Pragmatism not Passion: Adult Women decide on an ICT Career

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ABSTRACT

This paper reports on an investigation into why a group of adult women (who were not school leavers) chose to enrol in an ICT degree programme and the women's subsequent experiences in numerically male-dominated classes. Qualitative data collected during focus group interviews revealed that a significant attraction of an ICT career for these women was the range of benefits it would bring them as mothers. They viewed ICT work as lucrative, flexible, and stable. Although some of the women claimed to find technology exciting, pragmatic reasons for studying ICT outweighed any passion for ICT. The women did not find being in the minority a hindrance in their studies and faced the prospect of working in a male dominated industry with stoicism. They often referred to ICT study and work in terms of gender dualisms which may have allowed the women to confirm their sense of self-worth.

Keywords: gender, ICT, IT, career, education, work, study, dualisms

1. INTRODUCTION

New Zealand's ICT industry has for a considerable time experienced both a critical shortage of skilled professionals and a significant underrepresentation of women. Resolving the latter problem would help address the former, but the long-standing question remains – how to entice more women to a career in ICT? Traditional efforts to recruit women based on interventions targeting school girls appear to have had little success.

We are proposing that efforts to attract adult women, i.e. women who left school some years ago, would help boost numbers and may even have better outcomes than traditional approaches. The paper reports preliminary steps taken towards understanding the attitudes, career motivations, and education experiences of a group of adult women studying towards an ICT degree. Findings may be useful for parties seeking to promote ICT careers.

The contribution this paper makes is to draw attention to the untapped potential of adult women to help address the shortage of ICT professionals generally and of female ICT professionals in particular.

The paper is structured in five sections – first a review of relevant literature, second a statement of research questions, and third an explanation of methodology. Findings are reported in three subsections next with accompanying discussion. Conclusions complete the paper.

2. LITERATURE REVIEW

Women have been underrepresented in New Zealand's ICT industry for at least 30 years (Hunter, 2012). Recent census data from 2006 and 2013 show that the proportion of all professional ICT roles occupied by women dropped from 28% to 25% over the period, but during the same timeframe only 17% of computer programmers and 10% of software engineers were women (Statistics New Zealand, 2008, 2014). Educational statistics from the same period suggest that the underrepresentation may be worsening. In 2006 women received 16% of Bachelor's degrees in Computer Science and 28% in Information Systems (Education Counts Statistics, 2009) but these data dropped to 14% and 19% respectively in 2013 (Education Counts Statistics, 2014).

Efforts over the last 30 years to address this gender imbalance have largely focussed on attracting school girls to the field. There have been attempts to better understand girls' career choices in most Western countries and many interventions aiming to influence girls towards a career in ICT have been instigated – for example the Programming Challenge 4 Girls (PC4G) in New Zealand and the Digital Divas intervention in Australia. Typically the interventions aim to stimulate girls' interest in ICT so that they continue on to study computing at tertiary level and then begin an ICT career, i.e. they promote a traditional pathway into the industry. However findings in Australia suggest that these interventions have often not been adequately evaluated (Craig, 2014; Craig, Lang, & Fisher, 2008) and the continuing low number of girls opting for ICT careers raises doubts about the effectiveness of the interventions (Griffiths, Moore, & Richardson, 2007). Recently, however, interventions with an assortment of new formats have emerged and these may prove to be more successful.

Another group of women who could potentially join the ICT industry are women who are not school leavers. They may already be or have previously been working in non-ICT roles or they may never have undertaken paid work. Some of these women may have non-ICT qualifications, and many of them are likely to be mothers; thus these women represent a wide range of circumstances and experiences. These women would be entering the ICT industry via "non-traditional paths" (Ballard, Scales, & Edwards, 2006).

Various terms are used to distinguish between different non-traditional pathways. Leventman, cited in (Appianing & Van Eck, 2015), refers to women with a non-ICT qualification "transitioning" into ICT work by first acquiring an ICT qualification, and to "self-directed" women who also transition into the ICT workforce from a non-ICT background but without obtaining an ICT qualification. Valenduc's (2011) term "postponed entry paths" identifies three non-traditional pathways into ICT work: from being unemployed, from taking a career break, or by opting to change career.

Many women working in ICT enter the industry via non-traditional pathways (Bartol & Aspray, 2006; Turner, Bernt,

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& Pecora, 2002). In New Zealand Crump, Logan, and McIlroy's (2007) study involving 70 women working in ICT found that 33 out of 70 (47%) of the women had entered the industry via non-traditional pathways, and Meyer's (2007) report of women in high profile ICT roles noted that none of the eight women interviewed had planned a career in ICT.

