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Intervention Programmes to Recruit Female Computing Students: Why Do the Programme Champions Do It?

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Abstract
This paper looks at intervention programmes to improve the representation of female students in computing education and the computer industry. A multiple case study methodology was used to look at major intervention programmes conducted in Australia. One aspect of the research focused on the programme champions; those women from the computing industry, those working within government organisations and those in academia who instigated the programmes. The success of these intervention programmes appears to have been highly dependent upon not only the design of the programme but on the involvement of these strong individuals who were passionate and worked tirelessly to ensure the programme's success. This paper provides an opportunity for the voices of these women to be heard. It describes the champions' own initial involvement with computing which frequently motivated and inspired them to conduct such programmes. The research found that when these types of intervention programmes were conducted by academic staff the work was undervalued compared to when the activities were conducted by staff in industry or in government. The academic environment was often not supportive of academics who conducted intervention programmes for female students.

Keywords: Recruitment, computing students, female.

1 Introduction
Since the turn of the century there have been fewer students studying computing at all levels of secondary and tertiary education in Australia. In 2007 in Victoria for example, there are significantly less students studying computing at senior secondary school level (see Figure 1) than in 2001. Equally in 2007 there is a reduced number of Victorian secondary schools that offer computing education than in 2001 (see Table 1). The demand from industry for qualified computer graduates however is high and a subsequent skills shortage has seen the Australian Government include computer professionals on the Australian Migration Occupations in Demand List (MODL 2008).

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specifically aimed at encouraging young females have been designed and implemented (see for example Craig, Fisher, Scollary and Singh 1998; Clayton and Lynch 2002; Goral 2006)

While much has been written about the need for such programmes and the way they may operate little has been heard about the women (and few men) who undertake the task of designing and implementing the programmes. What is their history with the computing discipline and what are the consequences of their involvement with such programmes?

2 Methodology

For this research a collective case study of 14 individual intervention programmes was undertaken. Each of these cases was a concentrated inquiry into a particular intervention programme. Data was collected via detailed document and artefact analysis and by in-depth interviews with the instigator/leader of each of the programmes. Each case was investigated individually to try to understand its complexities (Stake 2000). Within the context of research in the computing discipline, the number of case studies is consistent with other research (Orlikowski and Bardoudi 1991). Myers (2002) queries why more than one case is actually necessary but Miles and Huberman (1994) suggest cross-case analysis enhances generalisability as a multiple-case design will deepen the understanding and ability to explain what has occurred. Herriott and Firestone (1983 as cited in Yin 1994, p. 45) suggest that the evidence from multiple cases is more compelling and therefore the study will be more robust than one of single-case design.

Miles and Huberman (1994) suggest that a multiple-case study requires clear choices about which cases to include within the study. The intervention programmes which became the case studies for this research were selected on the following basis:

- One of the programme's objectives was to increase the number of females who were part of the computing field.
- The programme could be made up of one or more projects however the programme needed to be a sustained activity.
- The principal champion/instigator of the programme was prepared to participate in this research.
- The programme and projects could be completed or be ongoing.
- The programmes were chosen to provide diversity in location and focus.
- The length of time in operation and range of influence of the programme and projects were also considered.

Intervention programmes have been conducted by three different types of entities: educational institutions, government bodies and industry groups. A total of fourteen cases were selected (eight from universities, three from government bodies and three from industry groups). A greater number of case studies were chosen from the university sector than the other sectors due to the proliferation of such activities in this sector.

A total of 19 interviews were conducted. For each case study the programme leader or a major contributor was interviewed. However additional interviews were conducted for five of the case studies either because there were joint programme leaders or another major contributor was available and willing to be interviewed. For four of the case studies two people were interviewed and in one instance a third person was interviewed. Interview times ranged from approximately 60 minutes to 100 minutes in duration. The interview participants are identified by pseudonyms and will be referred to as the programme's champion in further discussion.

