



Report on Girls in IT Workshop,

WOMEN'S COLLEGE, UNIVERSITY OF SYDNEY, 27-29 SEPTEMBER 2005

The low participation of females in IT

Although female enrolments in higher education amount to almost 50% of the total, the number of female enrolments within IT-related subjects make up only between 19% (Newmarch, *et al*, 2000) and 25.5% (Australian Bureau of Statistics, 2002) of enrolments in those subjects. Moreover, the proportion of females continuing into an IT-related career ranges from 7% to 28% of the IT workforce worldwide, with the percentage of females in the Australian IT workforce estimated at 20% (Larri, 2002).

Age of career choice

Studies have shown that career-orientated choices are made in the latter stages of youth – mainly 11 to 17 years old (Adya and Kaiser, 2005). As part of a developing program to encourage more women into IT therefore, the School ran a three day workshop for twenty high school girls, with the aim of changing the girls' attitude to the possibility of IT as a career.

Girls in IT Workshop

The workshop introduced the girls to various areas of the IT industry, consistent with the School's broad and integrated approach to IT (combining computer science, information systems and arts informatics). The workshop introduced them to a range of career opportunities in IT, through hands-on multi-media activities with six final year IT students as tutors, and through interactive mentor sessions with twelve female IT professionals. Working in teams, the girls designed and created an on-line magazine featuring their mentors.

Details of the workshop activities can be found in Appendix 1, a detailed discussion of the background to women in IT initiatives can be found in Appendix 2 and a summary of previous workshops for high school girls can be found in Appendix 3. These accounts were written by EO Solutions.

The workshop was developed, run and evaluated by EO Solutions, a final year undergraduate Information Systems project team consisting of Nimali Gunawardena, Nalaka Karunaratne, Evelyne Kun, Peter Sahlani, Geomayra Silva and Melody Yeo. It was coordinated and supervised by Dr James Curran and Ms. Andrea Stern and generously supported by Accenture, Microsoft, Cisco and Linux Australia.

In addition, the following twelve young women from industry volunteered their time and resources to mentor the girls: Shanti Rao, Kylie Owen, Polina Khoroshko, Shae Howard, Sarah Webster, Pia Waugh, Kate Callaghan, Marta Ganko, Krystle Kocik, Kristen Rumsey, Evelyn Moreno. Guest speakers were Professor Beryl Hesketh, Pro Vice-Chancellor, College

of Science and Technology, and Spiderlily Redgold, Director, Enterprise Architecture and Innovation, ICT, (both from the University of Sydney) and Pency Tan from Accenture.

Much valuable help in researching, designing and running the workshop was also received from: Women in Technology [WIT/Gidgets Qld](#) and [WIT W.A.](#), Females in Information Technology and Telecommunications [FITT](#), and EXploring Interests in Technology and Engineering [EXITE](#) in coordination with the national roof-body for Australian Women in IT and Science [AWISE](#).

Participants: the high school girls:

The age of the workshop participants ranged from 14 to 17 years of age (Graph 1). Fifteen-year old students represented 37% of the participants while 16 to 17 year olds were fairly evenly distributed (25%). The students mostly used computers for the purpose of completing homework and communicating with friends and were less likely to use computers to play PC games or to download music. While over 80% of the girls rated basic computer skills and problem solving as vital skills in studying IT at university, only about 50% considered logic, communication, and creativity as important. Maths, graphics, touch typing and business knowledge were considered relatively less important in studying IT.

Patience (87.5%), a hardworking nature (93.75%) and an organised nature (75%) were seen as critical personality characteristics required for IT. Team dynamics (69%) and eagerness to learn (69%) were considered important by fewer respondents. Only 19% regarded analytical skills of importance to IT.

In terms of participants rating their own computer skill levels, 100% claimed that they were either skilful or very skilful in basic computer operations. In terms of software, programming and hardware skills over 50% rated themselves as not sure of their skill levels. Over 20% considered themselves not very skilful in programming and hardware.

