CHAPTER 3

A question of attention: Challenges for researching the under-representation of girls in CIT subjects

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THE PERCENTAGE OF GIRLS UNDERTAKING university study in the broad fields of Computing and Information Technology (CIT) has barely changed in the past 20 years, hovering consistently around (and often below) 25% (James et al. 2004). Over this period, general interest has waxed and waned such that this particular 'girls' problem' has received less overt attention recently from teachers, parents and educational commentators than have other gender-based debates (such as those focused on boys and literacy, or girls and body image, or boys and their final school certificate results for example).

This chapter investigates some of the key contemporary issues for researchers interested in exploring the reasons for, and implications of, low numbers of girls in CIT study (at post compulsory levels). Specifically, it focuses on the ways in which students and teachers now make sense of this statistical reality and the extent to which their explanations relate to previous work in the area of girls' education. The chapter highlights the ways in which contemporary rationales relating to the under-representation of girls are connected to the history of gender-based educational reforms. It also emphasises some of the implications for researchers since debates about girls' education in the 21st century are now clearly competing for the attention of schools, teachers and students.

The chapter comprises three sections. The first provides an introduction to the key theme — the difficulty, in 2007, of drawing schools' attention to the problematic nature of the current situation regarding girls and CIT. The second links this question of attention to the history of gender reform in schooling over the past 30 years. The final section draws upon a current Australian Research Council (ARC) Linkage project focused on understanding the factors influencing girls' decisions to study (or to *not* study) CIT in the post compulsory years. In this section I will

identify the explanations put forward by students and teachers to account for the persistently low numbers of girls in CIT and relate these to rationales that have been previously used to account for girls' educational choices. A key aim in this section is to highlight that, despite 30 years of gender-based educational reform and the persistence of a robust literature focused explicitly on the implications of girls' participation in CIT-related areas, understandings of why girls do or do not study CIT have not changed dramatically over this time.

Emphasis throughout the chapter is on the difference between the ways in which various groups make sense of the same widespread phenomenon — low numbers of girls in CIT classrooms and professions — and the extent to which the explanations most commonly circulated work to reinscribe or interrupt traditional understandings concerning the interests, abilities and preferred career paths of contemporary Australian school students.

Part One: The question of attention

In common with the other chapters in this book, the data explored in this chapter is drawn from a current ARC Linkage project titled *From High School to Higher Education: Gendered pathways in information, communication and computer technology education* (hereafter known as the GaIT project). Allocations of ARC funding are generally connected to perceptions regarding the significance of a project — its importance to the national good, its significance for the future of the country and so on. Thus it seems reasonable to suggest that projects receiving ARC funding are generally regarded, at least by some people, as projects worthy of some ongoing attention.

Certainly there are many reasons why a project focused on better understanding factors influencing girls' decisions to study (or to not study) in the fields associated with CIT might be considered significant. Researchers working in the fields of gender and education, gender and CIT, or gender and computers, consistently draw attention to the persistent under-representation of women as students and employees within the broad field of Computing and Information Technology. Whitehouse (2005, p. 1), for example, makes the point that:

> ... women's share of professional computing occupations has fluctuated somewhat since the mid-1980s, but on average has remained around 20%. In contrast the proportion of all employees who are female has increased steadily, if slowly, over this time period, from a little over 40% to close to 50%.

This point is echoed by Wentling and Thomas who write that:

> Despite impressive gains in employment, women are still under-represented in the IT field. The world of IT is still dominated by men, and the imbalance becomes more striking at the higher rungs of the corporate ladder ... Obstacles and gender differences have created a gender gap that is responsible for the narrowing pipeline of women in IT careers. The

> shortage of women in IT fields has made it more difficult for them to obtain management positions ... Women [h]old (sic) only 8.1% of executive positions (VP and higher) at major technology companies. One of the reasons for the scarcity of women executives at technology firms is simply that there are fewer women in the technology-management pipeline ... (2004, p. 90)

This situation has long been understood as a problem (Jenson, de Castell & Bryson 2003, Miller & Hayward 2006). First, from an economic point of view, the low percentages of women moving into CIT fields — an area already struggling to fill vacancies — is at the very least, a practical matter. Any industry having difficulties finding employees cannot easily afford to ignore the disinterest in the profession displayed by such a large proportion of the available/potential workforce. Second, the rapid growth of employment in areas associated with CIT — according to Wentling and Thomas (2004, p. 90), the past 10 years has seen a tripling of employment in the United States computer and software industries — is a problem not only for industry but also for people wanting to join or remain in the workforce. Wentling and Thomas make the point that as the 'economy becomes more digitised, most of our jobs will involve the manufacture, operation, or use of equipment containing a computer chip; hence, all jobs will be IT jobs' (Cooke 2000 as cited in Wentling & Thomas 2004, p. 90). In this context, a persistent disinterest in the pursuit of CIT-related employment has the clear potential to impact severely upon the nature, stability and remuneration of women's employment into the future.

Thirdly, and in a similar vein, the point is often made that specialist positions associated with CIT (e.g. computer scientists, computer engineers, systems analysts and programmers) are generally very well paid and it is therefore important from both economic and equity standpoints to not restrict women's access to these potentially lucrative career paths (e.g. Wentling & Thomas 2004, Whitehouse 2005).