3 Focus of the Programmes

The UNDR report (2004, p. xii) advocates that the 'critical starting point for achieving gender in the ICT sector is tertiary level education'. Work by Clayton, Cranston, Crook, Egen, Lynch, Orchard, Robinson and Turner (1993) however, has provided a broader framework which identifies three stages where it is possible to influence the participation by females in computing. The three stages of the framework are as follows:

1. PRE-TERTIARY stage: Where the focus is to encourage females to develop the necessary pre-requisite skills and to enrol in computing courses.
2. TERTIARY stage: Where the focus is to decrease the attrition rates for female students.
3. POST-TERTIARY stage: Where the aim is to equip females with the necessary skills and contacts to obtain positions in the computing profession. (Clayton et al. 1993, p.16):

Eight of the case study entities conducted projects at all three stages (see Table 2), five conducted intervention projects at two stages with only Uni7's focus remaining on just one stage. It is interesting to note that all groups conducted activities at the pre-tertiary stage. Initially involvement by academia and industry commenced with a focus on only one of Clayton's three stages, with a growing awareness of the magnitude of the issues the programmes evolved to incorporate interventions at more stages.

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Table 2: Focus of Intervention Programmes
This paper reports on the findings from this research regarding the champions behind the programmes. All of these champions were women.

4 The Programme Champions

Success of the intervention programmes appears to have been highly-dependent upon not just the design of the programme but on the involvement of strong individuals who were passionate and worked tirelessly to ensure the programme’s success. The programme champions were ardent supporters of the cause to encourage more female participation in computing. Their personal involvement with the computing discipline and the intervention programmes are described in the following sections. This involvement was a career barrier for many of the women, though not for all.

4.1 The Journey into Computing for the Champions

While computing for a few of the interviewees was an interest that they had had for a long time, for example Clair received her first Atari at a young age, the majority came to computing by ‘accident’;

I don’t have a degree in this area. I haven’t got an IT background as such; I fell into it in the telecom’s game twelve years ago. My background was definitely not in IT. (Cheryl Ind1)

They said “Do you want to reorganise the library— it’s a mess?” and I said (because I liked organising things) “Yeah, I would.” So I had the card index system going with everything labelled and David came in one day and he said “Why don’t you put that on the computer?” and I said “What?” He said “Why don’t you put it on the computer and then people could come in and look it up on the computer VDU.” And I said “I don’t know anything about computers.” And he said “We could do it together.” And I said “No, there is no way. I’m not any good at maths.” And at the time I was also doing Aran knitting ... and David said “If you can follow that pattern to create a jumper, you can work computers as it is just another type of code.” So I thought okay, so he got my attention with that. I still thought I was going to have to add things up. So we sat down together and he did the programming bit of it but I watched him do it and just created a front-end menu, this was on the green screen, and behind it was my card index system basically which was already, as he pointed out, you already have the logic in the card index system. It was just a case of doing that bit together. So I was hooked. I said “Oh my god. This is how they work?” It demystified it for me and I said “I want to learn more about this”. (Bev Ind1)

... it was a complete accident. I fell into it, it bit me and I loved it and that was it and I just stayed. (Lesley Ind2)

Ending up in computing without having planned it was not only something that happened to these women themselves but they had also seen this happen with others. Sarah (Uni3) had discovered that a number of her female students ‘fell into the [computing] course by chance. Or despite the fact the careers teacher said there is no point in applying for that’. This has led Megan (Uni1) to conclude that;

... to a large extent, women’s lives in Computing ... are governed by serendipity. They don’t plan their careers. They look for interesting jobs. Perhaps there really are cultural differences between men and women and no amount of intervention will alter their perceptions of computing careers.

4.2 Motivation for the Programmes

The original impetus for the intervention programmes that were the subject of this research varied depending on the sector. For the university staff involved, the stimulus for the programmes was often a lack of female students within their own classes. Individual staff realised that there were few, if any, girls within their own computing classes and this led to the development of interventions particularly focused on retaining the current girls or raising awareness amongst secondary girls:

We didn’t have many women in the course and we wanted to keep the ones that we had. (Alison Uni5)

It was primarily to raise [school girls] awareness of what a course in IT and working in IT might involve. To get over the stereotypes of it being a nerdy, back-room occupation which did not involve working with people. (Nikki Uni2)

Their aim was relatively modest with the desire to increase the number of girls within their own courses a key factor.

What we are doing is hopefully going to make a difference and get more girls to consider IT at [Uni3]. (Sarah Uni3)

The motivation for the industry groups also emerged from their own circumstances; individual women, seeing the results of a lack of women in computing in their own workplace saw the need to create networking opportunities for women in the industry.

