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## Dualisms: what women say about working in ICT

Catherine Lang

*Swinburne University of Technology*, clang@swin.edu.au

Annemieke Craig

*Deakin University*, acraig@deakin.edu.au

Julie Fisher

*Monash University*, Julie.Fisher@monash.edu

Kathleen Bennetts;

*Monash University*, Kathleen.bennetts@monash.edu

Helen Forgasz

*Monash University*, helen.forgasz@monash.edu

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## Dualisms: what women say about working in ICT

Catherine Lang  
Faculty of ICT  
Swinburne University of Technology,  
Hawthorn, Victoria, Australia  
Email: clang@swin.edu.au

Julie Fisher  
Caulfield School of IT  
Monash University  
Caulfield, Victoria, Australia  
Email: Julie.Fisher@monash.edu

Annemieke Craig  
School of Information Systems  
Deakin University  
Geelong, Victoria, Australia  
Email: acraig@deakin.edu.au

Kathleen Bennetts; Helen Forgasz  
Faculty of Education  
Monash University  
Clayton, Victoria, Australia  
Email: Kathleen.bennetts@monash.edu  
Email: Helen.Forgasz@monash.edu

### Abstract

*This paper revisits the reported dualism associated with the perceptions of the ICT industry and the actual work experiences of women with this career. Eighteen female ICT professionals participated in a series of interviews in which their journeys towards their current employment roles were traced. Given the low numbers of women attracted to the ICT profession, we sought to explore what had attracted these women to pursue careers in ICT and what could be learnt about improving perceptions of ICT careers. Reported here are the women's responses about their initial career trajectories and their views of their current workplaces. A small number of the respondents were in the careers they had always aspired towards; the others, the vast majority, had stumbled serendipitously into the ICT industry. In general, the women enjoyed their jobs. While several were unaware of gender issues in their workplaces, others did perceive a male-dominated culture and felt that technically skilled females still encountered challenges in some work contexts. It would appear that the traditional stereotypes associated with computing careers have not yet been overcome. The implications of these findings are discussed.*

### Keywords

Dualism, women in computing, retention, recruitment

### INTRODUCTION

This paper revisits and extends the discussion on the reported dualism associated between societal perceptions of an ICT (Information Communication and Technology) career and the actual work experience of women who are in this profession. Many school students, and in particular female students, do not consider ICT as a career. Their expectation is that working in ICT is boring and lacking in human interaction (Cockburn 1991; Jewell and Maltby 2001; Margolis and Fisher 2002; MMV 2004). However research has found that many women working in ICT reported that their experience was anything but boring, with their careers described as exciting, challenging and engaging (Trauth 2002; Beekhuyzen, Nielsen and Von Hellens 2003). More recently a longitudinal study (Courtney, Lankshear, Anderson and Timms 2009) established that the negative stereotype associated with careers in ICT in Australian society was indeed "corrigible", that is able to be changed. Yet at the end of this first decade of the 21<sup>st</sup> century ICT is still not regarded as a profession preferred by women (Lang 2007). Equal representation of women in the ICT profession is either steady or in decline (MMV 2008) indicating that the stereotype of a boring and non-human interfacing job is perhaps not changing at all. Similarly Victorian Secondary School Certificate of Education completion statistics show that students of both genders are increasingly not considering IT units in their final years. In 2001 there were 16229 unit completions, 42% of which were female students. In 2009 the completion numbers were down to 5199, with only 19% female students (VCAA, 2010).

There is a strong argument that society needs more women at all levels of the ICT profession. (Klawe, Whitney and Simard 2009 p.68) have suggested that there is a need for more women purely "out of self-interest". Diversity in design and development teams often leads to teams with "enhanced abilities to perform tasks, greater creativity, and better decisions and outcomes" for all (Klawe, et al. 2009 p.68). The literature also reports on numerous design and system failures often attributed to the lack of diversity in development teams (Margolis and Fisher 2002). Furthermore it has been observed that the absence of women in this field is a deficit that we cannot measure and therefore we will never know what outcomes were possible and what we are missing out on

(NCWIT 2007). Equally the business case for increasing diversity in industry and on boards to prevent “groupthink” is as valid in ICT as in any profession. A recent study found that “the mere presence of socially distinct newcomers and the social concerns their presence stimulates among old-timers motivates behaviour that can convert affective pains into cognitive gains” (Phillips, Liljenquist and Neale 2009 p.1).