Participants: the mentors:

Prior to the workshop, the mentors stressed the diversity of IT career opportunities already available, with more evolving as organisations actively supported women in IT and as more women enter the field using their creative and social skills at the intersection of business and IT and enter traditionally non-female areas such as games and cryptography. A number of the mentors spoke of the attraction of IT involvement in organisational change and development as critical to their choice of it as a career.

To increase the participation rate of women in IT, the mentors highlighted the needs for: educating teachers, career counsellors and university lecturers about the opportunities for IT careers, increasing mentoring, increasing organisational support for women managing families and careers and redesigning traditionally male-oriented courses to welcome and include women.

Outcomes of the workshop: the high school girls

The majority of the participants enjoyed the activities and thought they were very interesting. There were no participants who did not like the activities or considered them to be not interesting. Some participants found Photoshop and Dreamweaver challenging however the

majority of participants found mentor breakout sessions easy. This may have been due to the structure of the session as it mostly involved listening, asking questions and taking down information about mentors. Ninety percent of the participants either agreed or strongly agreed that the mentor breakout sessions were helpful.

Nearly 65% of the participants stated that they would recommend the workshop to others. This is an important information as this would encourage more young women to participate in future IT workshops.

One of the highlights of the findings was the students' pre- and post-workshop responses to whether they would consider IT as a career (figure 1.4). Before the workshop only about 44% either agreed or strongly agreed that they would consider IT as a career while about 50% were just not sure. However, after the workshop about 80% agreed or strongly agree that they would now consider IT as a career. While the 50% that were not sure before was reduced to about 20%.

Outcomes of the workshop: the mentors

Post-workshop, the mentors' overall evaluation of the workshop was that it was very successful, particularly in: the interaction among the girls, tutors and mentors, the variety of experience and pathways into IT that the mentors represented, the enthusiasm of the mentors and tutors, and the interaction between the mentors themselves. Suggestions for improvement included recruiting more mentors from outside commercial IT and having a more technical focus for the workshop. Most of the mentors expressed a desire to support further workshops and informal communication among the girls, tutors and mentors has continued beyond the workshop.

The workshop experience was summed up by one mentor in the following piece written for the University's Science Alliance project:

A "Host a murder" party game, amateur photography and conducting interviews might not be what comes to mind in relation to "women in IT". But these were just a few of the activities high school girls participated in at a 3-day Women in IT workshop hosted by the University of Sydney last month.

EO Solutions Group, the final year Information Systems students who acted as consultants to the university and brought the workshop into fruition said, "We wanted the girls to realise that IT wasn't just about sitting in front of a computer and programming. We wanted them to see that IT is involved in every industry today..."

Sponsored by industry heavyweights Microsoft, Accenture, Cisco & Linux Australia, the workshop featured guest speakers and mentors who discussed career and study opportunities with the students.

The energy that kept the room buzzing is difficult to describe, but the numbers speak for themselves. Prior to the workshop, 44% of students agreed they would consider a career in IT, and 50% were unsure. After the workshop, the number of students who would consider a career in IT almost doubled to 80%.

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TABLES AND FIGURES

Tables 1.1 and 1.2 from <http://www.eeo.nsw.gov.au/women/reskilling/paper.htm>

Workforce

Table 1.1: Percentage of female workforce in Information Technology, Electronics and Communications (ITEC), worldwide

Country	Statistic and comment Participation of women in ITEC-related jobs - %
Australia	ABS estimates place women at 20% of IT&T professionals and the situation does not appear to be improving (2)
UK	13% in 2000 and declining (3)
USA	28% in 2000 and declining
Canada	21% in 1996 and declining
Ireland	19% in 2000 and declining
Taiwan	Not available
Spain	7% in 2000 and declining

Education and training

Table 1.2: Percentage of females in ITEC-related courses or subjects, worldwide

Country	Statistic and comment Participation of women in ITEC-related courses - %
Australia	The proportion of students in IT&T courses who are women has not changed significantly over the last five years - at around 19% nationally. (4)
	Women graduates in ITEC-related subjects
UK	35% in 1998/99 and increasing (5)
USA	40% in 1996/97 and increasing

