Yet, individual successes have not translated into any significant change in the overall percentages of women choosing IT. An analysis of current choices of women in their selection of four-year undergraduate institutions reveals yet another alarming trend—young women are not choosing to study IT at the traditional academic four year institutions that would best prepare them for the IT professional careers of the future.

To complicate matters, the information technology job market is changing rapidly. For example, some well-documented IT trends that are causing such shifts are outsourcing, the commoditization of IT, the effect of the dot com bust on the job market, and most importantly, the integration of IT into the fundamental economic, social and cultural fabric of our society. IT now permeates every aspect of professional work, even the traditional female-oriented occupations such as nursing and teaching. This integration of IT into the professions must guide the development of a new set of strategies to insure that women have equal opportunities and access to the benefits of an education that prepares them for professional careers. It is in the best interest of the IT profession and our society in general to help young women make choices that include the pursuit of information technology.

BACKGROUND

The under representation of women in IT is a critical issue of equity and access for women due to the pervasiveness of computing in our society, the many economic opportunities afforded those who have technology skills and knowledge, and value of diversity for this profession (Cohoon, 2003). Although job opportunities in technology companies and technology-oriented industries have recently declined, the need for advanced technology skills in mainstream business careers and entrepreneurship remains critical (Thibodeau & Lemon, 2004). Nearly 75% of future jobs will require the use of technology, 8 of the 10 fastest growing occupations between 2000 and 2010 will be computer-related. The annual mean salary for computer and technology occupations remains significantly above average compared to all occupations (U.S. Department of Labor, 2004). Thus, the IT gender gap translates into salary and employment inequities.

Table 1 shows that in 1996, women were 41% of the IT workforce compared to 34.9% in 2002, yet they accounted for 46% and 46.6% of the overall workforce in 1996 and 2002, respectively. Note that, in 1996 and 2002, the higher percentage of females was due largely to greater numbers of women in Data Entry and Computer Operator positions, jobs that required less formal education and experience, and provide lower pay. In fact, in both years, women

Table 1. Women in the IT workforce vs. overall workforce (1996 and 2002)

2002 Total	2002	2002		1996	
Employed (thousands)	Total	% Men	% Women	% Men	% Women
Electrical and electronic engineers	677	89.7	10.3	92	8
Computer systems analysts and scientists	1,742	72.2	27.8	72	28
Operation and systems researchers and analysts	238	51.3	48.7	57	43
Computer programmers	605	74.4	25.6	69	31
Computer operators	301	53.2	46.8	40	60
Data entry keyers	595	18.3	81.8	15	85
Total IT occupations	4,158	65.1	34.9	59	41
All Occupations	136,485	53.4	46.6	54	46

Source: Bureau of Labor Statistics

account for over 81% of the data entry positions. The current lack of women in the IT workforce is in part a consequence of women not choosing IT undergraduate degree programs or dropping out of these majors.

One traditional path into the IT profession is the completion of an undergraduate degree in Information Technology. However, the percentage of undergraduate degrees awarded to women in computer science and information technology as reported by the National Center for Education Statistics has declined since 1986 (See Table 2). It is well known that one approach to moving women into IT is through the educational pipeline, that is, motivating young women to explore these career paths early in life and to choose IT degree programs.

Despite the benefits of professional technology careers and the advancements of women in many other fields, little progress has been made in moving women through the educational pipeline in computer science (Camp, 1997). In fact, less than 33% of participants in computer courses and related activities in high schools are girls (AAUW, 2000).

The extensive literature on this topic (Beyer, Rynes, & Haller, 2004, Gurer & Camp, 2002; Klawe & Leveson, 1995) provides us with many reasons

Table 2. Computer/information science bachelor's degrees awarded

Year		Degrees awarded			
		Total	Men	Women	% Women
1986		42,195	27,069	15,126	35.8
1987		39,927	26,038	13,889	34.8
1988		34,896	23,543	11,353	32.5
1989		30,963	21,418	9,545	30.8
1990		27,695	19,321	8,374	30.2
1991		25,410	17,896	7,514	29.6
1992		24,958	17,748	7,210	28.9
1993		24,580	17,629	6,951	28.3
1994		24,553	17,533	7,020	28.6
1995		24,769	17,706	7,063	28.5
1996		24,545	17,773	6,772	27.6
1997		25,393	18,490	6,903	27.2
1998		27,674	20,235	7,439	26.9
2000		37,388	26,914	10,474	28.0
NOTE:		Data not available for 1999			

why IT is not attractive to young women. Potential causes include: unsupportive academic environment, the perception of computing as a male-oriented profession, gender differences in how students assess their own performance, lack of role models and insufficient critical mass of female students and faculty to build community.

Colleges and universities face additional challenges in recruiting women. Because of the pipeline issue, women are often less experienced in computing when they enter college, computer science department cultures and software are typically male-oriented and don't appeal to women, and there is a lack of visibility regarding the social value of computing that would appeal to women. Furthermore, while some institutions have been successful in recruiting females to undergraduate computer science programs (Fisher & Margolis, 2002; Roberts, Kassianidou, & Irani, 2002), the percentage of women in these disciplines for most institutions continues to decline (ITAA, 2002). Cohoon (2001) argues that, based on her investigation of the University of Virginia's CS department, the characteristics and practices of computer science departments affect female retention at the undergraduate level and inherent female characteristics are an insufficient explanation of women's under representation in computer science. In fact, women themselves tell us why they are not choosing IT, often indicating they find IT uninteresting or perceive that it is more difficult academically than other professions such as