We were all in similar positions in an IT company in that we were all starting to hit the glass ceiling ... Hitting glass ceilings and also the decline in numbers of women in the industry. So we started our group as a response to that ... to create a network where [women] could get to hear about opportunities and hear about trends in the industry and what was happening so that you were ahead of the game and not behind it all the time. (Stacey Ind3)

The government organisations were a little more pragmatic and they adopted a more holistic view point:

I guess everything that frames what we are involved in is around a government policy document ... So many different organisations are doing things to engage girls in ICT but we are not getting the full benefit when every man and his...
The views of the programme champions were that with a more diverse workforce in computing, the culture of the computing organisation, and the products it makes, might be quite different;

I think that we would probably have less system failures. I think we would have systems that were designed better, more with the user in mind.

(Alison Uni5)

For diversity, for every logical reason ... Because it is an untapped resource, it is untapped pool of talent, because girls see things through different eyes to boys. Because Asians see things through different eyes to Australians. We need diversity.

(Sarah Uni3)

I have seen a lot of women who are also valuable members of the team because they are able to support each other, the men and the women. They are able to ask different questions about what they are developing, they are able to bring probably the same skills, that is the programming skills but they look at things differently and bring different concepts. They see relationships differently within the application and the abstract aspects. They complement. Often highly-analytical abstract thinkers (say they are men) can be working with highly-analytical abstract women but women are seeing things from different metaphors or different structures so the two come together and create a better application or a better programming outcome.

(Stacey_Ind3)

However there are many assumptions and stereotypes that will need to be broken down before that will occur; I found a job working for an oil and gas company ... When I went there I was introduced around to all of the management team and one chap, Andrew, I'll never let him forget this. The personnel woman was bringing me around and she said "This is Bev, our new IT lady." And Andrew misheard her and said "Finally," and I thought "I wasn't expecting that from the operations manager." And he said "We've finally got a tea lady." (Bev_Ind1)

It was recognised by the programme champions however that diversity must be managed well if the benefits are to be realised otherwise it may cause conflict and even a decrease in cohesiveness within an organisation.

4.4 Support for the Programmes

Designing and implementing intervention programmes specifically for women in computing does not automatically get support from others in the organisation or community. Support for some intervention programmes was strong and came in the form of resources and/or an advocate:

It was a priority of the Head of School, ... he has set up that supportive environment for them ... I think it was certainly embedded into the culture ... This is a school where it was considered perfectly reasonable to do an honours thesis on something to do with female participation in IT and women's roles. (Helen Uni4)

Great financial support from the Strategic Initiative Grant. Time release from teaching was purchased, and the freedom to pay for functions for the students from our own budget.

(Sarah Uni3)

Thank god we have got the [support of the] university because we have got all the facilities, it is just fantastic. The Executive Dean in the Division of Arts is a supporter. He believes in diversity and he was great at the launch [of the intervention]. (Bev_Ind1)
Getting support at all was problematic for some with several programme champions having to contend with continually justifying the need for the programmes, or defying opposition to the programmes;

It was interesting when I first proposed it which was probably in the late 1990s ...it didn't get department support until I agreed to have a boy's day and a girl's day. (Kerrie_Uni7)

That is the other thing too you have got to convince people that it is a worthwhile thing to do ... It would be really good if instead of having an intervention programme that was run by a couple of interested people, the whole department took it on and said this is important. (Alison_Uni5)

The industry and government entities comprised mostly of women. The staff from the university sector however were conducting the intervention programmes for girls, through the context of their schools or departments, which were mostly made up of men. Many of the university groups had to counter opposition rather than receiving support:

The unintended was the backlash that we got from the boys about why no men's programs. And a degree of defensiveness which I am not sure how much we broke down. (Nikki_Uni2)

We have got a male chauvinist pig in as Head of School who basically denigrates us at any possible chance that he could. Basically criticised our whole courses, the female strong courses, saying they were easier ... From then it is just a really bad feeling around the play. The [percentage of students who are female] has gotten much less this year. It is the lowest it has ever been ... (Fiona_Uni)

Some of the male students did not support the initiatives either:

Some of the male double degree students wanted to come along [to the support community for females] because they thought the other female double degree students had an advantage ... There was just a tiny level of snide comments etc and different comments like that. ... They would just say "Your girly stuff" or whatever. It was certainly more than balanced by males who were supportive. But actually thinking about it some were actually supportive in a patronizing way. (Anne_Uni5)

While the male staff at some of the universities did not support the initiatives this was not the case at all of them:

