Persist and cope: New Zealand women in computing

Alison Hunter
Manukau Institute of Technology, New Zealand
ahunter@manukau.ac.nz


Abstract

New Zealand has a thriving computing industry but further growth is hampered by a skills shortage. A lack of women in the industry exacerbates this problem. Women are under-represented in the industry, and those who do take up computing careers experience conditions of discrimination and marginalisation. This paper reports on a qualitative study of the strategies used by women to cope with their marginalisation. Using multi-sited ethnographic methodology, data were collected using semi-structured interviews with twenty-nine computing professionals. Despite some women denying any marginalisation, all were found to employ some form of coping strategy. Seven different strategies were identified. The women interviewed were more inclined to join organisations directly relating to their roles rather than support initiatives which might improve conditions for women.

Keywords

women, gender, computing, occupations, marginalisation

1. Introduction

The under-representation and marginalisation of women in the computing industry in New Zealand is well recognised, as it is in many other Western countries (Byrne & Staehr, 2005; Crump, Logan, & McLroy, 2007; Hill, Corbett, & St. Rose, 2010; McKinney, Wilson, Brooks, O’Leary-Kelly, & Hardgrave, 2008). Under-representation can be seen in the census data (2006) which reveal that approximately 72% of professional occupations in computing are held by men (A. Hunter, 2011/2012). The disproportionately low number of women entering the industry is often attributed to the masculine culture of computing work. This masculine culture originates from prevailing cultural notions which link masculinity with technological expertise and rationality (Wajcman, 1991) and is exemplified by workplace behaviours such as aggression, domination, competitiveness, obsession, control, non-sensuality, and isolationism (Turkle, 2005; Wajcman, 1991). Many women reject this culture and hence avoid computing careers altogether (von Hellens, Nielsen, & Beekhuyzen, 2004; Wilson, 2003). The fact that computing work is frequently explained in terms of gender dualisms reflecting polarities which exalt masculinity, for example hard/soft, mind/body, and things/people, further dis-incentivises women from entering the industry (Faulkner, 2000; von Hellens et al., 2004; Wajcman, 1991).
Two key indicators of women’s marginalised position are the distinct horizontal and vertical gender segregation associated with computing occupations in New Zealand. These gendered employment patterns reveal women clustered in certain occupations such as business analysis, graphic design, database administration, and training, but significantly under-represented in the traditional and most populous roles of programming and systems analysis (A. Hunter, 2011/2012). Marginalisation is evidenced by the glass ceiling women face (vertically) and the lower status associated with the roles women more frequently occupy (horizontally), and by apparent pay discrimination experienced by women both vertically and horizontally (A. Hunter, 2011/2012).

Notwithstanding these unappealing conditions, more than 20,000 women have chosen a career in computing in New Zealand (although almost 6,000 of these are in data entry or word processing roles) (A. Hunter, 2011/2012). These women may be regarded "persisters", a term used by Margolis and Fisher (2002) to describe women who are prepared to endure the masculine culture of computing education in order to pursue a career in computing. To survive their marginalised position, persisters typically develop a range of coping strategies (Margolis & Fisher, 2002). The purpose of this study was to investigate the coping strategies of persisters in New Zealand’s computing industry.

In reporting results of the study, this paper makes several contributions to the research literature on women in computing. It provides additional understanding of women’s experiences of survival in the New Zealand computing industry and argues that women must not uncritically accept the gender dualisms commonly used in relation to computing work. The paper also highlights the need for effective mechanisms to challenge male domination of the industry and reasons that retaining women in the industry is as important as attracting them into it.

2. Research Method

The research method used for this investigation was a multi-sited ethnography (Marcus, 1995) involving 29 face-to-face semi-structured interviews with computing professionals (14 male and 15 female) employed in a wide range of roles in Auckland and Wellington. Data were collected as part of a larger study of New Zealand’s computing industry conducted over the period 2007 to 2010 (A. Hunter, 2012). Participants were recruited using convenience, snowball, and opportunistic sampling methods, as deemed necessary to capture a wide range of voices from the industry. Many different ages, qualifications, levels of responsibility, and work settings were represented amongst the participants. Interview transcriptions were examined repeatedly as I gradually identified relevant themes. Themes were reworked many times and eventually refined as I learned to "see" (Opie, 1999) which data were valuable and strived to avoid duplication (for example "discrimination" and "inequity"). From a starting point of the broad theme "gender" I developed sub-themes relevant to my research question and the literature on women in computing (for example "stereotype", "communication", "work-life balance", "culture").