In explaining the identified dualism in perception and reality of ICT careers, it seems that a contributing factor is the breadth of careers classified in this domain. The term ICT “lacks clarity of definition” (Webb and Young 2005, p. 148) and equally it is not easy to draw boundaries around what are ICT occupations (DCITA 2006). The rapid rate of change makes it difficult to conceptualise exactly what is the computing industry (Beekhuyzen, Nielsen and Von Hellens 2003; Valenduc et al. 2004) nor is it a trivial exercise in semantics (Spencer 2003). Many terms are in common use; computer science, information systems, systems engineering and so on, with ICT and IT being the contemporary “buzz” words. Each of these terms has slightly different meanings and all are hard to define.

ICT has both technical and non-technical descriptors applying to many position types, all of which fit within the ICT umbrella. While a secondary student will be fully aware what a nurse, a teacher or an architect does in their job, the same clarity seems elusive in the ICT arena. Hence when such uncertainty is apparent, many people fall back on the simplicity of ICT as “something to do with computers”, therefore it is technical, most likely involving programming and therefore must be a solitary pursuit.

For these reasons the questions our research sought to answer are: what attracted the Australian women who are in the industry to ICT, and what can we learn from this that might help improve the perceptions of ICT as a career in wider society? Answers to these questions should enable us to better address misconceptions and stereotypes associated with the profession.

## **DUALISMS AND STRUCTURATION THEORY – WHAT WE KNOW**

In 2001 a series of interviews was conducted with ICT professionals to investigate the “effect of social shaping of gender and information technology on gender identities” (Trauth 2002 p.114). These women spoke of being held to a higher standard than their male colleagues, not being assumed a seat at the ICT table, and experiencing both “blatant and subtle discrimination” (Trauth 2002 p. 114). These high achieving women did not dwell on sociological stereotypes for women, and indeed asked “what is normal?” (p.105). In Trauth’s study one woman commented that in communist societies it was normal for females to be in technical fields.

A group of women in Australia, who did not ascribe to socially gendered career pathways and chose ICT careers, took part in a detailed research study (Nielsen, von Hellens, Beekhuyzen and Trauth 2003). Analysis of the subsequent interviews was conducted using Giddens’ structuration theory which highlighted dualisms in interpretive schemes of these women. It suggested that when the women spoke about their work their story was not always consistent with their lived experiences: “Although each of the women maintain that the ICT industry is interesting to them and would be to more women if they understood it better, they represent ICT as a set of irreconcilable male and female attributes and domains, to which women must adapt”. While there were some issues in using Giddens’ theory, as acknowledged by the researchers, this is unavoidable due to the inability to complete a longitudinal study. Longitudinal studies are incredibly difficult in an industry where rapid change is the norm. Additionally the ICT industry is still a young field and as previously mentioned a field where no consensus has been reached over nomenclature and definitions. Nielsen et al (2003, p.73) concluded that women in ICT careers “... perceive that they have overcome barriers and succeeded in the industry... talk about themselves as different from other women they know, indicating that they are challenging the dualism of gender”.

Spender(1995) espoused the view that as more and more women entered cyber-space there would be an influx of female values, however this optimism is not reflected in the reality (Grundy 2000; Kvasny, Greenhill and Trauth 2005). Indeed the under-representation of women in ICT is evident in many western countries. In northern Europe, Corneliussen explored the gendered nature of ICT with her students and found a perception of “acceptable behaviours” was needed before females felt “permitted” to enjoy computers (Corneliussen 2004; 2005). Similar observations related to the acceptance of ICT as a suitable career for women are reported from southern Europe, the Middle-East, the USA and the UK (Gal-Ezar, Shahak and Zur 2008; Craig and Lang 2010). USA researchers explored the under representation of women in ICT degree courses at university and noted that societies around the world have often ascribed careers as gendered, that is some careers are considered more appropriate for men and others socially acceptable for women. They commented that the influence of allowing student choice in secondary education, while considered a right in most westernised countries, allows students to pursue society endorsed gendered pathways which leads to girls opting-out of ICT courses and careers (Barker and Aspray 2006 p.21).