Feminist arguments also emphasise the fact that the under-representation of women in CIT fields means that they have reduced opportunities to shape the design, management and implementation of the kinds of technologies that are increasingly dominating contemporary life. A commonly raised question relates to the extent to which 'technology' and technological processes would look/be quite different if more women were involved in technological invention and design (American Association of University Women [AAUW] 2000). As Wacjman writes, 'Getting women into IT is not only an equal employment opportunity issue but also an issue of how the world we live in is designed and for whom' (Wacjman 2005, p. 7).

In summary, there appears to be no shortage of educational, economic, and equity-based arguments regarding the reasons why girls' low rates of participation in CIT is a problem in the short- and long-term: a problem not only for the industry

and the economy, but also for the girls themselves. As mentioned at the start of this section, the power of these arguments — at least within an educational research community — is illustrated, in some way, by the fact that the project on which this chapter is based was funded by a range of industry partners (across three states) and by the ARC.[1]

However, the attention that the project, or its topic, has received across various sectors of industry and research has not been matched by teachers, schools or students. Indeed, quite the opposite has been the case. From the start of 2005, researchers working on the project began the process of identifying schools and teachers who would be willing to participate. The initial project design was premised on the belief that in each of three states — Victoria, New South Wales and South Australia — between 30 and 50 schools would be invited to take part in an initial teacher interview and, from this set, 24 case study schools would be selected to participate in student questionnaires and interviews. These selected schools would be a mix of high female CIT enrolments and low female CIT enrolments, and would be selected from a range of urban, rural and metropolitan locations and have different socioeconomic characteristics. To this end, researchers obtained data relating to the percentages of girls enrolled in post compulsory CIT subjects at diverse schools, established a short list of schools to target (with the range of enrolments and demographic features identified above) and then set about approaching the schools to see if they would be willing to participate.

Some weeks into this process it became obvious that recruiting schools to participate in the project was not going to be a straightforward task and the target number of schools was significantly reduced. In Victoria, none of the original 'short list' of schools responded to the first or second invitation to participate. This was despite the concerted efforts of three members of the research team, including one having sole responsibility to make contact with participant schools. Contact with individuals in the Victorian Department of Education (some months into the project) eventually saw the identification of two schools who agreed to take part. Four other schools were subsequently enrolled in the project thanks largely to pre-existing relationships between the schools and members of the research team. Schools continued to be added to the project in a very slow manner over a 19-month period. In this time, only two schools — out of more than 30 that were approached — responded to a standard invitation to participate (i.e. an invitation made by letter or e-mail that was not based upon some existing network or personal contact).

Over time, ongoing participation of the schools became more difficult to maintain. This was signalled not only by slow response times to phone calls and e-mails, but also through poor response rates by students who, when a school *did*

1. Interestingly, this is not the only project on Girls and IT to be funded by the ARC during the past 10 years.

agree to participate, were ultimately given responsibility for returning signed parental consent forms. By the end of the first 20 months of the project, time lines had been rewritten so many times that it was quite obvious the researchers were *not* in charge of when data would be collected!

The most important point to emphasise here is that the students, the teachers or the schools more generally are not in anyway at fault, nor are they to be criticised for their reluctance to participate. Rather, overt and covert messages coming through to the Victorian research team suggested that in the crowded, busy and demanding world of teachers and students, a project focused on girls and CIT was unable to command their close attention.

This is where a key concern of this chapter emerges: if, as outlined earlier, there is so much evidence to support the claims that, firstly, girls *are* under-represented in CIT and secondly, that this under-representation has a number of significant effects for the girls, the profession, the economy *and* the nation then why does this 'problem' struggle to draw attention to itself in contemporary Australian schools?

This leads me to the concept of attention itself. In this chapter I am using the term to reflect the work of Michael Goldhaber who makes the claim that the specific character of the 21st century is not so much that of an information economy, but rather an *attention* economy. Goldhaber writes:

> The attention economy that is emerging is radically different from any prior economy, and certainly from the industrial market economy. In its pure form, it doesn't involve any sort of money, nor a market or anything closely resembling one. It involves a quite different pattern of life than the routine-based, industrial one with its work/home, work/play and production/consumption dichotomies. What matters is seeking, obtaining and paying attention. (Goldhaber 1997, p. 2)

Drawing on this work, Chapman makes the related point that:

> Because the basic needs of the middle and upper classes of the United States were by and large satisfied a generation ago, transfers of wealth today are now based on capturing the attention — and thus the income — of the people in these classes. (Chapman 1998, n.p.)

