The Influences and Responses of Women in IT Education

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INTRODUCTION

This article highlights findings from an empirical study that explores the nature of female underrepresentation in information technology. Specifically, this research focuses on (a) identifying key sociocultural factors that can facilitate the pursuit of IT at the undergraduate level, and (b) testing Trauth's (2002) Individual Differences Theory of Gender and IT through a comparison of female responses to the social construction of IT. To answer the author's research questions, interviews were conducted with 10 female seniors in an IT department at an American university in the mid-Atlantic region (MAU).[1]

Although experiences with social factors vary, comparing the stories of women who have successfully navigated their way into and through an IT undergraduate degree program reveals common influences and motivations. In addition, though some common factors may facilitate female entry into the field, the Individual Differences Theory of Gender and IT explains that women will react differently to the social constructions of gender and IT. By gaining a better understanding of the gender imbalance, applying appropriate theories to explain the problem, and uncovering the challenges that women of our society face in their entry to the field of IT, collegiate programs can more effectively implement strategies that will improve the recruitment and retention of female students.

BACKGROUND

IT-related undergraduate degree programs such as computer science (CS), management information systems (MIS), and information-science and -technology programs are important gateways to the IT industry, providing valuable exposure and experience to students interested in pursuing IT careers.

Research suggests that women are entering undergraduate IT programs in smaller numbers (e.g., Camp, 1997; Freeman & Aspray, 1999) and may be doing so with less formal and informal IT experience (e.g., Craig & Stein, 2000; Fisher, Margolis, & Miller, 1997; Margolis & Fisher, 2002; Teague, 1997). Thus, education at the undergraduate level is critical in the foundation of their skills, their interests in IT, and their pursuit of work in the field. Moreover, actively recruiting and retaining females in IT-related undergraduate degree programs can have a significant impact on the diversification of the IT workforce. As Margolis and Fisher (2002, p. 3) explain, "women must be part of the design teams who are reshaping the world, if the reshaped world is to fit women as well as men."

This study first focuses on identifying sociocultural factors influential in women's decisions to pursue IT at the undergraduate level. The social-construction perspective of gender and IT explains that, reflective of the social norm in America, cultural expectations and influences often convey the message that women are unsuitable for the IT world (e.g., Trauth, 2002; von Hellens, Nielsen, & Trauth, 2001). By the time young women reach college, there is evidence of the effects of these social norms and expectations. For example, in the years prior to college, certain studies have revealed that, in comparison with males, females exhibit lower levels of self-efficacy in computing, are less likely to explore computing independently through informal channels (e.g., within peer groups, computer camps, and clubs), and elect to take advanced computing courses less frequently; in addition, some women have misconceptions about the IT workforce and IT work (e.g., Beise & Myers, 2000; Craig & Stein, 2000; Fisher et al., 1997; Margolis & Fisher, 1997, 2002; Nielsen, von Hellens, & Wong, 2000; Symonds, 2000; Teague, 1997; von Hellens, Nielsen, Doyle, & Greenhill, 1999; Woodfield, 2000).

An examination of the factors that enable women to confront and circumvent these social barriers is an important part of understanding the gender imbalance; however, it should not be assumed that all women have the same reactions to these barriers. The Individual Differences Theory of Gender and IT embraces the notion that gender is a fluid continuum rather than a dichotomy. This theory focuses on women as individuals, having distinct personalities, experiencing a range of sociocultural influences, and therefore exhibiting a range of responses to the construction of the IT field (Trauth, 2002). Comparing and contrasting females' responses to the social construction of IT tests the individual-difference theory of gender and IT.

RESEARCH APPROACH

This research focuses on women at a critical point of IT entry: the undergraduate level of education. In examining the trends of female underrepresentation discussed in the literature and the theoretical perspectives used to explain the problem, the following research questions emerged.

1. What significant sociocultural factors in the lives of women are influential in their pursuit of IT at the college level?
2. How similar are female responses to the social construction of gender and IT?

To investigate these questions, in-depth interviews were conducted with a sample of 10 female seniors in MAU's IT department in the spring of 2003. The IT department at this university was chosen because of its proactive stance with respect to the recruitment and retention of women students. The department also has a diversity committee and a student organization, Women in Information Technology (WIT), that was established to provide support and mentoring for female students in the program. At the time of these interviews, the student enrollment in the department was 21% female. Interviews were open ended and lasted approximately 40 minutes in duration. The qualitative format was selected as it was most appropriate for capturing in detail the participants' broad range of influ-

ences and experiences. Interview questions were derived from the themes of family background, educational history, personal traits and interests, discovery and selection of the IT program at MAU, experiences in the program, and future plans.

FINDINGS

Comparing Sociocultural Influences

In comparing participant experiences, the women study reported modest levels of formal education and informal experimentation in IT; these experiences made little impact on their decisions to pursue the IT degree. Participants consistently described their education in high-school computer classes as basic. The two women who elected to exceed the minimum computing requirements and complete C^{++} classes felt they lacked a clear understanding of the extent to which the language could be applied in real-world scenarios. On the whole, these high-school computer classes served the purpose of familiarizing these women with computers, but did little more. Although a few of the participants were aware of certain IT careers, the majority did not have a clear and complete understanding of the IT field prior to college. In terms of computing exposure and use in the home, experiences were quite consistent and corresponded strongly with the literature (e.g., Margolis & Fisher, 2002). The primary functions of home computers were education and communication: word processing for homework, and e-mail and instant messaging for chatting with friends.

Family influence and encouragement was a key social factor identified as impacting the participants' decisions to pursue the IT program at MAU. Despite differences in family environments, common to each of the women's experiences was a high level of parental academic support, encouragement, and expectation. The participants had mothers, fathers, and siblings that were, to varying degrees, actively involved in their academic careers. Many of the participants were pushed for academic achievement, and many were also specifically encouraged to choose the IT program at MAU. Other participants reported less direct academic involvement, though expectations and encouragement remained

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