Canada	36% in 1997 and increasing
Ireland	42% in 1998 and increasing
Taiwan	37% in 1998 and increasing
Spain	41% in 1990/91 and increasing

Figures 1.1 to 1.3 taken from <http://www.dest.gov.au/research/pubs/womeninit.htm>

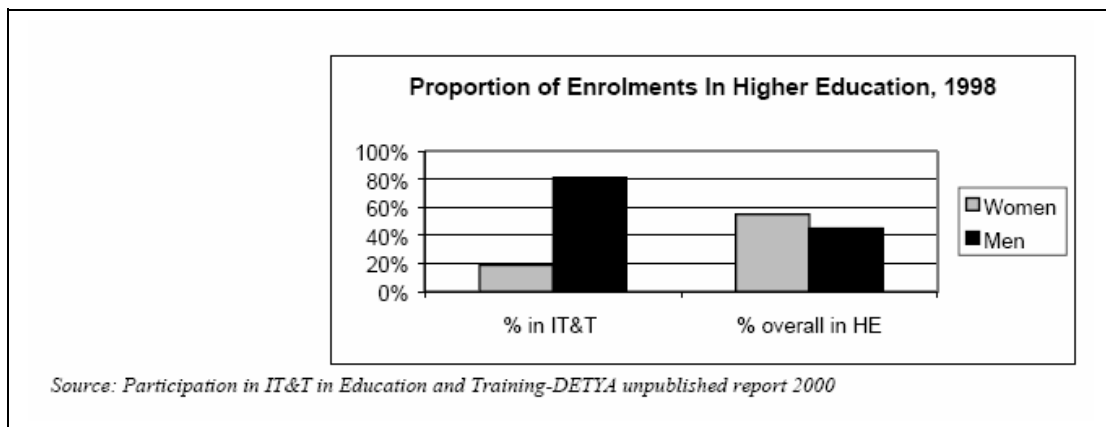


Figure 1.1: Proportion of Enrolments in Higher Education for 1998, Australia

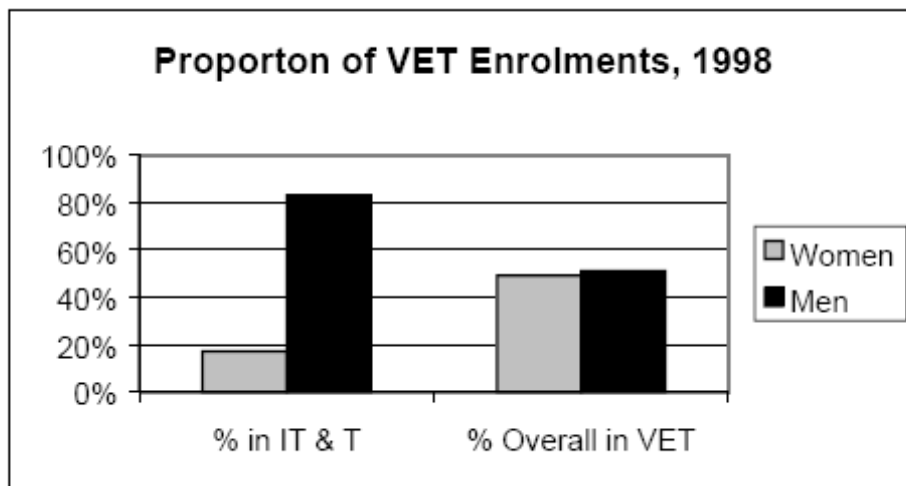


Figure 1.2: Proportion of VET Enrolments for 1998, Australia

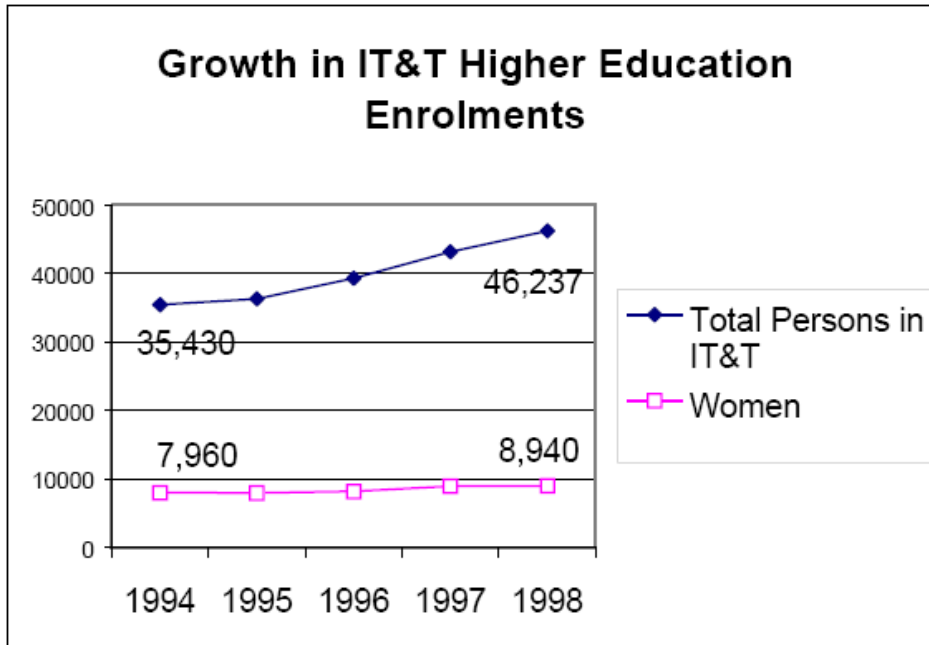


Figure 1.3: Higher Education enrolments in Australia from 1994 to 1998