Reflecting upon the kinds of attention drawn, through the late 1990s to various public 'scandals' Chapman goes on to make the important point that:

> The "attention economy" opens the door to two pernicious and corollary effects: a "race to the bottom" in the kind of information that guarantees attention — the O.J. Simpson trial, the murder of Gianni Versace, the Monica Lewinsky case — and accelerating speed in the circulation of such information.
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> Technology greatly enhances the latter effect, speed, and speed itself exacerbates the first effect by making attention more fleeting and difficult to maintain. (Chapman 1998, p. 1)

Chapman's point may be partly illustrated by the different degrees of attention received by two different strands of media focused on girls and computing. On the one hand, news stories reporting on projects such as GaIT have gained minimal coverage over the past few years. On the other hand, the media coverage associated with the launch of a Girls and IT calendar (a la *Calendar Girls* complete with recreations of famous movie scenes featuring scantily clad or overtly sexualised women) was tremendous. This coverage was able to take the longstanding issue of girls' under-representation in the computing industry and link it to a 'scandal' of established popularity: the exploitation of sexuality to 'sell' a product, a career, a brand of 'femininity'.

There are two immediate implications of the attention economy's association with speed and scandal for the GaIT project. The first is a general point: in an attention economy researchers located in universities must compete with many other imperatives — including those associated with media declared public scandals — for schools' attention. This means that academics are effectively in competition with people and things as diverse as new government agendas (including radical changes to curriculum structures via initiatives such as Essential Learnings in Victoria), media-based interrogations of school practices (focusing on everything from school canteens, bullying, through to literacy levels), changing workforce demands (including mixed messages about where employment now lies for the majority of children), and parents' and students' ever-increasing anxiety about all these issues. Schools, of course, are also staffed by real people who also have a range of personal and employment situations to address and may not always be well-positioned to play the role of eager research participant, no matter how worthy the problem.

In addition, when a school *does* turn its attention to research issues, there is little evidence to suggest that questions associated with the education of girls are likely to be at the top of a school's list. For a wide range of reasons, which I will explore in more detail in the pages that follow, it seems possible to argue that that portion of schools' attention which has historically focused on girls' education has increasingly shifted — firstly, towards the broader field of gender education and then subsequently to the related, but distinct, issue of boys' education. The important point is that in an attention economy the legitimacy of a research question is not the most important factor in recruiting and sustaining school interest. Rather, it is the ability to attach the research 'problem' to other factors that schools *are* interested in — or scandalised by — that may be the most significant influence on the implementation of current school-based research projects.

As the struggle for the attention of teachers and students became more apparent within the GaIT research project, members of the Victorian research team began to offer increasingly specific forms of support to the participants. Initially, schools were offered 'inducements' such as professional development sessions run by the research team on the girls and CIT topic, and some Casual Relief Teacher (CRT) support to

cover the organisation of the project. When this failed to generate much response, more dramatic measures were implemented. The time commitment required of participants was reduced significantly, from two sessions to one; all sessions were scheduled to coincide with, or run into, lunch breaks; a free lunch (funded by the researchers) was provided to all who took part (and often to their friends as well); participant teachers were offered not only CRT relief but also funding towards their own professional development funds. Staffrooms were provided with cakes and chocolates. Teacher participants received formal thank you letters, Christmas cards and, in some cases, movie tickets and lollies ... the list went on. Few of these scenarios featured in the project's early planning; however, it is reasonable to suggest that it was only through these measures that we were able to capture the attention of some students and some teachers. Certainly it was not the topic of our discussion, nor any data we put forward to demonstrate the low numbers of girls in CIT that drew attention to our project. It was rather our ability to link the project to other products that attract attention — time, money, pizza — that eventually produced some level of participation. Of course, making these available to participants can be read in many way as simple markers of courtesy — or some small instances of reciprocity — towards students and teachers willing to participate in a university study. When read together with the data ultimately collected within the Victorian dimension of the study, however, they help to emphasise a widespread sense that the low numbers of girls (and indeed boys) in CIT pathways is not an issue of concern — that is, not a genuine educational problem.

This is an urgent area of concern and raises important issues when considered alongside the multiple contexts within which the low numbers of girls' in CIT classrooms is considered legitimate. This chapter seeks to explore this phenomenon of girls under-representation in CIT education in more detail, and to highlight some of the reasons why this is not seen as a priority area of concern for teachers and students within a number of the schools included in the GaIT project. Many of the explanations relate to longstanding debates about the 'nature' of girls and boys, and their varying/different/competing educational needs and abilities. For this reason it is useful to begin the next section of this chapter with a brief overview of dominant explanations for gender-based educational differences over the past 20 years.

Part Two: Shifts in attention: a brief history of gender-based educational reform

The history of gender-based educational reform is long, with debates about the purposes, strengths and limitations of girls' and boys' education dating back several centuries. Clearly it is beyond the scope of this chapter to review this literature in its entirety. What is important to acknowledge is that from the 1970s onwards there emerged a particular and relatively high profile focus on the differential educational achievements and experiences of girls and boys in western society. As McLeod notes:

> From at least the mid-1970s in Australia, teachers' organisations and government and education department reports began documenting and comparing the access, participation, retention and educational experiences and outcomes of girls and boys and found that to be a girl was an educational disadvantage: importantly, it was noted that the degree of disadvantage was also linked to girls' socio-economic status. (McLeod 2004, p. 168)