More recently Courtney, Lankshear, Timms and Anderson (2009) surveyed 272 women working in ICT and reaffirmed this position that women in ICT often perceive themselves to be going against the norm. However, in this study the majority of respondents considered their ICT career rewarding, and able to provide opportunities

and challenges not readily available elsewhere. This stance is quite a long way from the perception of an ICT career held by the majority of secondary school students. Further analysis of their data found that respondents entered ICT careers via university studies with a sense of performing socially useful work and their experiences were in the most as expected (Courtney, et al. 2009 p.58). Based on interviewee reports that varied depending on the work environment and workplace relationships, the researchers concluded that their findings “demonstrate the corrigibility of stereotypes and public perceptions of ICT careers and the industry” (Courtney, et al. 2009 p.59).

The lack of women in ICT careers has been a topic for research for more than twenty years (Clayton and Lynch 2002). Trauth suggested that it was "ironic ... there is a documented need to study the gender imbalance in this field, yet this topic is both under-studied and under-theorized" (Trauth 2002 p.99). Similarly, it has been suggested that the under-representation of women is a factor that contributes to the lack of attention to the problem: “The discursive constitution of ICT is focussed on the technical, system application, education, *NOT* on who is *DOING* this. So the discursive conversation of women in ICT sits on the outside of accepted research of the discipline” (Yates 1993 p.1). It would appear that there has been no change to the issue in almost 20 years and it is still predominantly women, the visible minority in ICT, who are currently researching this issue (Spencer 2003). The perception remains of marginalising research into women in ICT and associated feminist concerns, evident by the gender of participants in any conference with this focus (see [www.ozwit.org](http://www.ozwit.org), [www.gracehopper.org](http://www.gracehopper.org)).

These prior research studies, and the difficulty associated with conducting longitudinal research in the constantly changing field of ICT provided a framework for the study reported in this paper. The current series of interviews with ICT professionals explores the themes of workplace climate and acceptability of the career path. It adds to the earlier research by assessing the effect of positive choice in women who are ICT professionals. Qualitative case studies like the ones in this research contribute to the emerging theories of duality and structuration in ICT careers.

## METHOD

Qualitative exploratory interviews were conducted with 18 Australian women who were working in ICT professions. To allow for rich descriptions to be gathered, the interviews were guided by a set of key questions informed both by the literature such as previous studies by Nielsen et al. 2003 and Trauth 2002 and a brainstorming session among the researchers. A precise script was not adhered to and participants were encouraged to expand on their perceptions, stories and work relationships as the interview progressed.

Interviews were conducted over the telephone as well as face to face during 2009 and 2010. Interview participants were sourced via two professional networks, the Victorian ICT for Women Network and the Australian Computing Society.. The interviewer asked the women to describe their current position, title, activities and work environment. They were asked to reflect on what drew them to an ICT career and to comment on the best and worst aspects of working in this profession. If it was not already mentioned, the women were then asked to comment on the whether the gender disparity in the profession affected their working life. The interviews were digitally recorded and manually transcribed. They were then summarised and analysed with a focus on main themes of:

- The individual’s history or journey to their current role; was happenstance involved or were conscious choices made?
- Their gender awareness; focusing on modesty, comfort, stereotypes.
- What they like best as well as the worst aspect of a career in ICT; work satisfaction.
- Their confidence in what they do.

The method of analysis relied on inductive coding (Miles and Huberman 1994), with the starting list of codes derived from the main themes. A database tool was used to allow a series of reports to be generated according to the themes to allow a structured analysis of responses. This method was adopted because it enabled a series of responses on the same topic to be analysed independently or in conjunction with associated and previously coded complementary themes.

Of the 18 women interviewed, 16 held full-time positions and the other two worked part-time. Their job titles were varied including Business Developer, Manager of ICT, Business Analyst, Manager e-services and IT architect. Table 1 illustrates the wide range of roles the women performed in the ICT profession. Eight of the women worked in large corporations, five for the government sector, four in educational institutions and one for a small to medium enterprise that had global partnerships. Eleven of the woman had been in the industry for more than 10 years with four of them for less than five years in ICT. The interviewees came from both Government and the private sector ensuring a cross section of views.