For women taking a postponed entry path into ICT work, there are many benefits, for example interesting and varied work, attractive salaries, opportunities to be creative and to use problem solving skills, good employability, and opportunities to hone technical and/or social skills. However the prospect of a satisfactory work-family balance being difficult to maintain is a significant negative factor for women considering ICT work, especially if they have or are planning to have children (Eccles, 2012; Griffiths et al., 2007).

The women interviewed by Crump et al. (2007) identified long work hours and a lack of flexibility in the workplace as serious problems for mothers. Most of the women (70%), the majority of whom were in an average age band of 35-39 years, did not have children and they expressed concern about whether they would be able to balance work and motherhood (Crump et al., 2007). The fact that part-time work in ICT is not often available in New Zealand (Hunter, 2012; Logan & Crump, 2007) is another factor making it difficult for women in ICT roles to balance work and family commitments. The dilemma facing many women was summarised by one of the women interviewed by Meyer (2007): "How can I take that promotion and still have children?" (p.11).

A study of career aspirations of university students studying STEM subjects in Australia raised the possibility that there could be a mismatch between young women's expectations of ICT work and their later experiences in the industry (Preston, 2006). Although the women viewed themselves as primary caregivers of their children in the future, they did not consider job flexibility an important factor when choosing a career (Preston, 2006). Such a mismatch could lead to high numbers of women leaving the industry, as has happened in the UK (Griffiths & Moore, 2010).

One of the few studies of attitudes towards ICT work of women considering a career transition (not necessarily into an ICT career) found that the women typically viewed ICT work positively (Ballard et al., 2006). The women indicated they would enjoy the variety, the fast paced and changing work environment, and the opportunities for creativity and problem solving (Ballard et al., 2006). This lead the researchers to suggest that ICT careers should be marketed to women already in the workforce, with particular emphasis on these appealing aspects of ICT work. We endorse this suggestion.

Marketing ICT work to women, young or older, involves overcoming many other daunting hurdles besides the challenge to balance work and family commitments. Factors thought to be off-putting to women include the image and culture of computing, often portrayed as a male domain which is unwelcoming to women, societal and cultural expectations of appropriate careers for women, a lack of female role models in the industry, ICT educational environments which marginalise women, and lower levels of confidence and interest in technology amongst women (Cohoon & Aspray, 2006). Many of these factors involve gender stereotypes, and as Cohoon and Aspray (2006) point out, people often act according to stereotype unless they individuate, or disassociate themselves from the group.

A number of scholars have noted that the culture of ICT work is often depicted in terms of gender dualisms, e.g. see Margolis and Fisher (2002), Wajcman (1991), and von Hellens, Nielsen, and Beekhuyzen (2004). Gender dualisms reflect the polarities of skills and attributes often associated with masculinity or femininity, for example unassertive = feminine, assertive = masculine, (von Hellens et al., 2004). An essentialist explanation of the dualisms would be that they are inherent and fixed qualities of men and women, whereas according to a social-constructivist view, dualistic notions result from social context and conditioning – see Wharton (2005) and Wajcman (1991). In Australia women working in ICT were found to discuss their experiences in the ICT industry in dualistic terms (von Hellens et al., 2004) and similar findings were reported in New Zealand (Hunter, 2012). In the UK, Guerrier, Evans, Glover, and Wilson (2009) reported that senior managers charged with addressing the shortage of women in ICT often referred to differences between men and women in essentialist terms. Similarly in New Zealand Crump et al. (2007) detected essentialist perspectives regarding female characteristics amongst the women they interviewed and noted that these perspectives serve to strengthen stereotypes associated with ICT work. If women account for their attributes and potentialities in essentialist terms and also adopt dualistic notions of ICT work, then the segregation of women into ICT roles which match their viewpoints are to be expected. A possible explanation for women not only accepting but also promulgating their marginalisation is provided by Von Hellens, Nielsen, and Beekhuyzen (2004) who argue that to represent work in terms of gender dualisms provides women with a form of refuge in a male dominated (and therefore often alien) environment.

3. RESEARCH QUESTIONS

The aim of this study was to investigate issues associated with women's decisions to study towards a career in ICT and their experiences of learning within a male dominated learning environment.