From this data, attempts were made to explain and account for widespread and persistent differences regarding the nature and outcomes of girls' and boys' education. The different explanations for the problem produced, naturally enough, a range of solutions that can be generally characterised in three ways. First, there were projects designed to improve girls' *access* to various experiences and to guarantee them *equal opportunities* in the literal sense of the terms. In this framework, attention was focused on removing formal barriers to girls' participation in various educational activities. Emphasis was placed upon ensuring that there were no structural barriers (including timetable issues) impacting on girls' participation in diverse curriculum areas; that they had opportunity for equal time in various school spaces (such as playgrounds and, later, computer labs) and that there was a stated school commitment to reminding students that 'girls can do anything' (including things to do with computers into and beyond the 1980s). This slogan is found both within general literature focused on the achievements of girls, and in school and government policies (see for instance the Women's Info Link site of the Queensland government at http://www.women.qld.gov.au/?id=3).

Alongside this access/equity approach to girls' education (which basically left contexts unaltered but just added girls into the mix) there were other projects designed to 'value the difference' of girls. In these initiatives girls were seen as having particular and (in some cases biologically-determined and thus unique) interests, abilities and capacities (for a summary of these arguments see Allard et al. 1995). In many schools, then, the argument was made (by teachers, parents, and to some extent official government policies) that to ensure girls got the most out of their educational opportunities they needed to be educated in 'girl friendly' ways (see, for instance, The Alliance of Girls' Schools 2005). This kind of logic supported initiatives as diverse as those designed to ensure that girls' prior and 'real life' experiences (including domestic and 'feminine' activities) were included and valued within curriculum. Such experiences extended to designing 'girl friendly' projects allowing girls to display their 'feminine' side by providing space for girls to demonstrate creativity, collegiality and intuition or to work on projects aligned with their 'natural' interests (in such things as relationships, fashion, dolls and so on). This kind of thinking has given rise to such phenomena as pink computers and Barbie® laptops, which are based on the premise that girls will be more interested in 'technology' if it is presented in traditionally feminine packages.

As the 1970s moved into the 1980s, there was an increasing recognition within girls' education, that working to improve educational experiences was not just a matter of removing barriers, or catering for some particular (and stereotypical) notion of what it might mean to be a 'girl'. During this time, emphasis was placed upon the diverse ways in which girls were socialised into performing particular versions of 'femininity' (for discussion see Allard et al. 1995; MCEETYA Gender Equity Taskforce 1997; Rowan et al. 2002). These discussions — in research documents, at conferences and in school staff rooms — generally attempted to downplay claims that girls' were 'naturally' interested in, or motivated by, traditionally feminine pursuits, and focused instead on the social processes through which girls and boys came to see certain interests, behaviours and educational activities as naturally suited to males and females.

Research into the socialisation of girls drew close attention to the multiple ways in which girls receive messages about what it meant to be a female, and a female student. Through this research schools became increasingly conscious of the role that diverse texts — curriculum materials, text books, teacher talk, student talk — worked to naturalise particular and limiting images of the 'good girl' and the 'good girl student' (for an overview see MCEETYA Gender Equity Taskforce 1997). At this point, the notion of role models and positive socialisation experiences became hot topics. Pictures of women engineers, scientists and computer programmers began to increasingly appear in schools and girls were again reminded that there was outside proof of the fact that girls could study/do anything they chose. Each of these strategies are reflected in the key policy document on gender in Australia through the late 1990s (MCEETYA Gender Equity Taskforce 1997).

By the end of the 1990s, therefore, three different explanations for girls' and boys' differing educational experiences had been put forward: the first emphasised equity of access and suggested modifications to access and the removal of structural barriers to equal participation. The second emphasised the natural differences between boys' and girls' and argued that this could only be addressed by modifying school systems to respect and value these differences. The third argued that to move beyond limited understandings of gender, students need access to a diverse range of images of femininity and opportunities to be rewarded for alternative subject choices. Alongside these explanations, of course, were counter claims often found in the popular press or on talk back radio that argued the differences were not, in fact, of any significance, and that there was no need to be meddling in the 'natural' order of things.

Into the 1990s, there were a number of important moves within girls' education debates. First, feminist analysis of the category 'girls' increasingly drew attention to the fact that just as there were differences in the life experiences of girls and boys, so, too, were their differences *within* the category of girls. Factors such as cultural background, socioeconomic status, physical ability and so on, were increasingly recognised as combining with gender to produce diverse and competing

understandings of what being a girl involved. Similarly, it was increasingly acknowledged within gender literature and policy documents that the category 'boys' was also characterised by significant diversity, and that just as gender norms could limit educational experiences and outcomes for girls, boys could also be disadvantaged by particular understandings of masculinity, and what it means to be a boy in education.

Parallel to the pro-feminist strand of this research there was, of course, the high profile 'backlash' literature which raised the question 'what about the boys?' Such literature simultaneously suggested that the problems facing boys in education were often the fault of over-zealous feminist educational reformers who went 'too far' to produce girls as the new dominant group and boys as the new victims within a feminised educational environment (for an overview of this literature see Rowan et al. 2002 and McLeod 2004).