Table 1: Demographic summary of interviewees

<i>Mode of Employment</i>	<i>Job Title/Role name</i>	<i>Where employed</i>	<i>Years in IT</i>
Full-time	Manager Large Projects	SME (global partners)	25+
Full-time	Academic	Education	25+
Full-time	Senior Lecturer	Education	25+
Full-time	Academic, Deputy Head	Education	25+
Full-time	Planning/Service Management	Large Corporation	15-24
Full-time	Business Analyst	Government	15-24
Full-time	Client Resources	Large Corporation	15-24
Full-time	Call Service Specialist - Infrastructure	Large Corporation	15-24
Full-time	Systems Architect	Large Corporation	15-24
Full-time	ICT Trade and Business Development	Government	5-14
0.6 Part-time	Senior Analyst	Large Corporation	5-14
Full-time	Manager e-Services	Government	5-14
Full-time	IT Architect	Large Corporation	5-14
Full-time	IT Architect	Large Corporation	5-14
0.8 Part-time	Manager ICT Workforce Development	Government	Less than 5
Full-time	Content Manager	Large Corporation	Less than 5
Full-time	Support SAP	Large Corporation	Less than 5
Full-time	Application Manager	Education	Less than 5

## LIMITATIONS

The authors acknowledge the limitations associated with this sample. All the interviewees were sourced from the state of Victoria so are not representative of the whole of Australia. However, many of these women work in companies with a national and international reach. Victoria represents approximately 29% of ICT employment in Australia (Multimedia Victoria, 2009). Lastly we acknowledge that while it is not statistically sound to generalise from a localised case study such as this, the benefit of qualitative case study research “strives to develop theory in the case setting” (Lee and Baskerville, 2003).

## FINDINGS

The interviews provided a series of stories about the journey each of these women took to achieve their current role. What we were keen to determine was if a career in ICT had been a conscious choice, or was affected by happenstance, for example after a chance encounter with an individual or a chance opportunity. The next section reports on the results and is presented under the themes explored.

### *Why the computer industry?*

Only four of the participants selected ICT as their chosen first career. One attributed her choice to the fact that both her father and brother were already working in ICT, another said she had been strongly influenced by family “I lived with my uncle and watched him assemble computers”. Another could not remember any other career she aspired to. In her story she used the word ‘always’ consistently, saying she had been attracted to the career because it was “dynamic, *always* changing, [she had been] *always* technical, *always* on the computer at home, ... *always* mucking around, ... *always* enjoyed it” leaving no doubt that this was a conscious career choice. The fourth decided to go straight into ICT because “computing was booming and there were good job opportunities” qualifying her response with “I chose maths and computing to hedge [my] bets”.

All of the other women in the sample had started out in another field; however six made a conscious choice to switch to ICT. For example, one woman who had been a journalist was attracted by the “innovative activity” in computing; another an engineering student who struggled with the course was encouraged to switch by her

parents: “my parents keep on telling me, [the] moneys in IT ... I grew [up] in a country where your choice of profession is mostly driven by where you’re going to get more money”. A third had been a nurse and was looking for “something different and something that paid well”.

Happenstance influenced the choice of an ICT career in the remaining 8 cases which consist of almost half the sample [n=18]. One woman had been in Human Resources and dealing with the office IT system when a “vacancy arose”; another was an accountant and through that work “discovered IT ... that was where I wanted to be”, a third had a degree in politics and became involved in website management in a large corporation. She then decided she “wanted to take it further”. She mentioned the flexibility of the career being a positive attraction “a lot of what I do can be done remotely so ... that’s really useful”. One of the academics was in her final year of a maths degree and looking for a job when a vacancy arose to tutor in ICT and “it all started there”. A second academic completed one ICT unit in her maths degree and this was enough to get employed in the ICT industry, which in turn led back to a career as an ICT academic. One mentioned it was “sort of an accident ... it grew from a computing course at a women’s co-op”, another who was going to be a chef discovered an aptitude for IT. She modestly said “I had a go and just really enjoyed it and picked it up very quickly and learned very quickly and was able to help friends... I didn’t realise that, you know, I had people ask me [for help].” This type of response was reiterated by several others; one said “an opportunity arose and I liked it”, another was studying a biology degree and “fell in love with computers”.