3. Findings

Amongst the women interviewed for this study, seven different coping strategies were identified. These were to: deny any marginalisation, tolerate any unpleasantness, suppress one’s femininity, adopt masculine characteristics, rationalise one’s position, capitalise on one’s femininity, and resist marginalisation.

3.1. Denying

One of my interview questions was to ask each participant whether it is easier being a man or a woman in the computing industry. Anna’s reply was typical of women who thought circumstances are easier for men:

*Probably being a male, you probably would have a lot more respect than being a female ... you would have many more chances being a male in your job.*

In contrast, approximately half the women claimed there is no difference between the
genders, despite frequent descriptions of marginalisation later in their narratives (none of the women thought it was easier being a woman than a man in the industry). For example, Sharon noticed challenges for women balancing work and home life, but did not connect this with computing work being more difficult for women:

*I think for some [women] when they go on maternity leave; that means there’s a lapse, there’s a break in their career and then they have to come back and perhaps play catch up. * ... I know a few women who start at 6 o’clock in the morning just so that they can pick their kids up after school.

Linda also did not think it was any easier being a man or a woman in computing, despite having explained at length her personal struggles as a mother:

*I have an 11-year old daughter, and a son who is 2, and the little one on the way. It's been very tough. I have to say it's been very tough because I'm very career focussed, I have a huge guilt complex about not having enough time for my children. My daughter has a lot of issues, we've been seeing psychologists, paediatrician, counsellors, and to be honest with you it always comes back to me. It's my fault because the more time I spend with her the less issues she has. The less time I spend with her the more she's brought up by other people. ... So that's left me with a tremendous amount of guilt. I've tried to balance it. I'm not a good balancer because somehow you always see the outcomes at work a lot quicker than you do in the children and so I tend to end up dropping the ball on them. I do give them a lot of quality of time, I do, but it’s not the same as the day-to-day quality of time that they should be getting. To the point that with this next baby I've decided that I'm going to work 5 hours a day. I want to pick them up from school, from kindy every day ... I do think that's very tough, and I definitely think that it is more so for a woman than for a guy.

Andrea "couldn't see that there would be a difference" between men's and women’s experiences in the industry, even though she had noticed "quite a few women who have been programmers and hated the pressure and didn't want to be any more".

### 3.2. Tolerating

Some women described incidents which indicated they simply accepted their marginalisation. Their strategy was to tolerate any unpleasantness. Sharon has a non-technical business analyst role in which she regularly needs to discuss issues with technically-oriented male developers. Communication differences often cause frustration for both parties, but Sharon is conciliatory:

*If there’s things I don’t know I just ask. Sometimes they get frustrated that I don’t actually talk on the same level that they do and they need to explain to me things, but you just accept it. [Do you feel frustration too?] Oh all the time, yes, all the time. But you just have to compromise.*

When Anna was appointed to her first role, she endured months of bullying by her male boss and felt demoralised and demeaned:

*The first three months, the guy I was working under, just completely squashed all my self confidence... He was a little bit impatient, he'd say can you do this and this and this and wouldn't tell you how, and I wasn’t quite sure when I first started, I’d ask can you just show me what you want, and he'd say I haven't got time, I might as well do it myself, and what did they teach you on your course? Just remarks like that the whole time. It just wears you down after a while; it's quite belittling.*

Later Anna was shifted to a new team and came under the supervision of a female team leader. Her confidence began to grow. Without this change Anna was unlikely to have persisted in her computing career.

### 3.3. Suppressing

Some of the narratives were indicative of women suppressing characteristics they
believed their male colleagues would dismiss as feminine weaknesses. When Hilary began a new job leading a team of men, she suspected the men would expect her to react emotionally to workplace problems:

The men had never had a woman boss before. So that took some time to work through those issues of, is she going to be the same as the men we’ve reported to before? How's she going to be different? Is she going to get all emotional on us if we don't do the right thing?

