The Impact of Gender and Ethnicity on Participation in IT

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INTRODUCTION

The excitement of information technology is not only within the discipline itself. Advances in computers have led to leaps in almost every academic discipline and changed the very nature of our everyday lives. The knowledge revolution has resulted in rapid changes to the way we work and live. This includes the offering of an increasing range of career opportunities that did not exist before. Computing is one of the fastest growing industries, but since most jobs remain dominated by males, women remain a major latent source of talent for the technology field.

BACKGROUND

Participation in IT

Information technology (IT) serves broad needs of society. The technology workplace should reflect the interests of both men and women. Assuming entry to the IT career domain is restricted by tertiary qualifications, female's low enrolment rate in computer related subjects would lead to ineffectual future workforce planning. A survey of the top 150 public hi-tech companies in the Silicon Valley found that only four had female CEOs (Raghaven, 2001). In the United States, the number of female computer science graduates has fallen from a 1985 peak of 35.8% to 27.5% in 1994 (Raghaven, 2001). The United States National Science Foundation (1999) statistics show that the proportion of women receiving bachelor's degrees in computer science dropped from 37% to 27% between 1984 and 1997 (Anonymous, 2000). According to research conducted by Arthur Anderson, young men are five times more likely than young women to select computer science or computer related majors in schools (Cohen, 2001). Also, women are not entering university computing and information technology courses at the same rate as men. If this situation persists, the gender imbalance in the computer technology industry could worsen. Women are, therefore, excluded from the exciting prospects promised by information technology.

There are issues of stereotyping and false perceptions permeating throughout society that women are less competent in technology compared to their male counterparts. These misconceptions could be one of the reasons for the low enrolment rate for women. Previous research suggests that girls receive little encouragement to explore computers early in their schooling (Henwood, 2000). Some suggest that there are few female role models in technical industries (Cockcroft & Cunningham, 1995). These problems may each contribute to part of the overall problem of declining female participation. Identifying reasons leading to the problem helps us to understand the gender imbalance. Surveys have been conducted to see if the genders and domains of the case studies influence student participation in IT (Wong & Paynter, 2001). However, no consensus could be drawn from the results. Seeking ways to increase women's participation remains an important but yet unsolved task.

Gender imbalance is not a new topic in the information systems (IS) research realm. Much effort has been spent in identifying remedies to combat the problem. Evidence shows that women of Asian ethnicity significantly outnumber other ethnic female students, both in Australian and New Zealand IT degree studies (Cockcroft & Cunningham, 1995; von Hellens & Nielsen, 2001). European studies, too, show an ethnicity bias with female participation decreasing in Western European countries but not in developing nations, including Eastern Europe (Schinzel, 1999, 2002). It seems that cultural differences may be more influential than gender alone. This finding forms the background of this research. Social and cultural factors have to be considered together with inherent gender differences. The gen-

der imbalance issue in the IT industry is a social as well as cultural construct that can be improved if its causes are being identified and therefore appropriate measures are being applied.

Cognitive Style and Learning

Kirton's Adaptor Innovation (KAI) Inventory is a 33-item questionnaire. It is a pre-tested and validated instrument. It consists of 33 questions in the form that looks like the Likert scale often used in Information System (and other) surveys. Kirton claims KAI measures creativity in his adaptation-innovation theory, which was first introduced in 1976. The adaption innovation theory studies individuals' cognitive styles. The theory classifies people's cognitive styles as lying on a continuum with adaptive and innovative on two opposite poles. The associated tool for the theory is called Kirton's Adaption Innovation (KAI) Inventory. KAI measures people's cognition and it is especially effective for identifying a person's learning preferences as well as problem solving styles. Creators have a high KAI, while Adaptors have a low one. Kirton's study states that each person has a preferred problem-solving style that remains stable over a lifetime.

Individuals develop coping mechanisms to deal with circumstances which are at odds with their preferred problem-solving style, but as soon as the situation allows, return to the preferred style; positive or negative outcomes are not necessarily the result of differences between adaptors' and innovators' problem-solving approaches but of situational factors. (Kirton, 1976 as cited in Osborne, 1995).

To assist practitioners, Kirton encourages a distinction between level (what is done) and style (how it is done). It is said that level may be affected by intelligence, knowledge and experience while style develops early in life and persists over time, regardless of age (Osborne, 1995).

Methodology and Findings

This research started by examining the ethnicity and gender composition of the students taking information systems courses at the University of Auckland Information Systems Business School. It then used a survey instrument (KAI) to examine different cognitive styles to see if this had an influence on their participation. Students were initially surveyed during their lectures and follow up surveys were sent to those who were not present on the day the surveys were initially given.

The students taking the courses surveyed represent a mixture of genders and nationalities and ethnicities and have a variety of educational backgrounds. The first year information systems course is typically a mixture of IS and non-IS majors, whereas the second and third year classes have a more technical orientation (e.g., computer science, engineering, information systems). For female students it was found that year I students had the highest KAI, while the mean KAI of stage III students was the lowest. The stage II mean KAI score was higher than those of stage III and lower than those of stage I so that there was no statistical significance between stage II and the other two groups. This finding was interesting and it led us to ask what type of female students the university is retaining. As Kirton (1978) suggested that people's problem solving styles are consistent over time, it is unlikely that female students become more "adaptive" as they proceed to higher levels. In other words, it is likely that the Information Systems major is attracting and retaining females of "adaptive" problem solving styles. Enrolment patterns show that different genders have different preferences in selecting their major. Learning styles are deter-

Figure 1. Impact of course and gender on KAI