### *The workplace climate*

We were also particularly interested if the ICT workplaces were considered unfriendly to women, a “chilly” environment as reported in other studies (Roldan, Soe and Yakura 2004). The responses from two-thirds of this group of women were however overwhelmingly positive: “I have never felt chilly in twenty years in IT”; “The company is very strong about managing people and managing diversity”; “I don’t find it chilly, I attend a lot of those senior IT kind of meetings”. However, a third of the respondents was more hesitant or agreed with the view that the workplace was unfriendly for women. One said it was a “boy’s club” but not “chilly”. One agreed that the environment was “chilly and a boy’s club”, another said in response “not really, but it is very male, swearing, one manager in particular”, indicating that she found the workplace less than pleasant.

These responses hint at the underlying issue of lack of acceptance, as iterated by one interviewee: “not chilly, just not accepting of equality in technical knowledge. I fought for two years for credibility”. It should be noted that the same woman stated that the best thing about her role was “Everything. I just love my job, I have to tell you that.” This range of responses indicates that in many workplaces the climate is still determined as much by policy as by personality, and suggests that women as the under-represented minority have developed a degree of resilience to adapt to the “boy’s club” environment.

### *Gender issues in the workplace*

The women interviewed were also asked to comment on their perception of any gender issues at work. At least a third had noticed that the higher levels of management were mainly male dominated, as one commented “it does make a difference if you ... have a female above you that can support you and understands the difficulties of managing a house of small children and workload.” The majority however said that there was not anything they had noticed. In conjunction with this question we asked if there were transparent salary scales, a strong indicator of gender differences. The majority of respondents said that this was the case, that is, that salary scales were structured and linked to positions. Two had not asked and one said they were individually negotiated, a strategy that is renowned for disadvantaging women. This woman noted she “believes there is no gender distinction” around salary, an optimistic view given that inequality in remuneration was a major issue reported in the Australian Computer Society – Women’s Board survey “Women @ Work 2009” (Warne and Bandias 2009).

### *Skills and confidence*

Finally the women were asked what types of skills were required for this career path. One succinctly reflected the change that has been observed in most ICT occupations “it used to be like scientists, now it is more business oriented skills [are] needed.” In most other responses the first word said was “communication”, supporting the previous response. Others commented on behaviours that are needed such as “need to be proactive”, another said there is a need to be an “outgoing person ... innovative thinker, not the stereotype, not just sitting in front of the computer”. A third commented that the skills required must be “transferable and valuable”, indicating the need to be adaptable in this constantly changing field. Several mentioned the need for “creativity” or “thinking outside the square” as valuable skills to enable problem-solving. There was mention of a “need for attention to detail” but the same person said it helped to be a “quick decision maker”. No one mentioned knowing any particular software or hardware component specifically.

## DISCUSSION/CONCLUSION

One clear message from our study is consistent with findings from other research that an ICT career is “challenging, exciting, rewarding and compelling” (Courtney, et al. 2009 p.60). The dualism between school students’ as well as the wider society’s perception of what an ICT career involves and the actual work experience of women in ICT is maintained. An ICT career, according to the women we interviewed is quite the opposite to the narrow perceptions of students in secondary schools as referred to in the introduction.

We found however, that there was limited evidence to support earlier findings that women in the ICT field were held to different standards with only one participant referring to the battle to gain technical credibility, suggesting that perhaps the workplace was changing. The results of our interviews lead to further questions. Have the women we interviewed accepted and adapted to a male-oriented ICT workplace, or has the workplace changed as a result of the differing focus of what an ICT career is? We certainly found a greater climate of diversity, acceptability and inclusion, however a more comprehensive study with a greater number of participants needs to be carried out before further conclusions can be drawn.

Students are still relatively unaware of the reality of ICT career possibilities. This lack of knowledge was articulated by several of the women interviewed for this research and is embedded in their discussions about their “journeys” to ICT careers. Most of the women described a chain of events and job prospects presenting themselves and of taking advantage of a series of “chance” offerings, or a happenstance event that led to their current position, as distinct from a conscious decision to pursue an ICT career. Several respondents reported that at the time, they were not even aware of the existence of such jobs, and specific job titles emerged subsequently. Thus the difficulty in defining an area that is constantly and dynamically changing and evolving is highlighted. Ignorance and a general lack of awareness of the scope of ICT careers appear to be an impediment to increasing the gender mix of those in the profession. There is a real sense of contradiction, technology permeates contemporary society, yet there remains a struggle to define its workplace identity and communicate this adequately and indeed accurately to younger generations considering future career options.

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