We had a Dean that supported it. We nominated Jack for the equity manager award two years ago for a very good reason; he has always been supportive of women in IT. When we wanted to become a corporate member of WIT, no questions asked. Any of the things that I have tried to do he has always supported. (Jodie_Uni6)

4.5 Issues with Conducting Interventions

The most common difficulty facing all the women involved with these intervention programmes was the need to invest large amounts of time which detracted from their other responsibilities. Debbie (Gov3) indicated that her involvement with intervention programmes was 'a huge cost in time'. Even the women of the largest of all the case study entities had trouble balancing the time involved, though they were the most successful in terms of being able to share the load:

The financial controller I mentioned last night she got married in August last year. I had recruited her on the steering committee. She was really enthusiastic and did a big event in August but she got married in September and now she has realized realistically that her new lifestyle is not going to mean that she has got the time available to do this then. You have to be magnanimous about this and you also have to have a pool of people that is available and up and coming and interested. (Stacey_Ind3)

The time it takes to be involved and to be able to do things well was by far the most common difficulty faced by all the programme champions with regard to their involvement with girls and computing initiatives, keeping in mind that all were also working full-time and most were mothers and wives as well. Furthermore there was a real concern regarding 'burnout';

Again why I haven't really been involved this year is because last year just killed me; it was just so much work... (Fiona_Ind2)

Even when you get government funding for all these programs... We have never had federal government funding but you get state funding, you are not allowed to pay for the project management and the organisation behind it. Isn't that bloody ridiculous? ... Yeah, every one of those, we have had to put in voluntary... and massive amounts of time. (Lesley_Ind2)

We were starting to do mentoring but it is like everything else, when push comes to shove you just don't have time to do it ... I must admit I am a bit naught I had seen the emails come out [regarding another possible project] and I just thought I haven't got time for it. (Kim_Uni4)

I found when I went back to state A this time, [the women in computing group] has virtually vanished because the key people involved had burnt out, others had moved on ... (Helen_Uni4)

Then Josephine decided she was going to put her toe in the water and do a role model day. She did and it nearly killed her. I am sure you have heard the story. We thought we should do it, but it nearly killed Josephine and she nearly lost her business. How are we going to cope? ... The end result was that it was a mind-blowing experience. ... After we did that we thought well it nearly killed us and by this time Josephine was saying "No way am I doing it again ever." (Cheryl_Ind1)

Nevertheless Josephine, Cherly and Bev have gone on to organise similar events again;
I am coming up to the third one and each time it is like having a child, when we have a child you think “I will never do this again” and then two or three years later here you are pregnant again going through the same issues again. That moment that that child is placed on your tummy is the most special moment you could ever have, you can’t replace it with anything. Similarly I think when we had the first [event] and we were there and we were just surrounded by the young girls 13-14 year olds with all the hype and all the energy and all the stress level that got you there and then the day was over and you came back and you thought “What an accomplishment. What a feeling of absolute pure adrenaline pump.” ... We [recently] played the DVD and it still brings tears to my eye because I look at the girls and the excitement and I look at the speakers and I look at everything and sometimes I have to pinch myself to realise that we were just a bunch of women who had a passion, who wanted to make a change and a difference, and coming together and say we can do this. All we have is energy and nothing else, and a belief that it is needed. You look at this DVD and think “We created this. This was us. We did it.” It makes you feel so good, it really does. That moment! (Cheryl_IInd)

The amount of time it takes to be involved with programmes was a key factor in the scaling back, or closure, of intervention programmes in the university sector. Changing environments in universities across Australia has resulted in more students and greater demands upon staff. Kim (Uni4) explained ‘we are all being pressured with heavier teaching loads and more commitments’. For the university women the lack of value placed on this work by colleagues was another major difficulty. Therefore when this type of work does not come within a person’s job description, it is not seen to be important and therefore is rarely supported with adequate funding; it becomes difficult to justify or sustain;

We tried to share the costs by also engaging the Computer Science School and with TAFE. The idea was that we would rotate the organisation between those units. The reality was that no-one picked it up. I think eventually we just kept our dummies as it was all extra work, above and beyond, for those who were doing the work. (Nikki_Uni2)

I was actually spending too much time on intervention programmes and not keeping up to date with my own area of research which is object oriented systems and development. In the end I needed to make decisions about where most of my time was spent as it can be an all-consuming one and I do tend to get a little obsessive about it. (Anne_Uni5)

