

# A Historical Perspective of Australian Women in Computing

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## INTRODUCTION

Women's participation in the Australian workforce has been increasing since the mid-1950s. In 1954, women made up 23% of the total labour force (Office for Women [OFW], 2004), but by 2004, they accounted for 44.5% (Australian Bureau of Statistics [ABS], 2004).

Over the same period, there was growth in new employment opportunities in the emerging computer industry. However, this industry did not manage to attract equal numbers of women and men, and currently women account for about one fifth of the Australian ICT workforce (Maslog-Levis, 2005). Women are paid less than men in similar positions in this sector and are less likely to hold senior management positions (Byrne & Staehr, 2003).

Gender imbalance in employment is not unique to computing. Australia's workforce is more gender segregated than that of most other industrialised countries (Gray, 2003). Over half of all female employees are employed in the clerical, sales, and service groups of occupations, and these are areas where there are substantially less men (ABS, 2000). Men dominate the trades, production, and transport occupations.

When does gender imbalance become a concern? Common sense would suggest that it has become a problem when gender imbalance has a detrimental effect on some sections of society.

The computing profession is an area where gender imbalance is of concern. New technologies bring about changes that have the potential to affect all society, and we "would be most likely to achieve maximum benefit if each significant section of society was represented in the planning decisions" (Ryan, 1994, p. 548). Without diversity in the ICT workforce, "we limit the set of life experiences that are applied, and as a result, we pay an opportunity cost, a cost in products not built, in designs not considered, in

constraints not understood, in processes not invented" (Wulf, 1998).

Unless more women are employed in the areas of ICT design and development, these products and services are unlikely to meet the needs and desires of approximately half the population. Women need to be actively involved in all levels of these new technologies that have such immense potential for social change.

## BACKGROUND

The ideas, curiosity, and advanced thinking that led to the creation of the computer evolved over time, with many people from around the world making a contribution.

Australia moved into the modern computing era with the development of the CSIR Mk1 in the late 1940s (Pearcey, 1994). This machine, later renamed CSIRAC, was the first computer in Australia, and it was arguably the fourth or fifth electronic stored-program computer ever developed in the world (Jones & Broomham, 1994). It provided computing service until well into the 1960s. By then, there were 34 computers in the country, and this number increased to 348 by 1965 and then to just over 3,000 machines by 1975 (Thornton & Stanley, 1978). By the year 2000, over 4 million computers were in homes around Australia, with over half (56%) of households having a home computer. In 2003, 66% of Australian households had access to a computer at home, with 53% of these households having access to the Internet (ABS, 2005).

In less than 50 years the industry had developed so rapidly that more than 264,400 people were employed in selected information-technology-related occupations in Australia (IETF, 1993). Within this time frame, however, computers and computer work had also become stereotyped as more appropriate

for males (Game & Pringle, 1984), and now only 23.6% of the current IT workforce are women. Women have tended to be highly represented in the less skilled, less sophisticated areas of data entry and computer operation, while men have made up the majority of the higher level, higher status, higher paid computer workforce (Davis, 1986).

## **EDUCATING THE COMPUTER PROFESSIONAL**

Following the emergence of the new discipline of computing, the universities of Melbourne, Sydney, and New South Wales (NSW) first introduced courses on programming and the application of computers in 1956. By 1985, every Australian university had a computer department covering a wide range of curriculum areas. Two main approaches to the teaching of university computing emerged: computer-science and information-systems courses. In high schools, computing education was initiated in the mid-1960s “by a handful of enthusiastic maths and science teachers, mostly male” (Sale, 1994, p. 155).

The 1980s and early 1990s provided a period of enormous change in the Australian education system. High-school retention rates more than doubled during the 1980s, increasing from 34.5% in 1980 to 76.6% in 1993 (ABS, 1992). In 1987, for the first time, school retention rates for girls exceeded those of boys. Changing community expectations, a depressed teenage labour market, and government policies encouraging students to complete their secondary education were all contributing factors (Williams, Long, Carpenter, & Hayden, 1993). The result was an increased number of young people, particularly women, eligible to enter higher education. The first 130 years of Australian higher education saw women students outnumbered by men. Whereas female students made up only 45% of the student population in 1981, by 2001, women made up 57% of the 206,834 students commencing an undergraduate qualification (Office of the Status of Women [OSW], 2002).

It was in the mid-1980s that the lack of female students in computing in secondary and tertiary education as well as in the profession began to

emerge as an issue and was finally recognised by academics, the industry, and politicians (see, for example, Kay, Lublin, Poiner, & Prosser, 1989; Symons, 1984). In 1990, the federal government attempted to improve the situation by setting targets to increase the proportion of women in university information-technology courses to 40% (see DEET, 1990).

During the following decade, many initiatives were created to encourage women to undertake undergraduate courses in information technology. Initiatives ranged from mentor programs to the production of videos, special classes for female students, curriculum changes to create a more inclusive curriculum, computer camps, and so on (see, for example, Clayton & Lynch, 2002; Craig, Fisher, Scollary, & Singh, 1998; Greenhill, Von Hellens, Nielsen, & Pringle, 1997).

Undergraduate female enrollments in computer science and information systems peaked at 27.2% during the early 1990s (Lang, 2003). In 2004, approximately 20% of commencing tertiary information-technology students were female (DEST, [http://www.dest.gov.au/NR/rdonlyres/79212D3A-218C-D6D-9F28-7C59A9FE5F75/2464/01\\_Commencing\\_Students.xls#ITbl03>!A1](http://www.dest.gov.au/NR/rdonlyres/79212D3A-218C-D6D-9F28-7C59A9FE5F75/2464/01_Commencing_Students.xls#ITbl03>!A1)). Australian women in the ICT profession are not only a small minority, but appear to be a decreasing one with a consequential reduction in diversity and creativity within the profession.

## **WHAT KEEPS WOMEN AWAY FROM IT?**

A variety of factors impact Australian girls' decisions to not study computing.

### *RELATIVE COMPLEXITY*

*In my parents' lounge room after Christmas dinner, I am talking to my brother the computer programmer.*

*He is explaining to me the principles of cyberspace.*

*“It is only relatively complex,” he says finally, peeling the icing off his fruitcake, “It is mainly a system of binaries, permutations of zero and one.*

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