Later Hilary explained that she eventually began to behave more like men:

I absorbed that culture from always having male bosses. So their way of working had rubbed off on me.

This suggests that Hilary was mindful of, and suppressed, any of her emotional tendencies.

Sharon thinks that women tend to react personally to criticism at work, and regards this as a failing. She doesn’t approve of her own tendency to get upset, and tries to hold back any emotional responses in case they make her appear weak:

We [women] take things more personally than men do. Well, I personally, if someone critiques my business requirements, I take it a little personally even though I shouldn't... But you take it too emotionally as well, it makes you upset.

Phyllis was a programmer who worked alongside many men. She sometimes felt inferior, particularly when men challenged her technical expertise. A lack of confidence was something Phyllis believed she needed to conceal. Her tactic was to appear self-confident, even when she wasn't.

I think I probably gave off quite positive vibes that I was confident and in control, even though I wasn't always.

3.4 Adopting

Several women described aggressive work environments which men dominated. To survive, the women needed to learn to be more assertive themselves. They had to become better "fighters". Hilary described frequently having to "fight for equal recognition" when working as a solitary female amongst men, and Mandy found that women need to "fight" for higher salaries, whereas men "don't have to fight much, they just get given it". I asked Mandy if she learned to fight for better pay; she replied:

Initially I didn't because I just believed in fairness, I thought you do a good job you will get what you deserve... I hate reviews and things like that. I don't like having to speak up for myself.

Mandy and Hilary had to consciously hone their fighting abilities. For some other women, this was not necessary because they already "behaved like men". Emma described herself as supremely self-confident and oblivious to criticism, qualities she associated with men:

Maybe I'm really just up myself and have a really high opinion of myself and I never notice, or perhaps I just ride through any questions that anybody might have about me because they might think that I'm not so good because I'm a woman, because I think I'm so great. Because I think in those ways I act like a guy.

Similarly, Keri believes her non-stereotypical behaviour is attributable to "who she is" rather than any deliberate strategy:

Somebody called me the other day a truth-teller and I think that is what I am. And I think that that is acceptable in a male and it's not in a female. ... I think I'm very blunt, and I often don't soften the message and that's because I don't think you need to. ... And it wasn't that I chose to adopt an alternative role, it's just who I am.
Emma and Keri attribute their relatively unproblematic experience of the industry to the fact that they fit comfortably within the masculine culture.

3.5. Rationalising

Many of the women explained the industry’s gendered employment patterns in terms of gender dualisms. For example, Mandy used dualisms to explain the predominance of female business analysts:

*Soft skills. Women can be stronger on this. You need a lot of patience. You need to have the whole people skills and be able to relate to people, sometimes in an emotional way rather than just fact and numbers, whereas I find guys might not have that much patience to do that sort of thing. ...I think women probably can be stronger on the soft skills side than men. Men are in project management, they are good at the quantitative sort of roles or technical roles where men are perceived to be better than women.*

Sharon similarly thought:

*Women are more sociable and therefore they choose to be business analysts [rather] than introverted and sit in front of the computer. Plus I think males tend to like the development work more because like, playing with new toys...*

Keri mentioned one young woman who had remained in a programming role, whereas the others had all left: “She was the only one still coding. They had all branched off and gone into (in quotes) softer areas”. Andrea also discussed programming, describing programmers as mainly men; "people who don’t like to communicate and just want to play on their little machines".

The term "geeks" was introduced by Julia who described her previous boss, a woman, as "probably the epitome of what male geeks don’t like in a woman, she was so non-technological".

Common gender dualisms which emerged in the narratives are shown in Table 1:

<table>
<thead>
<tr>
<th>Men</th>
<th>Women</th>
</tr>
</thead>
<tbody>
<tr>
<td>Technically skilled</td>
<td>Soft skills</td>
</tr>
<tr>
<td>Play with toys</td>
<td>People oriented</td>
</tr>
<tr>
<td>Introverted</td>
<td>Sociable</td>
</tr>
<tr>
<td>Assertive</td>
<td>Emotional</td>
</tr>
<tr>
<td>Poor communicators</td>
<td>People skills</td>
</tr>
<tr>
<td>Confident</td>
<td>Self-effacing</td>
</tr>
<tr>
<td>Logical</td>
<td>Generic</td>
</tr>
<tr>
<td>Work long hours</td>
<td>Family/children</td>
</tr>
</tbody>
</table>

The gender dualisms allowed the women to rationalise their and other women’s experiences of the industry. For example, following the dualisms, it "makes sense" for the majority of programmers/developers to be men, since men are "more logical, more technically curious and capable, less interested in people, and, having fewer family responsibilities, are more able to work long hours".