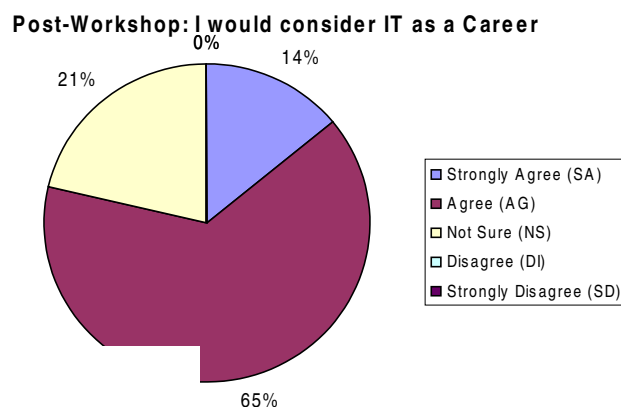
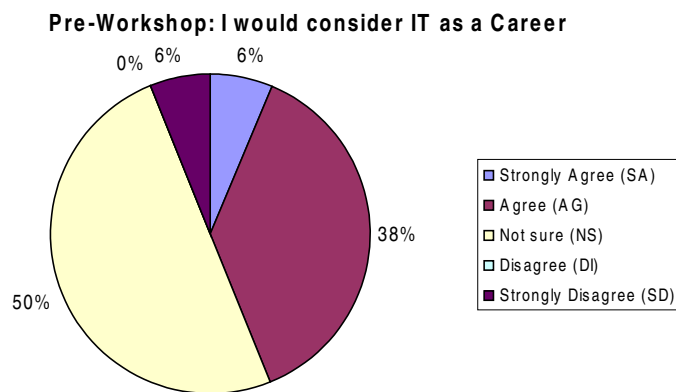


Figure 1.4

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APPENDIX 1. WORKSHOP ACTIVITIES

According to the recommendations report and the negotiations with the client, several activities that cover different areas of IT were chosen. The following table is an extraction of the workshop activity table and outlines each activity developed along with its aim and resources required to run the activity.