Specific research questions were:

- What factors influenced these adult women (i.e. non-school leavers) in their decision to study towards an ICT qualification?
- What are the women's experiences in classes in which they are greatly outnumbered by men?

4. METHODOLOGY

This study comprised the first iteration of a longitudinal qualitative study involving semi-structured focus group interviews with women enrolled in a three year ICT degree in a large technical institute in New Zealand. Focus group interviews are considered to be particularly appropriate for research that seeks to explore perceptions and understanding of specific issues through in-depth discussion amongst small numbers of people (Liamputtong & Ezzy, 2005). The method is most successful when the participants have some experience or area of concern in common and when the focus group facilitator is able to generate interactions and discussion between participants (Liamputtong & Ezzy, 2005).

The participants in the study were not randomly selected, as is the case for most qualitative research methods. Rather, all women enrolled in the degree programme, 28 in total, were invited to participate and 9 chose to do so. Participant's ages varied from 19 to 45 years and all of the women had left school one or more years ago. Thus all of the women can be considered to be taking a "postponed entry path" (Valenduc, 2011) or "non-traditional path" (Ballard et al., 2006) towards an ICT career.

The focus group session ran for 1 hour 15 minutes, with refreshments offered to participants beforehand. Discussions were audio-recorded. Due to a power relationship between the

primary researcher and participants in this study, many of whom were or would be the researcher's students, an independent person undertook the ethical consent and focus group facilitation steps of the research. The audio recording was independently transcribed and anonymised.

Following Punch's (1998) recommendations for analysis of qualitative data, the two researchers and a research assistant independently coded the data by attaching descriptive labels against sections of data in order to identify themes relevant to the research questions. Following this initial analysis, the researchers shared their coding decisions to identify common themes and then discussed implications of these. Punch (1998) describes this as an interpretive exercise involving inference beyond the data. This step allowed us to draw meaning and conclusions concerning the lived experiences of this particular group of women.

5. FINDINGS AND DISCUSSION

This section presents findings in three sub-sections. Sections 5.1 and 5.2 report data relating to the two research questions. Section 5.3 reports other, unexpected but relevant, data which arose during the focus group discussion.

5.1 Reasons for deciding on an ICT career

Three main themes emerged from the data relating to the women's decision to pursue an ICT career. Some, around half, of the women were motivated by the challenge an ICT career presents, while the other half took a more stoical approach to challenge. A common theme was a belief that an ICT career would fit well with motherhood.

5.1.1 Interest, Excitement, Challenge, Change

Several of the women chose to study ICT because it would be exciting, interesting, challenging, and/or constantly changing.

> *I was interested to find out how they [computers] worked because ... probably computers are the thing I use more than anything else. It was just interesting to find out how they work, how to programme them*
>
> *I chose IT because it's exciting and it's changing*
>
> *I studied IT because it's a challenge*
>
> *Computers are a bit of an interesting field*

Although these women appear to be somewhat stimulated by the prospect of challenge and change, no great passion for technology is evident. They appear to be focussed on the idea of ICT generally, rather than on any particular career or field within the industry.

5.1.2 Resigned Acceptance of Change

The constant change which epitomises the ICT world is a scary prospect for some of the women, but one that they face up to with fortitude.

> *Technology is evolving all the time. I think it's a scary thing, so being in the thick of it is probably the best place to be*
>
> *It's a big disadvantage if you're afraid of it so throwing yourself in the deep end and constantly staying up to date with what is actually happening*
>
> *I don't enjoy it. I'm quick for learning [it] but I'm not…I do it because…that's life*
>
> *Making yourself more comfortable with the way that life is evolving into the technological field*
>
> *I'm sort of finding now that some of the more technical, really quite difficult parts, I'm really not enjoying. But I'm doing it because this is the way that I feel the evolutionary path is going in terms of ... you've got to keep up with the guys otherwise you're going to get left behind and it's you who'll be the one packing bags at the supermarket…*

These women appear to have accepted that ICT is now an essential and enduring part of life and is therefore something which must be confronted and conquered if one is to avoid a dreary job. Unless their confidence grows and they become fascinated with ICT it is possible that these women may not continue onto a career in the industry.

5.1.3 Good Fit with Motherhood

The rewards and opportunities a career in ICT would give the women as mothers was the strongest theme to emerge from the data.

Some of the women who are already mothers simply wanted to avoid being "left behind" their children with respect to understanding computers.

> *Everyone is on them, especially my kids. I got sick of … oh you don't know what to do… Well now I know. So, yeah, can't beat them, join them*
>
> *I wanted to be doing things that were relevant to my own children*

The prospect of an attractive salary was an important factor for some.