For the women in the university sector their work with girls and computing initiatives was regarded as ‘peripheral’ to their main job. Legitimacy for participating in ‘women and computing’ interventions for university staff could come through it being seen as ‘recruitment of students’ or via a publication record, however it was seen by many colleagues as not real work and not important;

I am in a school in a university that doesn’t have many women or female staff members and we are not very well regarded by our male staff members in terms of our research, particularly our research of women in IT. ... We have been criticised many times that our research is frivolous, it is meaningless and why do we bother? That it is not important. ... We do much more important research. We are talking about robots, it is much more important’. In that way it hasn’t been so nice and I know I get the impression that we are looked at as the feminist group I guess whereas I don’t really think we are feminists as such. I think it is just that we want equity for everyone. I think that is what it is ... (Flora)

Being labelled as feminists by work colleagues was not an isolated incident;

Probably the biggest challenge is that sense that you are a butch feminist pushing an agenda which is not relevant ... You think, boys go and meet a rabid feminist and then meet us! Because it is not where we are coming from. We are not after dominance, we are after equality. We are after the outcome where it is no longer an issue. (Nikki_Uni2)

Having got a reputation for conducting interventions has also led to an expectation that you could do more. After a very large role model event for secondary girls the state minister suggested that Cheryl’s group should run some activities for teachers as well;

As we said to the minister it would be nice if we could look after everybody but we can’t. It is like George, he wants us to do a showcase ... he wants us to do it for boys as well. We can’t be everything to everybody because we then won’t be successful for anything. (Cheryl_IInd)

As mentioned previously by Kerrie at one university the ‘Girls in Computing days’ were only able to be conducted if there were also ‘Boys in Computing days’. At another university it was suggested that the programme champion could also be involved in creating intervention activities for other groups too;

In fact I had one lecturer say to me, “Well we have got an issue with non-English speaking backgrounds, why aren’t you helping there?” ...and my reaction to him was “You’re supporting this issue, why don’t you do something about it? I haven’t got the time to do both” and he backed off very strongly. But it was a shame because I would have liked to have seen some of those issues addressed ... Those sorts of issues have to be carried through but one person can’t address them all. (Jodie_Uni6)

4.6 Effect on Own Career
For the women from the university sector being involved in girls and computing initiatives was often not seen as a good career move, with their research output often suffering from the amount of time used up by the intervention programmes. In the university sector a
strong research profile is necessary for credibility and therefore promotion;

Doing all those sorts of things certainly did not help my research because if I was doing those, I was not doing research. It did, I suppose, get me a reputation for knowing something about it, which in some ways probably did help.... I suppose I have had some interesting invitations to speak because of it, but it did take a lot of time from my research, yes. There were times when I got a bit sick of being “Miss Women-in-Computers”, when I actually wanted to get on with doing something else. (Megan_Uni5)

It has not just been women-in-computing but student support. I suppose I have been involved in student support when other people have been doing their PhDs. From that point of view if I had got a PhD earlier I would have finished it. I also would have been promoted earlier. (Jodie_ Uni6)

It is not an enabler. It is funny with my background [as] a secondary school teacher, education specialist, moving into IT. So I have never really been a solid IT, which is fine because I have never really wanted to be a solid IT. I suppose now I am moving into Information Systems a bit more. I have always looked with a bit of humour at the status. The more technical, the more status, regardless of your education experiences. There are young bucks who have redesigned the whole technical degree with very little educational background. They are allowed to do it because they are the programming specialists. Women in IT is not an enabler.

I would never have it as my mainstream research area. Because I don’t believe that people take it seriously as a main research area. ... I have spoken to people like Sally, she has done a little bit of gender stuff too but she would never do it as her main thing. She is interested in it and sympathetic but she knows that if you want to be accepted in the mainstream that it is a bit of a problem. (Alison_ Uni5)

While the work was not seen as an enabler for an academic career it did have some benefits, as publications could come out of the work and it did make possible contact with influential people in government and industry;

I think for me it has given me a lot of opportunity; it has given me access to a lot of people that I probably wouldn’t have had access to before. I have had people like the IT Minister, his PA came out and talked to me saying ‘What are you doing for girls in IT?’ ....we are the people they are coming to. (Fiona_Ind2)

The effect on the women’s careers from industry and government entities was not nearly as negative;

No I can’t say that it has had negatives. My family suffered because they don’t see me but they are so proud of what I am doing, and I am doing something that is making a difference. I am not doing it for me and it is not a selfish motivation that is pushing me forward, it is because I believe in it. (Cheryl_Ind3)