Name of the Activity	Description of the activity	Aim of the activity	Resources needed (including hardware, software, stationary and human resources)
Computer Demolition	<p>This activity requires the girls to both pull apart a computer tower, and then put it all back together, whilst learning about what each part does and how it all works together to get the machine up and running.</p> <p>The girls should be divided into groups to work together with one unit.</p>	<p>The aim of this is to learn how 'easy' it is to build your own computer and to build networks through working in groups.</p> <p>Every component the girls remove and install, are components which can be upgraded to improve computer performance.</p>	<ul style="list-style-type: none"> - Two computers, one to take apart (including monitor, tower, keyboard and mouse – to make sure it works) and the other to follow the Flash tutorial (with Flash player installed) - girls divided into groups (max of 4 girls per unit) - one tutor per group - one screwdriver per group - a grounding wrist band
Host-A-Murder	<p>This activity utilises Microsoft Word, Excel, Powerpoint and chat to solve an interactive murder mystery. To correctly solve the mystery, the girls will need to determine who killed the victim, how the murder was committed, the motive behind the murder and the link the suspect has to the crime scene.</p> <p>For the girls to get the most out of this activity there should be no more than two girls to one group. While the activity can work individually, it is aimed for pair work.</p> <p>There are three rounds, the first round introduces the crime and the characters, the second provides further clues and the final round is used to formulate theories and present them to the group. In rounds one and two, each character is given a set of clues unique to them. Within each set are clues to</p>	<p>There are five aims for this activity:</p> <ol style="list-style-type: none"> 1. To familiarise the girls with Microsoft Word, Excel and Powerpoint 2. To familiarise the girls with Internet chat in a controlled environment where a moderator helps mediate the chat and advise girls, informally, about acceptable chat behaviour (netiquette) 3. To promote teamwork and virtual collaboration 4. To promote information gathering, deductive reasoning and problem solving skills 5. To practise presentation skills 	<ul style="list-style-type: none"> - One computer per two students - Microsoft Office installed - Flash player installed - Data projector (as well as additional computer to run final presentations) - one tutor among four girls - one tutor to act as moderator in chat room <p>The files included in activity:</p> <ul style="list-style-type: none"> • 2 x Flash animations (Round 1 and Round 2 crime scenes) • 10 x Round 1 Character Clues in Word (each character gets given a unique set of clues) • 10 x Round 2 Character Clues in Word • Clue Sheet in Excel • 3 x Powerpoint templates • Word document with character details, clues, motives, and links to crime scene (tutors and

	<p>reveal and clues to conceal. The clues to reveal are meant for everyone to know, the clues to conceal are meant to be kept hidden <i>unless</i> it is specifically asked about (at this point the clue needs to be revealed)</p> <p>If a person is asked a question, they cannot lie about the answer.</p>		<p>admin only)</p> <ul style="list-style-type: none"> • Final Powerpoint slides to reveal the story behind the murder (tutors and admin only)
<p>Photoshop Tutorial</p>	<p>This activity requires the girls to learn the basic fundamentals of using Adobe Photoshop, through an interactive online tutorial.</p> <p>Girls will learn techniques such as, red eye elimination, photo manipulation, inserting texts and cropping images.</p>	<p>The aim of this activity is for girls to learn how to use Photoshop in a fun way, in order to learn all the skills they need for making a magazine cover, which is another activity done after the Photoshop tutorial.</p>	<ul style="list-style-type: none"> - Digital Cameras - One computer per 2 students - Macromedia Flash player installed on the computer the girls are using to run the online tutorials. - Adobe Photoshop CS2 installed on the computer the girls are using. - 1 tutor per 4 students to assist them. - 1 advanced tutor to assist other tutors, if they cannot answer student questions.
<p>Dreamweaver Tutorial</p>	<p>This activity involves students learning basic skills in the Macromedia Dreamweaver software.</p> <p>Skills they will learn in the tutorial is creating tables, inserting texts and images and creating hyper links.</p>	<p>The aim of this activity is to teach the students the basics of Macromedia Dreamweaver so they can build a basic website using the software.</p> <p>This activity will give them the skills they need to make a website which will be done in an activity later in the workshop.</p>	<ul style="list-style-type: none"> - One computer per 2 students - Macromedia Flash player installed on the computer that the girls are using to run the online tutorials. - Macromedia Dreamweaver MX 2004 installed on the computer the girls are using. - 1 tutor per 4 students to assist them. - 1 advanced tutor to assist other tutors, if they can not answer student questions.
<p>E-Magazine</p>	<p>This activity entails creating a professional-looking e-Magazine featuring the students, mentors and their stories.</p>	<p>The aims of the activity include:</p> <ul style="list-style-type: none"> • Applying the basic Photoshop skills learnt in the Photoshop tutorial in order to create the magazine cover featuring the students and their mentors • Applying the basic Dreamweaver skills learnt in the Dreamweaver tutorial in order to 	<p>Hardware:</p> <ul style="list-style-type: none"> - Computer - Digital Camera <p>Software:</p> <ul style="list-style-type: none"> - Dreamweaver MX 2004 - Adobe Photoshop <p>Other Resources:</p> <ul style="list-style-type: none"> - e-Mag Templates - e-Mag Samples

