
New Thinking, New Interventions: Strategies to Improve Women's Participation and Retention Rates in Physical Science, Engineering and Technology*

Sue Morley

Regency Institute of TAFE, Days Road, Regency Park, Adelaide, SA 5010, Australia

Australia has one of the most sex segregated work forces in the Western world. Despite a range of strategies across Australia in the last 10-20 years to increase the participation of women in science, engineering and technology occupations, little has changed. Recent research is suggesting that women's experience in these occupations is problematic. A recent report, the *Women in Science, Engineering and Technology Report*, identified and labelled a new term that may assist in better understanding women's experiences - gender harassment. This paper discusses gender harassment and outlines a project in South Australia, *The Gender Equity Project*, that is trying to develop ways for staff within TAFE SA to identify, understand the impact of and redress gender harassment.

INTRODUCTION

Australia has one of the most sex segregated workforces in the world. Over half of all women in Australia are employed in only two occupations: clerks and salespeople.

Over the last 15-20 years there have been many projects and initiatives to broaden the scope of jobs and careers that women pursue, including strategies to increase the participation of women in engineering, science and technology related occupations at both university level training and within the vocational education and training sector.

Despite these efforts, women's employment patterns have changed very little. There have been slight improvements in the percentages of women entering engineering at the university level; participation rates for women were 13.1% in 1994; an improvement on the 3.3% participation rate in 1980 [1]. Participation in TAFE systems at apprenticeship/trade levels has declined in the last few years; in 1993, women secured 23.8% of apprenticeship positions; this declined to a low of 11.2% in 1995 and a slight increase to 14.9% in 1996. Over half of all appren-

ticeship positions held by women are in hairdressing, a traditional occupation for women [2]¹.

Participation rates for women across all levels of training within vocational education and training (certificate or trade level, advanced certificate, diploma, and associate diploma levels) are still poor. There has been a slight increase from 5.3% in 1986, to 7% in 1993 [1].

As well as encouraging women to gain qualifications in occupations that have historically been dominated by men (often referred to as *non-traditional occupations for women* in Australia), various strategies have been designed to support women when they commence working in their chosen occupation. Research has identified that a few years after women enter the workforce, they can encounter discrimination based on their gender. In some instances the discrimination they experience is not overt, yet has the effect of marginalising them. Some women have chosen to leave the companies or organisations they work for or even to leave their profession altogether when they have this experience as it can be extremely difficult to articulate and to counter.

* A paper presented at a special session of the 1st UICEE Annual Conference on Engineering Education, titled TAFE Engineering & Technology Education

¹An apprenticeship is a training contract where a person is employed and has a legal contract with an employer to serve a period of training for the purpose of attaining tradesperson's status in a recognised trade classification

WOMEN IN SCIENCE, ENGINEERING AND TECHNOLOGY

A report, *Women in Science, Engineering and Technology: A Discussion Paper Prepared by the Women in Science, Engineering and Technology Advisory Group*, published by the Australian Federal Government in 1995, clearly identified that women working and studying in science, engineering and technology based occupations frequently encountered *gender harassment*. The report included an extensive explanation of this term, quoted below, which is particularly helpful in beginning to understand the complexities of women's experiences in non-traditional occupations, including science, engineering and technology occupations and study pathways. It is also helpful in reviewing and rethinking how best to work towards better retention and recruitment strategies for women into these fields.

From the *Women in Science, Engineering and Technology Report*:

GENDER HARASSMENT - AN EXPLANATORY NOTE

In researching the current positions and experience of women and girls in science, engineering and technology (SET) in Australia, the Advisory Group became conscious of a repeated pattern. This pattern was evident in a range of behaviour by the men and boys who predominate in both the educational and employment settings of SET which had a consistently negative impact upon the girls and women wishing to enter, contribute to and progress through higher levels of SET education, training and employment. This behaviour was more evident by its impact and effect than any description or analysis. Indeed, part of the difficulty in drawing attention to this behaviour as a significant issue impacting on the current position of girls and women in SET is that it is apparently accepted as normal and unremarkable by the dominant culture and as such has not been named or identified.

Common elements in this behaviour by men and boys is that it expresses a strong sense of masculine ownership of the whole area of SET, as an area of knowledge, as an area of study, as an area of research and as an area of employment. A second common characteristic of the behaviour is that it consistently emphasises solidarity and shared identity, values and interests between men and

boys in such a way that it excludes, alienates, marginalises and isolates the girls and women who are, by definition, the outsiders. Indeed, the words which constantly occur throughout the literature describing female experiences are exclusion, alien, outsider, different, out of place, resistance, impenetrable, boundaries, barriers, rejection and isolation. On the other hand, words which describe the male experience include group solidarity, inner circle, network, club, camaraderie, bonding and in-group understandings. While it is obvious that it is women who make up the group which is outside and that it is men who are keeping them there, it is rare to find references which directly attribute the exclusionary behaviour which women and girls experience to their male colleagues and from boys. Thus women are referred to as being excluded, isolated and alienated but men are rarely acknowledged or described as actually doing anything which achieves this outcome. What we are left with is a mysterious and disembodied negative force [3].

CHANGING STRATEGIES

Many of the strategies developed in Australia over the last 10-20 years to try and increase the number of women in non-traditional occupations assumed that information and education for girls and women about jobs or careers that women had not traditionally entered in to, and some affirmative action strategies to actively recruit and support women, were all that was required to see improvements in women's participation and qualification rates.