The disadvantages are that you tend to get tarred with a brush and people think that that is all you are interested in and that is all you do. If people have heard of me, and obviously not many have but if they have, that would be why and they think that is what you do when you actually have a whole heap of interests and this is just one of them but it is one that I am very passionate about so I don’t like getting put on the shelf and “This is who you are.” At the same time I also fight to keep doing this because I think it is so important and I don’t think it would get picked up if I got dropped. That worries me. ... I really enjoy being part of something that is part of the State and being able to have that influence. (Clair_Gov3)

4.7 Were these Programmes Successful?

How successful were the intervention projects, implemented by the case study entities, from the perspective of the programme champion?

Fantastic, incredibly successful. (Debbie_Gov3)

The end result was that it was a mind-blowing experience. It was a fantastic effort by all; we just did the unimaginable and pulled it off and we had 1500 girls by the end and we were able to pay our expenses and still manage to do very well. We put together the questionnaire and the feedback just came back from the girls “Fantastic, want it again.” ... and then as time went on the schools started calling and saying “Are you doing this? We had such a positive experience.” ... It started building its own momentum. The fact that we have already got 1800 girls registered for the third showcase speaks volumes. (Cheryl_Ind1)

Results of the survey show that the intervention project achieved its objective in that it was successful in improving the participants’ awareness of the tasks required of a ‘typical computing professional’. (Uni7_documents)

All the interviewees, when asked whether they considered their programmes a success, said ‘Yes’ though a number of the respondents then qualified their answer;

Were the conferences successful? Very much so. I probably would have liked more people at the second one. No, I think they were great. (Kim_ Uni4)

Yes. We tried to measure it quantitatively and we couldn’t. We couldn’t relate anything really to the program but our qualitative work tells us that women students perceived that the program was just great and that is enough for me. (Alison_ Uni5)

Almost all of the respondents talked about individual instances of having made a difference in one persons’ life and that this was enough to make the programme a success;
Yes, I know that I personally have touched lots of women's lives from that point of view. That satisfies me but does it really justify the amount of time and effort that I have put into it? I don't care. Really you cannot always measure things by the direct and tangible benefits so to me if we supported an activity and it made the difference between no girls going into a course and one girl going in I would be quite satisfied with it, I don't think it is an issue. (Stacey_In3)

While nobody described any of the projects or programmes as failures or unsuccessful, not all responses were completely positive:

There is no doubt that the success of the intervention programmes depended largely on the personalities and qualities of the senior women students. Naturally some were better at the task than others. (Uni5_documents)

Partial only. I doubt if I move on that it will last independently. The paradox of the majority of gender taking no ownership of the issue persists in this Faculty. We have not been able to affect staff perceptions - the plan for a gender unit has failed, there has been no gender awareness training. (Sarah_Uni3)

4.8 Were the Efforts Worthwhile?

Designing and implementing intervention programmes for most of the women was a voluntary task which was not their main 'job'. For many of the women it was a passion which took an incredible amount of time and effort. But these efforts were all worthwhile if it made a difference even to only one participant;

Just seeing the girls' faces. There was this one moment, I think we were in [Place X] and there was the robots and stuff and they were programming the robots and this girl was sitting there and she just couldn't get the words out and she was almost shaking because she wanted to say something, she was just so exciting. It was just like "that is awesome", just that moment that is what we are here for. It just makes everything worthwhile. I believe it is making a difference and I think if nothing else it makes me feel good but I think it does actually help and even if it helps one girl that is what matters to me. (Fiona_In4)

Almost all the interviewees related stories of having made an impression with some girls that really encouraged them to continue with this work;

We had a set of two girls from a government school who were at our 2004 showcase and we had another two girls from a catholic college who were there. They got up and spoke about the fantastic showcase and how they got so much out of it. "Sincere thanks to the organisers. We would love to see it again and although we are going to be Year 12 next year we are hoping that they will allow us to attend." And I had tears in my eyes. I went afterwards to thank them and I just couldn’t. They just really touched my heart. (Cheryl_In1)

Even Clair (Gov1), whose principal job did involve girls and ICT activities, considered that the efforts were worthwhile and admitted to spending considerably more time working on these initiatives than what she was paid for;

I think so. I think if I didn’t feel that I couldn’t come to work. Sometimes it is frustrating but it is more at an anecdotal level. I have seen that kind go off who you know wouldn’t have known anything about an IT career and wouldn’t have even considered it, going and doing an IT traineeship because she was involved in the girls’ computer club and those sorts of things ... Seeing the light switch on for teachers as well and just looking at what they can do and that sort of thing ... I know in my case anyway it is part of my job and I will do extra hours over and above and it is still quite demanding. (Clair_Gov1)

While there was no doubt in most interviewees' minds that their efforts had been worthwhile there was a disappointment that all the efforts had not brought about more change; that while touching the lives of some girls was really great, the statistics of girls in computing courses were not improving, nor for women in the industry.