		<p>create feature articles about the students and mentors.</p> <ul style="list-style-type: none"> • Emphasising the project based nature of IT work. • Promoting group collaboration <p>Outcomes:</p> <ul style="list-style-type: none"> • The e-Magazines may be burnt onto a CD for students to take away • The web space in which the students create their e-Magazine cover may be made public to allow access for students after the workshop 	<p>Human Resources:</p> <ul style="list-style-type: none"> - One tutor per group
Mentor Panel	Four young women from industry speak about their experiences in industry and the critical events for them in choosing IT as a career	To raise the girls' consciousness of the variety of pathways into IT and of experiences in the field.	
Mentor Breakout Session	In this session, the girls will breakout into groups of 4 or 5, each with a mentor and a facilitator (tutor).	The aim of the session will be for the girls and mentors to discuss aspects of being a woman in IT, (with the help of the facilitator) and to capture highlights of the session for the girls and what it meant to them, for presentation on the website by the end of the workshop.	Mentor, tutors as facilitators, cameras, stationery for recording

APPENDIX 2. BACKGROUND TO WOMEN IN IT: REVIEW OF LITERATURE AND RELATED WORK

What do the Information Technology education and employment statistics show?

Within Australia, a study conducted in 1998 shows that although women make up to 55% of all Higher Education enrolments, women constitute only 19% of Information Technologies & Telecommunications (IT & T) related Higher Education enrolments (refer to Figure 1.1 in Appendix 1). Whilst 'female enrolments in the Vocational Education and Training' (VET) sector show similarities, with women making up almost half of enrolments, only 17% of IT & T enrolments are female (Figure 1.2).

Although enrolments in IT & T Higher Education have increased since 1994 to 1998 by 30%, female enrolments have actually decreased from 22% to 19% (Figure 1.3). Either way the trends show that women make up at most 19% of enrolments in IT & T, and that without deliberate effort to discover why women are under-represented and constant attempts to increase their participation, the gender imbalance will not be equalised (Newmarch, *et al*, 2000).

Internationally, research shows, the number of women studying IT & T related subjects, is either constant or increasing since 1996 (Table 1.2) with the highest percentage being in Ireland. However, the number of women pursuing IT & T careers is both low and declining (refer to Table 1.1 in Appendix 1) (Larri, 2002).

Studies also show that women are more concentrated in low status specialties (Von Hellens, 2000). While there are a considerable number of women involved in data entry, analysis and customer focused roles they are somewhat under-represented in managerial, technical and operational areas.

Why are girls and women under-represented in the Information Technology studies and workforce?

It is difficult to pin point exactly why the numbers are dropping in Higher Education, when the results demonstrate that females pass the units they enrol in at a higher rate than the general student body. Within the VET sector however, they have a slightly lower pass rate than the general student body as a whole. Paradoxically, the enrolments have increased for the VET courses and dropped for those in Higher Education.

One study showed that the low female participation in IT & T courses in high school could be a significant factor. Courses within NSW showed a significant difference between male and female participation. Twenty seven percent of students studying 3-unit computing (1998 high school level) applied for IT courses as their first UAC preference while only 17% of 'women studying 3rd unit computing did so'.