> *I can't say I did it for money but it is one of those fields that lead to better pay packet*

Likewise the women also recognised that ICT is an expanding industry offering good long-term prospects.

> *It's also one of those careers that's growing. Even as recently as the weekend they had the driverless cars so, I mean, in the future maybe the taxi drivers and the truck drivers and those sorts of vocations will fade out, but IT is definitely growing. So we're not going to be redundant soon*

Many of the women believed that the ICT industry offers widespread work from home opportunities.

> *You can have a family and do a lot of it at home*
>
> *Now you can just log in from home rather than having to go to the office every day. So it's quite a handy field to be a part of*

The women identified many important aspects of ICT work that fit well with motherhood – relevance, financial rewards, and stability. These are all factors which could be made clear when promoting ICT careers to adult women. However the women's expectation that an ICT professional can easily work from home whilst also caring for children is unlikely to be realised. This is the type of mismatch between expectation and reality detected previously by Preston (2006) and which Griffiths and Moore (2010) believed lead to women leaving the industry. There is clearly a need for the industry to allow flexible work arrangements for mothers (and fathers).

5.2 Being in the Minority in the Classroom

As noted earlier, women have often been reported as finding ICT classroom environments alienating. Sometimes this leads to women dropping out of study altogether or changing to a different discipline.

Women in this study were asked "what's it like being a female in a class with lots of males?" Contrary to previous reports, these women do not find being in the minority a hindrance, nor do they feel inferior to their male peers; rather they enjoy their minority status and often see themselves as superior to the male students.

5.2.1 Enjoying Minority Status

Many of the women clearly enjoyed their minority status and were motivated to be as good as (or better than) the men.

> *It's special*
>
> *You just feel like you're the queen*
>
> *You feel like you're just only the female in the class, it's like, oh yeah, if the boys can do it, I can do it*
>
> *Being amongst a lot of males I feel special*

Although we did not ask our participants about their lecturers (an oversight on our part) they commented positively about a female lecturer.

> *It's really cool actually, having a female instructor for something like software engineering. It's really like, yeah man*

Female lecturers are in the minority in this institution, as they are in similar institutions elsewhere. The comment reminds us of the importance of gender balance and female role models within lecturing teams.

5.2.2 Women as Superior

Many of the women regarded themselves as having qualities the male students lack, for example multi-tasking ability and dedication.

> *I think males need females in the class… females are very good at multi-tasking which males lack. Females are just brilliant at that, that's just a given talent that a female has … With a male he'll do only what he's been asked to do. But a female will be given some task to do – and then give more*

The women believed that they have a greater commitment to study than the male students.

> *I think the girls take it [study] much more seriously…*
>
> *The guys … especially the younger guys, will sit there with their head phones in. I don't think I'd ever see a girl… I think we work harder, not that we've got anything to prove, it's just that we…well, I seem to work quite hard, I'm sure we all do*
>
> *I just notice that when we look at the girls we're all doing our work … we're all trying to get the job done. Whereas some of the guys are watching YouTube…*

It is possible that age and maturity account for some of the claimed gender differences in commitment to work but we do not have the necessary data to investigate this further.

5.3 Other findings

Analysis of the focus group discussions revealed some other themes relating to the issue of women's underrepresentation in the ICT industry.

5.3.1 The prospect of working with mainly men

The women were not at all daunted by the prospect of working in a male dominated environment and some were looking forward to it.

Most of the women did not foresee any problems working with mainly men and one thinks it will be preferable to working with mainly women.

> *I don't have a problem with it*
>
> *Working with men doesn't really bother me*
>
> *Given my professional career today of working mostly with women, I'm really looking forward to not working with so many women*

One woman believed conditions have improved for women.

> *It's not a problem because it's not acceptable for men to be the way it was back in the 50s anymore and I fully exercise that new way of thinking. I don't take any crap from anyone … I think we're all on a level playing field [now]*

Reference to "a level playing field" indicates that this woman is unaware of several issues she could face in the workplace, for example pay discrimination, a glass ceiling, being judged differently than men – see Hunter (2012).

Another woman already has experience of working with many men.

> *I find with the guys I work with … there's that mutual respect. If you're not an idiot about things and you don't try to pretend that you know more than you know, they're quite happy to help you …*

This woman describes her relationships with male colleagues as respectful, but this respect is given only if she does not overstate her abilities. She sees herself as the helped rather than the helper, and thus appears to accept a subservient role.