3.6. Capitalising

A coping strategy used by two of my participants is to capitalise on the uniqueness of their minority status. Linda finds advantages in being the solitary woman amongst men (despite her parenting challenges):

*In most of my jobs I’ve been the only lady in the management. To be honest I’ve quite enjoyed it. I’ve found depending on how you interact with the team I’ve actually found it can be quite an advantage.*

Julia also enjoys her exclusive position:
Well you do get the advantage of being a big fish in a small pond. You get noticed more because there are so few of you. I must admit I quite like that, to be honest. I quite like being cutting edge, slightly different.

3.7. Resisting

A few of the women interviewed resist efforts by men to assert power over them and refuse to conform to stereotypical expectations. Lyn, whose role is non-technical, does not feel compelled to represent herself as ‘equal’ to male colleagues and readily admits her limited technical knowledge:

So I’m not backward in coming forward and saying, please don’t talk like that because I can’t understand it.

Andrea’s role is also non-technical. She effectively quashes any attempt to denigrate her technical expertise:

I would give them my 'look' and they don’t do it. I have to say; as I’ve got older they don’t take you on like that anyway.

Pam has a senior role and is often the only woman in large gatherings of computing executives. Early in her career Pam decided to resist stereotypical expectations regarding women’s clothing in the workplace:

I’m not really a suit person, I’ll dress appropriately but I’ll just dress casually so I’m comfortable, but I’m not really what you’d call traditional…

4. Discussion

Most results from this study align closely with those obtained elsewhere. For instance, active denial of marginalisation was found to be common in Australia (R. Hunter, 2006) and the UK (Wilson, 2003). Denial suggests that prospects for change in the industry are unlikely, particularly when denial occurs at the higher levels, as was the case when Suzanne Hansen, regional manager for Cisco, claimed that "women [in computing] are successful in their own right in New Zealand, which is not the same everywhere else" (Meyer, 2007). Other similar claims reported in the New Zealand Herald (South, 2009) suggest that the few women in leadership roles in the industry are either unaware of, or unwilling to draw attention to, the actual experiences of female computing professionals in this country.

Women faced with male-dominated work environments, typically characterised by assertiveness, aggression, and hierarchical structures (Turkle, 2005; Wajcman, 1991), have several options. Firstly, they may choose to tolerate the unsavoury aspects of their situation, despite any resulting demoralisation. This was Anna’s method of coping with months of put-downs by her domineering male boss. A second option, more widely reported, is for the women to suppress any behaviours they consider contrary to masculine norms and male expectations (Fletcher, 1999). Phyllis, Hilary, and Sharon adopted this strategy, and in doing so censored their own behaviour. A third option, also common, is for the women to behave more like a man – to become more assertive and aggressive themselves (Tannen, 1994). Mandy’s narrative gave the clearest example of this strategy, whereas Hilary suppressed her feminine qualities whilst also consciously adopting masculine characteristics. With all three options, the women are making adjustments in order to accommodate men. The third option carries an extra cost since women who have adopted more masculine working styles are frequently judged negatively by men for having abandoned stereotypical feminine qualities (Tannen, 1990; Trauth, 2002). An example of this tendency to judge female colleagues as women rather colleagues came from Tim, one of my male participants, who commented that "some of the women have been really technically competent but they’ve had almost no personality". Two women (Keri and Emma) credited their success in the industry to the fact that their normal behaviour was man-like. Although Keri and Emma do not feel the need to compensate for their gender, they are also at risk of being judged un-feminine.