At the same time as the categories of *girls* and *boys* were being problematised, attention was also focusing on the need for any debate about girls' education to recognise that the notion of 'gender' itself was not a fixed and unproblematic category. Gender identity was increasingly regarded as something negotiated at the intersection of multiple and competing discourses, so that 'girls' was a category that was defined not only by differences in regards to 'boys', or to differences amongst 'girls' but also differences *within* each individual girl (for some discussion see Braidotti 1994a; Butler 1990; Jeffries 1991; Rowan & Bartlett 1997; Yates 1994). This movement was based largely on the influence of poststructural writings, which argued the importance of gender-based educational reform focusing not only on the apparent structural influences on the formation of a gendered sense of self, but also on the multiple ways in which 'self' is understood, and performed, by different girls and boys, at different historical moments, in different physical environments.

This poststructural analysis of gender drew closer attention to the complex interplay of factors that shape the performance of gendered identities (in and beyond school), and helped to explain why standalone school-based 'reforms' did not always produce the kinds of transformation in student practice that schools might have anticipated. A key move within this literature is the identification of the ongoing nature of projects with a transformative agenda, and a parallel recognition that patterns of gender reform can not simply 'wish away' the consequences of sexist, patriarchal, or gendered ideologies (Braidotti 1994a, 1994b).

To summarise, each of the phases of gender reform explored earlier — including some of the more recent anti-feminist or backlash literature — have put forward different explanations to account for the differences in the educational interests and achievements of boys and girls. From access/equity literature we have the suggestion that it is mostly a question of equality of opportunity — that if structural barriers are removed then girls will be free to choose, or not, to study anything at all. From the literature on valuing difference came the suggestion that girls will generally choose to study or work in areas which respect their essential femininity,

and that subjects seeking to recruit girls therefore need to change to accommodate this fact or, alternatively, simply accept that there are some areas that will not be attractive to girls. The related essentialist perspective often explored by anti-feminist literature also emphasises the fundamental, 'natural' differences between boys and girls, and argues that schools need to respect these differences by treating boys and girls in different ways — by employing different pedagogies, using different texts, encouraging different career paths and so on.

Socialisation perspectives, by contrast, often suggest that boys and girls simply need to be shown that it *is* possible to step outside gender norms (Rowan et al. 2002). Girls can be encouraged through initiatives such as role models, critical thinking programs (helping them identify sexist or stereotypical images of women) and other pro-feminist initiatives into non-traditional areas which will, in turn, change the culture of these professions and make for more equitable futures.

Beside these initiatives is the poststructural awareness that no single agenda, and its associated 'solutions', can work in isolation. Any attempt to denaturalise long-standing gendered patterns of behaviour and employment requires ongoing attention to the multiple ways in which gendered identities are constructed, and the similarly multiple — but always fragile — processes through which new images of female (and male) subjectivity are brought into circulation. On this issue, it is worth acknowledging the work of theorists such as Braidotti, who argue that gender transformation depends upon the introduction of new subjectivities, or 'figurations' and the continual reference back to — and through — old identities. She argues:

> Figurations are not pretty metaphors: They are politically informed maps, which play a crucial role at this point in the cartography of feminist corporeal materialism in that they aim at redesigning female subjectivity ... In this respect, the more figurations that are disclosed in this phase of feminist practice, the better. (Braidotti 1994b, p. 181)

Braidotti acknowledges that new figurations cannot be called into existence independent of the processes of denaturalising existing subject positions. In Braidotti's (1994b, p. 169) terms, 'the new is created by revisiting and burning up the old':

> Like the gradual peeling off of old skins ... it is the metabolic consumption of the old that can engender the new. Difference is not the effect of willpower, but the result of many, of endless repetitions. (Braidotti 1994b, p. 182)

Theorists such as Braidotti, therefore, capture the poststructural emphasis about the ongoing nature of any transformative agenda, also highlighting the multiple fronts on which transformative work must operate. When read in conjunction with Goldhaber's comments on the nature of the attention economy, Braidotti reminds us that 'endless repetitions' of new gender figurations require ongoing attention: attention from those producing, or showcasing them, *and* the attention of those 'seeing' them.

Whilst changes in theoretical understandings of the construction and contestation of gender norms has a certain developmental or progressive character, it is important to recognise that this most recent wave of thought — that is, the broadly poststructural perspective — is neither the most fashionable or the most influential in regards to the ways schools today approach the analysis of scenarios such as girls' under-representation in CIT. Indeed, quite the opposite is the case with less complex, more easily circulated arguments to explain the different interests and abilities of girls increasingly dominating gender debates.

This brings me to the central point of this section: I have argued that the emergence of an attention economy has significant consequences for educational researchers who compete with multiple other actors for the attention — and thus the time — of schools, students and teachers. I have also suggested that these consequences are particularly severe for those wishing to pursue research in areas that have either faded from public attention, or had so much attention that they are understood as being already solved (as much as they ever will be) and which, as a consequence, now gain attention only when linked to something palpably different or scandalous. If we read this understanding of the attention economy alongside the history of gender reform and, most specifically, the emergence of complex poststructural perspectives on the performance of gendered identity it is possible to identify a clear tension between Braidotti's emphasis on the need for 'endless repetitions' of alternative subjectivities, and the pressure produced by an attention economy for the 'new' or at least the controversial.