Equity practitioners and researchers are beginning to understand that changing women's participation patterns in these occupations is much more difficult. Consequently, it is time to revisit past strategies and develop approaches that take into account current knowledge about the complexities of women's experiences working in traditionally male dominated occupations. It is also time to listen carefully to our male colleagues, to better understand the nature and extent of their work experiences and to develop collaborative approaches to ensure women are less likely to encounter gender harassment.

GENDER EQUITY PROJECT, TAFE SA

Anecdotal evidence suggests that women teaching in non-traditional disciplines for women in vocational education and training systems across Australia ex-

perience gender harassment in their work places.

The *Women in Science, Engineering and Technology Report* went on to define gender harassment as:

... a range of exclusion, marginalising, and resistance behaviours (usually exhibited by men) which result in women being discouraged or inhibited from access to and progression in SET (science, engineering and technology) education, training and employment. These behaviours are often subtle and sometimes unintentional. Nevertheless, they continue to have a significant impact on the way women perceive SET and careers and education in these fields [3].

In South Australia, there are seven Institutes of TAFE, serving a student population of about 90,000. These Institutes are publicly funded vocational education and training organisations. Collectively these Institutes are referred to as TAFE SA.

Teaching disciplines across TAFE SA are grouped into five broad categories. These are:

- Manufacturing, Construction and Transport
- Information Technology and Applied Design
- Primary Industry and Tourism and Hospitality
- Business Services
- Human Services

Science, engineering and technology courses are taught in three of these categories: manufacturing, construction and transport; information technology and applied design; and primary industry, tourism and hospitality.

The staffing population within TAFE SA mirrors the workforce population across Australia and is a stereotypical gendered work force. In March 1997, the greatest percentage of women lecturers were employed in human services, with 82.4% women and 17.6% men in this area. Manufacturing, construction and transport had the greatest percentage of male lecturers, with 93.6% men and 6.4% women (Table 1).

Some examples of gender harassment that women have experienced in TAFE SA include:

- Exclusion and isolation: women have reported being ignored and overlooked in relation to information about meeting times and places; being ignored during meetings; having their own ideas dismissed or ignored and then the same idea being put forward by a male colleague and being heralded as a great idea.
- Inferences that women have few skills and little expertise in their chosen discipline.
- Inferences from male colleagues that without a qualification relevant to the specific trade or technical area, women are not capable of developing generic curriculum for that teaching area.
- Patronising and negative attitudes expressed to women staff about their parenting abilities.

It seems that gender harassment can be aggravated by one or more of the following:

- Having higher qualifications than male peers.
- Being of a different nationality and/or having a first language other than English.
- Being considerably younger than male colleagues.

The *Gender Equity Project* has been established to:

- ascertain the scope and extent of gender harassment experienced by teaching staff within TAFE SA;
- develop materials that will assist managers and lecturing staff to understand the nature and impact of gender harassment;
- provide guidelines on how to deal with or address gender harassment in work teams; and
- improve recruitment processes so that women are actively encouraged to apply for teaching positions when they occur in disciplines that are non-traditional for women.

The project has a life span of two years, with com-

Table 1: Teaching staff (FTEs) x gender x programme area.

	Female		Male		Total
	No.	%	No.	%	
Manufacturing, Construction & Transport	25.7	6.4	378.3	93.6	404.0
Information Technology & Application Design	31.5	19.5	129.8	80.5	161.3
Primary Industry, Tourism & Hospitality	70.0	28.6	174.4	71.4	244.4
Business Services	88.1	58.8	61.8	41.2	149.9
Human Services	215.6	82.4	46.0	17.6	261.6
TOTAL	430.9	35.3	790.3	64.8	1221.2

pletion due in April 1999.

To identify the extent and scope of gender harassment across all Institutes, an interview schedule has been developed for lecturing staff and educational managers working in areas where there are fewer than 30% of one gender employed on the staff. This schedule is used to talk with staff who have been contacted about the project and are willing to talk to the senior project officer.

It is anticipated that 50 individual interviews will be conducted. Responses and comments from the interviews will be collated and analysed and used as the basis for defining the extent of gender harassment across TAFE SA and also to inform the content of the staff development material to address gender harassment.

The material developed to address gender harassment will be produced as staff development modules, and will be available in both traditional formats and on-line. Across the vocational educational and training sector in Australia there is a strong move towards flexible delivery of courses and this applies to staff development as well as student delivery.

CONCLUSION

From anecdotal evidence it is known that some women have already left the organisation due to the gender harassment they experienced and lack of processes for resolving or dealing with these issues. It is hoped that the project will contribute to diminishing the likelihood of women leaving TAFE SA due to gender harassment, and contribute to increasing the number of women working as lecturers and educational managers in areas where there are still few women employed.

REFERENCES

1. National Centre for Women, Data Matters, November 1995. Swinburne University of Technology, Victoria, Australia, 2 (1995). (An occasional data sheet on women's participation in non-traditional study and employment).
2. Australian Bureau of Statistics, Australian Women's Year Book 1997. Canberra, Australia (1997).
3. Office of the Chief Scientist, Women in Science, Engineering and Technology: A discussion paper prepared by the Women in Science, Engineering and Technology Advisory Group. Australian Government Publishing Service, Canberra, Australia (1995).

BIOGRAPHY



Sue Morley is the senior project officer for the Gender Equity Project of TAFE SA. Sue holds degrees in social work and in arts and has worked as an advocate and project officer in a number of public sector organisations throughout Australia. Her work is usually based in the vocational education and training sector. Sue is particularly interested in the complex issues that surround women's participation in education, training and employment in areas where women have been under-represented in the past. Sue has been a member of a number of State and National Ministerial Advisory Committees and has contributed to and been directly involved in National and State equity projects.