Many of the women, regardless of other coping strategies they employed, used
gender dualisms to rationalise women’s position in the industry, and these closely matched dualisms identified in other studies (Faulkner, 2000; von Hellens et al., 2004). Women’s perceived superior soft skills and sociability, their comparative indifference to "new toys", and their family/home responsibilities were common explanations for women more often choosing business analysis roles than programming roles. As argued by von Hellens, Nielsen, and Beekhuyzen (2004), use of such gender dualisms provides women with sufficient "ontological security" to cope with their marginalisation. But uncritical acceptance of the dualisms means that the underlying value systems which award greater social esteem to behaviours and orientations which are socially defined as masculine (Faulkner, 2000) remain unchallenged. By endorsing the dualisms, women continue to accept subordination.

The strategies discussed thus far enable women to persist and cope in their occupations but they fail to challenge the status quo. In comparison, the final two coping strategies demonstrate some (small) level of opposition. Savouring and possibly benefiting from one’s minority gender status is a coping strategy also observed by other researchers (Crump & Logan, 2000; Margolis & Fisher, 2002), although less frequently. Women who use this strategy, along with others who have developed personal forms of resistance to male domination, are refusing to succumb to expectations of a submissive and technically-inept female (Margolis & Fisher, 2002). Linda, Julia, Andrea, and Lyn all chose these more confrontational strategies.

Amongst the women interviewed there was little interest in mechanisms which might bring about change for women in the industry. One such mechanism, the (now disbanded) organisation Women in Technology (WIT), had provided support and training opportunities for women in professional computing occupations over the period 1996 to 2009. Only three of the women were familiar with WIT. Sharon had attended gatherings and described WIT as "good", but Julia thought it "a waste of time – the people running it are mainly interested in power dressing". Pam expressed regret over WIT’s cessation: "I used to be a member of WIT and they’ve kind of fallen over, which is quite sad". These results suggest a general lack of awareness of WIT amongst women in the industry, but Julia’s comment also suggests that WIT may have been seen by some women as endorsing and replicating a masculine corporate culture (A. Hunter, 2012). Many of the women explained that they were simply too busy with their jobs and families to become involved in any form of professional organisation. Their preference, when they could afford some time, was to join an organisation linked directly to their work (for example the IIBA, the International Institute of Business Analysts).

Other researchers (Hill et al., 2010; Wilson, 2003) have suggested that the culture of computing education needs to change in order for more women to be attracted to careers in computing. One initiative which aims to encourage and empower secondary school girls who may be interested in pursuing computing careers is the Programming Challenge 4 Girls. This is an annual contest held throughout New Zealand, with the winners competing internationally. The goal is to show girls in a non-threatening environment that programming can be collaborative and fun, rather than isolationist and geeky. Ventures such as this may entice more women into traditional roles in the industry; the challenge is to retain the women in these roles.

5. Conclusion

Women working in New Zealand’s computing industry are faced with an alien environment which often places them in positions subordinate to men, although, as this study has found, this situation is often denied by the women concerned. Nevertheless, these female "persisters" continue in their careers and use a range of strategies to cope with their marginalisation. Seven different coping strategies were identified in this study and are discussed in this paper. While there were a few women who actively resist domination by men, no momentum for collective action to bring about change for women in the industry was detected.

The continuing low number of women joining New Zealand’s computing industry is a concern for several reasons. As New Zealand’s economy relies increasingly on revenue generated by sales of computing goods and services ($19,557 million in 2010
(Statistics New Zealand, 2011, April 15)), greater numbers of computing professionals are required. Growth in the sector is currently hindered by a serious skills shortage (Immigration New Zealand, 2012). More women taking up computing careers would help fill this shortfall. Besides this pragmatic rationale, it is ethically unacceptable for conditions which marginalise women to continue in a country which espouses non-discriminatory and equal opportunity doctrines. Women deserve equal access to the lucrative and intellectual rewards the industry offers. In addition, female computer users can rightfully expect their needs to be considered in the design of new technologies. Women are in the best position to do this.

Changing the current under-representation and marginalisation of women in New Zealand's computing industry requires mobilisation by women, but change is not solely women's responsibility. All individuals and organisations comprising the computing industry need to reflect on and challenge the practices which ensure women remain mere "persisters" rather than outright "flourishers" in the industry.

Acknowledgements

My thanks to the men and women who willingly gave their time to be interviewed for this study. Also to the University of Auckland for their support of this research.

7. References

Milsons Point, NSW, Australia: Random House.