5.3.2 Reasons for women's underrepresentation

The women offered several suggestions for there being so few women in ICT. Some believe that taking time off to have children puts women at a disadvantage – they risk being "left behind" and losing confidence.

> *I think we have our families and give up our career and we sort of think there's this perception that we're behind the eight ball and [have] no confidence, your confidence goes. And getting back into [work] is hard. You know, leaving your family and going back to work is a big thing and the gaps are filled by other people.*
>
> *It's the getting left behind when you take time off to have a child, isn't it?*

Another suggestion was that many women are capable of working in ICT but are either unaware of this or choose not to (possible reasons for choosing not to, were not explored).

> *I think a lot of women have a lot of IT skills that they don't give themselves credit for …*
>
> *There are a lot of women out there that have got that potential, that skill, but they don't want to …*

ICT work may also be seen as too technical and lacking sociability, the women suggested.

> *You talk to your friends and all they want to do is [be] social … cause IT's pretty technical sometimes*
>
> *You feel like you're by yourself or with a small group [when you're in IT]. You're not constantly talking to people…*

A further suggestion was that women often reject ICT in favour of a "helping" career (presumably a career such as nursing or teaching). This comment indicates that ICT work is not widely regarded as "helping" people, even by these women who are studying towards an ICT qualification.

> *I really do think that they just tend to go towards, you know, helping other people*

A final suggestion was that ICT work may be more actively promoted to males than it is to females.

> *Do you think they sell IT more to boys more in schools?*

They're not targeting IT for women, other than shopping which is what they think we do …

These comments are in line with previous findings outlined earlier. Perceptions that ICT careers do not offer the flexibility needed for mothering, require technical rather than social skills, and are not concerned with helping others all serve to put women off a career in ICT. In addition, some women do not realise their potential to succeed in the industry. These are all factors which could be addressed in recruitment programmes targeting adult women.

5.3.3 Gender Dualisms

During the data analysis phase of this study it became clear that the women spoke of their experiences and perceptions in terms reflecting gender dualisms. Table 1 presents the gender dualisms identified.

Table 1: Gender dualisms

Women	Men
Family/children	Work
Home	Office
Lack confidence	Confident
Underestimate themselves	Pushy
Good communicators /	Poor communicators /
Social /Good with people	Sense of humour
Good multi-taskers	Focus on single task
Go the extra mile	Give what was asked
Take things seriously /take responsibility	Relaxed approach
Like helping/flexible to suit others	Happy to help if not challenged
Find ICT scary/get left behind /technophobic	Are right into IT/ know more /keep up with IT

The women appeared to accept these dualisms as a given, despite some comments that "things have changed recently". For example, children were universally regarded to be the mother's responsibility, with no mention of a father's contribution to childcare. Comments such as women's multitasking ability is "a given talent" and women's managerial skills are "just from being a woman" further suggest that the women hold essentialist views of gender differences. These findings are similar to those found in other studies noted earlier.

We can also see that the women are proud of their claimed qualities such as: taking things seriously, going the extra mile, being flexible to suit others, multi-tasking, and being good at managing people. This may be, as Von Hellens, Nielsen, and Beekhuyzen (2004) have suggested, an unconscious coping mechanism employed by women faced with studying and working in a male dominated environment. A comment such as "males need females in the class" raises the image of females seeking to be needed rather than letting the males take responsibility for themselves.

6. CONCLUSIONS

For the women in this study ICT serves a purpose. The women are focussed on their family responsibilities and ICT provides a means for them to achieve future well-being. The fact that they may also enjoy ICT is a secondary matter. The women recognise the rewards and opportunities a career in ICT offers but do not have well defined career plans. Their pragmatism outweighs any passion they have for ICT.

The women have a romanticised idea of ICT work; they assume they will be treated equitably and will be able to combine motherhood with work in flexible, work from home arrangements.

The women's narratives reveal dualistic conceptions of gender, which the women believe result from inherent differences between men and women. Many of the qualities they attribute to women affirm the women as valuable, thereby boosting their sense of self-worth. As a result the women are likely to be confirming stereotypes associated with ICT work.

The women are optimistic that the gender balance in the ICT industry will improve.

I think it's just going to grow. Yeah, the numbers of women in IT will grow. I don't think we'll ever go back the other way.

One way for this to happen is for industry groups and educational institutions to target adult women in their drives to recruit more ICT professionals.

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