This tension creates real challenges for those wishing to research 'old' topics in these new times. These questions concern how, in the first instance, to attract and sustain attention; how to go about managing attention when one has it; and how to move beyond creating forums within which old and, perhaps, limiting understandings of gender will receive another airing thereby reinscribing the very patterns with which the project may be concerned.

I will explore some of the theoretical and methodological issues associated with these challenges in a range of forthcoming papers. In the remainder of this chapter, however, I have two goals. First, to acknowledge that within the current GaIT project, data collected from students and teachers has routinely reinforced the traditional explanations for gender-based educational differences: explanations that pre-date the poststructural work of the 1990s — except in their general acceptance that 'gender problems' of the 1970s and 1980s have largely been solved and that boys maybe the new disadvantaged. Second, I want to position this data, not as evidence that there is actually no way to disrupt mainstream and popular understandings of gender, nor as proof that the feminist agendas of the 1990s have failed. Rather, I want to read this data as evidence that competing for attention means drawing attention *away* from well-established and powerful explanations; that this competition necessitates the provision of spaces for these normative explanations to be aired. It is only through this process — and endless repetitions

of this process — that disruptions to longstanding gendered-based behaviours (and their constitutive explanations) can hope to be displaced. There is clear evidence to suggest that in the broad area of girls and information technology this work has only just begun.

In the third and final section of this chapter I will look at the data collected from teachers and students who have participated in the GaIT project. The focus of this analysis will be on identifying the explanations put forward by teachers and students to account for girls' under-representation, and highlighting the extent to which these explanations depart from, or articulate with, previous explanations for the educational differences between boys and girls.

Part Three: So what IS the problem? Teachers' and students' explanations for girls' under-representation in CIT education

The voices recorded in this next section of the chapter are drawn from a range of public secondary schools located primarily in Victoria. In addition, some of this data is drawn from schools located in New South Wales and South Australia. As indicated below, the schools are from a range of locations, vary in terms of socioeconomic status (SES) and cultural diversity, and have generally mid-range to low rates of female participation in senior secondary school CIT education. All students have been anonymised, referred to only as boy or girl, and differentiated only from other speakers in their group.

- Crocodile Secondary College: Rural, low SES, low diversity, moderate female participation
- Otter College: Rural, low SES, low diversity, moderate female participation
- Bandicoot Secondary College: Regional, high SES, low diversity, low female participation
- Dragon Secondary College: Metropolitan, low SES, high diversity, moderate female participation
- Angelfish Secondary College: Metropolitan, low SES, high diversity, low female participation
- Black Mare College: Regional, medium SES, low diversity, low female participation
- Sheepdog Secondary College: Rural, low SES, low diversity, low female participation
- Dolomite High School: Rural, low-medium SES, low diversity, moderate female participation
- Fairy Wren High School: Rural, high SES, low female participation

All interviews were conducted between 2005 and 2006. The themes identified in this chapter emerged consistently in interviews with teachers and students: each of these themes connect to explanations for gender-based differences aired from the 1970s to the 1980s (and pre-dating the advent of poststructuralism). An important dimension of these explanations is, of course, a certain gender blindness, or a denial

that gender is the key determinant in any of the decision-making. This leads to the first theme identified in the GaIT data: that decisions are not motivated by gender, but connected to a 'neutral' analysis of the CIT industry and its career paths.

Why would ANYONE study CIT?

As indicated earlier, it was common for students *and* teachers interviewed through the GaIT project to remark that there was not a problem in girls (or boys) choosing not to study CIT because the industry as a whole was not a good employment option. This opinion was clearly expressed by girls and boys in a range of schools. For example:

> There [are] ways to influence more people to get on computers but there's ... no point cause there's already a lot of people on computers. (Boy, Bandicoot Secondary College, Focus group)
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> In Year 10 I did like certificate 2 and I was going to continue on with IT but then a lot of people are saying that there would be actually a shortage of positions in IT because its so popular so then I just had a different career change and I just decided to do something else. (Boy, Angelfish Secondary College, Focus group)
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> A lot of our parents and that say' oh there's no jobs out in the IT word cause there's a big boom last time' and yeah that's what they tell us so we just don't need to do it. I just find the boys are more better at it than the girls cause they're more creative in that way and their brains work differently. (Girl, Crocodile Secondary College, Focus group)

This kind of perception may be associated with the fact that numbers of boys enrolling in CIT subjects has also declined over the past 10 years. A related line of argument emphasised the fact that CIT subjects were not ranked highly in the Victorian Certificate of Education (VCE)[2] calculations and that students wishing to maximise their final ENTER[3] score were likely to study other subjects.