One of the most disappointing and frustrating things in writing this has been the realisation that despite the Australian Government's national objective very little has changed in the last ten years and if anything we seem to be going backwards. Participation of women in IT degrees in Australia is still nowhere near the objective of 40% ... Only 13% of the commencing students in our computing degree programs in 2002 are women. The time effort and money we have put into producing promotional materials and liaison with secondary schools over the years appears to have made little difference. (Uni5_documents)

Despite various initiatives aimed at attracting and retaining more females over many years, the figures [now] are little different. (Gov2_documents)

4.9 Feelings of Despondency

For all the enthusiasm and commitment for the intervention programmes there was an undertone of despondency amongst the programme champions.

Anne (Uni5) stopped working on intervention projects for a number of years, due to a lack of funding and support and because 'I also didn’t think I had any answers anymore. I quite literally thought no this is too big a question to be solving. I just didn’t have any answers'. Though she still does not believe she has the answers to the wider problem of females and computing, Anne has begun to be involved in intervention projects again. Jodie (Uni6) also feels that the answer to the 'bigger problem' eludes her:

I have been bashing my head against a brick wall for 20 years, I don’t know. It is an attitudinal change, very much, and it is not just the kids. It is the parents and the whole society. I think that
there is something wrong in our society for a start that we have such a problem with that dichotomy between males and females and what we do and what we can't do. The reality is so far from the image. (Jodie_Uni6)

Sarah (Uni3) was concerned about her programme and that it may not ultimately be as successful as she would like:

Making no change is a big risk ... Then being ridiculed, "You have had all this money, where are our extra girls? You put your neck on the line ... a. I was very optimistic in 1996 when I started, when I got my teaching fellowship and I thought we were making a difference... I think we are moving forward, yes, in that we are moving away from the 'deficit model' to the 'let us look at IT'. I think we have moved forward in that. We are looking at what IT is. We are asking the questions, the women in Computing. It is only the women asking the questions, very few men take this on board. It is really difficult. When we go to the Women in Computing conference and you preach to the converted. Until blokes see that (WinC Conferences etc) as mainstream it is not going to happen. It is just not going to happen .... Until it is seen as an issue for all [lasting change won't happen]. (Sarah_Uni3)

There were concerns expressed about whether, for the individual female who did venture into computing, the discipline would be a good place be:

Why would a girl consider choosing computing as a career? If she is happy to go against the mainstream. (Alison_Uni5)

5 Conclusion

It was the passion, commitment and vast amounts of unpaid time contributed by the programme champions which was the driving force behind the majority of intervention programmes operated by industry, governments and the educational sector.

The success of these programmes was investigated from the perspective of the programme champions as well as via the formal and informal evaluation performed. All the programmes were considered to be successful. Almost all of the programme champions talked about individual instances of having made a difference in one persons' life and that this was enough to make the programme a success. There was disappointment expressed by many of the women however that the incredible time and effort needed to sustain these programmes (most of which was of a voluntary nature) had not brought about more change, with the overall state and national statistics showing little improvement.

The value placed upon the work of designing and implementing intervention programmes varied by sector. When this work was undertaken by academic women in universities the work was frequently undervalued compared to when the activities were conducted by staff in industry or in the government sector. The academic environment was often not supportive of academics who conducted intervention programmes for female students.

With the current poor number of students who are attracted to computer courses it can only be hoped that the need to encourage young boys as well as young girls into computing may see this work more highly valued. The recruitment and retention of computing students right throughout the educational pipeline should not just be left to the women and a few men. If more computer professionals engaged in recruitment activities then the work may not only become more valued but may help stem the fall in enrolments in computer courses.

6 References


MILES, M. B. and HUBERMAN, A. M. (1994). An Expanded Sourcebook; Qualitative Data Analysis