> I think that people choose the subject that they do because of the pressure put on them by teachers and mixed teachers and parents as well but from like Year 10 you're pressured into choosing subjects that will get you into a uni course you want to do and from Year 10 you have to choose what you uni course you want to do and they're always going on about pre-reqs and what you need so you don't really have the chance to sort of explore other subjects. Its sort of if you want to do that then you have to do these subjects and then that's it. (Girl, Bandicoot Secondary College, Focus group)

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2. Students and teachers in New South Wales and South Australia also indicated a belief that studying CIT was not going to improve their tertiary entrance scores.
3. The Equivalent National Tertiary Entrance Rank (ENTER) — is the university entrance score each student receives at the completion of the Victorian Certificate of Education. The ENTER is used as a selection tool for entry into university courses. The higher the ENTER score the better.

This means that CIT was an area that was generally chosen only by those students who were *seriously* interested in it or who saw it as an easy option. For example, the question, 'why did you choose IT?' produced the following kinds of responses:

Boy 1: ... Sounds easy.

Boy 2: ... 'cause I was dropping one subject so I had to pick up another. This is the easiest.

Interviewer: Why does everyone say that ... [that] it was a bludge and it's easy.

Boy 3: ... Because it is kind of a bludge and it is easy. (Students, Bandicoot Secondary College, Focus group)

It's just not interesting ...

A second, similarly 'gender neutral' theme concerns the extent to which CIT as a broad area of study just isn't that interesting to most students. This 'interest' factor was also seen as separate to issues of gender and tied more closely to factors such as pedagogy and content, with the implication being that both girls and boys would be alienated by similar kinds of things. For example, on the question of the impact of the teacher, or the teaching style, students at Bandicoot and Dragon made the following points:

Girl: I think it would be better if an IT teacher was more fun. Cause they ... not generalising but like IT for me its not the funniest, staring at a computer, clicking on things, is not my idea of ... so if I enjoy it and so maybe the teachers a bit more vibrant. (Bandicoot Secondary College, Student focus group)

A different group suggested that being a good teacher would involve being interesting:

Boy 3: To be interesting.

Interviewer: And does that happen at the moment?

Boy 1: Not really.

Boy 2: No, not at all.

Boy 3: It's the same old stuff over and over again. (Students, Dragon Secondary College, Focus group)

Other students at a different school were similarly critical of the pedagogy of their classroom:

Interviewer: Does the teacher make a difference? Some students before said it didn't make a difference

Girl: Yeah it does; if they're like boring or strict or whatever no one wants to do it. (Crocodile Secondary College, Student focus group)

Within this strand of argument, the possibility that there are specific problems facing girls is downplayed. They are seen only as a subset of broader 'problems'

associated with CIT generally. These problems concern the subject content, the dominant pedagogies and the overall image that the profession isn't likely to be a good career choice.

Similar to some other studies (e.g. Thomas & Allen 2006), in at least some portion of the GaIT research, students and teachers proffered explanations that made no reference to issues of gender. Indeed, within the focus groups conducted by the author of this chapter, questions of gender were almost never raised by the students themselves: it was up to me, as the researcher, to ask the explicit questions about whether or not masculinity and femininity had any impact upon subject selection or enjoyment.

Responses to these specific questions drew two contradictory, but consistently articulated, responses. The first explicitly downplayed the role of gender in subject selection, ability or enjoyment — referring back to the issue of 'natural interest'; whilst the second used sex — or biology — as a rationale for the observed differences. These themes will now be explored further.

Natural interests or sexed brains?

On the one hand, when the question of gender was explicitly raised by the researchers, most students denied that it had any direct impact on subject choice, citing the more general phenomenon of 'interest' and 'ability'.

> Boy: I don't think it's the sex of the person. I think it's based on the interest and what they like doing.
>
> Girl: And their intellectual abilities. (Students, Angelfish Secondary College, Focus group)

A similar sentiment is expressed by a teacher at Fairy Wren who argues that:

> I guess it probably or maybe gets down to interests. Like we try to encourage the kids to take the courses that they're interested in. I guess, I don't know, it probably comes down to the girls probably aren't interested in it, I guess, the programming as well as computing. I don't know why but it's not something we promote, we try to promote everyone does it equally but it's probably that they're interested in other subjects you know. (Teacher, Fairy Wren High School, Interview)

On the other hand, it was equally common for students and teachers to make the point that girls' interests were routinely different to boys, and that this difference was a natural, biologically determined event.

> Girl 1: I think guys ... it's probably the way guys' brains work more than anything. Cause you know how they do physics well a larger portion, maybe that's how they ... [think] ...
>
> Girl 2: I think its more the way ... it's just what guys get into. Like guys won't get into hair and makeup as much as girls do so it's just the same computers and ... (Students, Otter College, Focus group)

Girl: I reckon girls are more into fashion and social wise than boys. Like into computer games and ... (Bandicoot Secondary College, Student focus group)

Boy 1: They're more interested in fashion and stuff.

Boy 2: Don't want to break their nails.

Boy 1: Like they just think fashion and stuff.

Girl: It's probably cause they are not interested, I think they choose another subject that they're more likely to become ... and clear ... probably won't get more together. Have like to create a multimedia industry. As you said probably go to hairdressing or fashion or something else. I think that is more suitable for a girl. (Students, Dragon Secondary College, Focus group)

Girl: I just think boys tend to play the games and things on the computer. Do you know what I mean. Kind of like a PlayStation, they'll go on and play the games together. Like PlayStation stuff aren't really ... it's kind of like you've got girl and boy things. (Bandicoot Secondary College, Student focus group)

Similar sentiments were expressed by several teachers. For example:

Teacher: ... I found most of the girls have problems in logic, in mathematics, they just can't understand the procedure. They cannot ... I don't know why. They have to follow teacher's instruction step by step. I can't skipped some steps [sic]. It's quite hard for them. But in Microsoft Excel it's very hard for girls because they need to know how to create a formula. I mean that's very hard for them. (Dragon Secondary College, Teacher interview)

Teacher: Probably one of the difficult areas I have, certainly even in 12, is that the boys tend to look at the hardware and revolve around you know what sort of CPU have you got in the machine. Whereas the girls tend to not have that perspective. They've had no interest in hardware, and that's why I really don't want see us trying teach the systems which really revolves around the hardware. So the boys have more interest in that technical side, the girls don't. (Sheepdog Secondary College, Teacher interview)

The 'natural' dimension assigned to disinterest and ability was also reflected in comments by students regarding the relationship between CIT study and their future careers. It was common for girls and their teachers to argue that they had acquired all they would need in terms of CIT competency in the early years of their

schooling and that there was no need for further study. These career paths — particularly in schools located in rural areas, and in low-socio economic suburbs, were generally associated with traditionally feminine occupations including administration work, hairdressing and other service industries.

Rather surprisingly — given the more than 20 years that has elapsed since the emergence of the socialisation literature within gender reform (for a complete overview see Kenway 1997) — there were relatively few places within the data where either students or teachers suggested that girls' attitudes might be the result of their upbringing or socialisation. Where this possibility was raised, it was generally in regard to the ways girls could be encouraged into the area: through more female teachers:

Interviewer: ... If you had a really good female IT teacher would that make any difference?

Girl 1: I think a difference because we've never had a female IT teacher.

Girl 2: Yeah, a couple of girls might be afraid to go up to a male and ask them.

Boy: Didn't know you felt that way.

Girl 2: I thought you would have known. (Students, Crocodile Secondary College, Focus group)

Teacher: I do wonder whether having some better role models of girls in the school teaching IT, helps. I know that a College down the road from us have got a whiz bang female IT teacher and I do wonder what their statistic[s] would be like. (Sheepdog Secondary College, Teacher interview)

Through peer support:

Boy: Have a few friends like so little women there, like they only do it because their friends are or something. Maybe. (Bandicoot Secondary College, Student focus group)

Teacher: If the groups going through is supportive particularly if they're a group of girls ... girls do love to share. They love to talk. So if you get a group of them or a group of girls and boys who are cooperative in the class, if the chemistry works really well, then they'll support each other and they'll follow it through. If you don't have that then that's when you'll suddenly find that you've ended up with these boys who are tending to be really competitive about it and they're following it through but it's in a different sort of way I suppose. (Sheepdog Secondary College, Teacher interview)

Through appealing to existing gender stereotypes:

Interviewer: Any theories why girls mightn't be interested? What we could do to make them more interested?

Boy: Maybe you should paint the computers pink. Make computers a fashion accessory and it might work. (Bandicoot Secondary College, Student focus group)

And perhaps even through more visible media role models:

Girl 1: They make it look cool on TV and people will do it.

Boy: Does the same thing happen with legal studies? Is that sort of influenced by a lot of legal shows, cop shows, and stuff.

Girl 2: I use to want to be a lawyer because of all the law shows and stuff but like I thought it would be too hard so I gave up on that. (Students, Crocodile Secondary College, Focus group)

To summarise, the data collected from students and teachers throughout the GaIT project has generally argued on the one hand, that although there are low numbers of girls studying CIT, this is not necessarily a problem and that if it *is* a problem, attempts to correct the situation will need to appeal to the 'natural' interests and abilities of girls, which will involve investigations of curriculum, pedagogy and assessment to ensure that they are able to meet these 'natural interests'.

If we relate these explanations back to the history of gender reform explored in section two of the chapter, it is easy to see that the understandings of factors shaping girls' access to, and participation in CIT study and employment are most closely aligned with the earliest waves of debates about gender and education. There is recognition of the importance of access, there is an emphasis on the natural differences between girls and boys, and there is some acknowledgment that these differences can be the result of socialisation. Because of this, there is very little recognition, in the majority of the interviews and focus groups, of the value or even the possibility of attracting more girls into the CIT subjects in schools.

Nevertheless, it is important to acknowledge that at key moments through the study interviews and focus groups, the students *did* articulate ideas relating to gender and CIT which seemed to run counter to traditional representations of both terms. For instance, in opposition to the longstanding representation of boys as more technologically competent than girls, both boys and girls routinely argued that girls could and generally were as good 'with computers' as their male counterparts. For example:

Interviewer: So do you think that they are as competent as — you know, are boys and girls as competent as each other on computing, like they can use the computers as equally as good and they get marks as good as each other?

Boy 1: Yeah.

Interviewer: So would you actually ask a girl how to do something if you didn't know how to do it?

Boy 1: Yeah, probably.

Interviewer: Yeah. What about you?