These figures are seen to affect in some way the numbers of female enrolments in Higher Education and VET courses, which in turn are seen to affect the proportion of female employment in IT & T. The percentage of women working within the IT & T industry declined slightly from almost 22% in 1996 to 20% in 1999 (Newmarch, *et al*, 2000).

In determining why high school girls are less likely to pursue IT than boys, it is evident that the factors influencing their decisions come from within the home, school and the media.

There is a common misconception of the true nature of IT careers (Teague, 2002). It is often portrayed as a highly technical area (Von Hellens, *et al*, 2000). The achievements of women computer professionals are not widely recognised or publicized and there is a lack of female role models within the society (Carey, 2002). Many spokespersons at computer conferences and in the media are male which further perpetuates this view.

Research indicates that girls have lower levels of confidence about their computer skills than boys (Moorman and Johnson, 2003) and they undertake IT for more extrinsic reasons (career opportunities, salary) as opposed to having intrinsic value (personal interest) (Clarke and Teague, 1994). The gap between male and female achievement is slight in the early stages of schooling and it's known to expand in the progressive stages (Anderson, 2005). This may indicate a gradual shift by girls away from computers and computer courses as the effects of subtle influences accumulates.

In the school environment, computer courses have a more male-oriented focus (Anderson, 2005). While girls are not encouraged as much to choose IT subjects, those who do are usually more confined to word processing tasks as opposed to being exposed to a wide range of IT skills. Scott (1996) found that girls in single sex schools had experienced a wider range of computer tasks.

The domestic environment can also contribute towards hindering female involvement in IT. Girls are less likely to have access to or ownership of computer resources at home (Anderson, 2005). Computer-related extra-curricular activities such as computer games are often designed with male interests in mind (e.g. war games, shooting games etc) (Moorman and Johnson, 2003).

From the above account it is evident that in order to move towards an equality of the gender imbalance in the IT industry there is a need to increase female role models, to communicate the true nature of IT and its applications, to make IT courses more relevant to girls and to encourage girls to explore a variety of IT tools both at school and at home.

Why is it important to attract more women into the IT workforce?

There is an increasing demand for qualified IT professionals that is often unmet. Further there is also a demand for differing skills (Teague, 2002). Women are known to possess differing skills to men. It is believed that females can make a distinctive contribution to the IT industry and even to improve it. Research showed that women are more client-oriented, innovative, strategic, more intuitive and has the ability to switch between technical and business roles. They are also known to possess a variety of skills such as accounting, marketing, sales, analytical and IT business skills (Von Hellens, *et al*, 2000).

This is not to imply that all women have all these skills or that all men do not; rather these different skill sets between genders should be viewed as complementary and combining these skills in the workplace will allow for ITs evolution.

One research study found that many women had not come from an IT background but had switched over to IT quite early in their career (Von Hellens, *et al*, 2000). However, tertiary qualifications are becoming more and more respected and advantageous in the workplace. Since technology is changing at a fast pace it requires professionals to train constantly in order to keep up to date.

While technical skills are important in IT, general skills such as communication and report writing are also vital in effective client relationship management. Women are known to be able to not only to communicate, write well and liaise with clients but they can also switch between these roles effectively. As Von Hellens, (2000) states, "One needs to understand and adapt to corporate culture, networking and talking about achievements".

What are the perceptions of secondary school, tertiary students and IT professional women?

As with any industry, IT has its generalizations, the perceptions often viewed and expressed include being seen as a very technical environment (Von Hellens, *et al*, 2000). Women generally have a preference for non-technical areas and so have a misunderstanding of the true nature of IT.

It is also difficult to describe the range of jobs available in IT as occupations since roles are constantly forming and reforming. Further the media tends to put great emphasis on the latest technologies and gadgets while drowning the fundamental concern of IT, which is how to effectively employ these technologies into different industries (Von Hellens, *et al*, 2000).

Finally the most common and dominant image of IT is that of the computer nerd (Anderson, 2005). This image propagates the misconception that IT solely involves highly technical personnel working long hours in isolation with no life beyond their computer.

With regards to studying IT, Teague (2002) writes of environmental factors that influenced several women into choosing an IT career. High school was the starting point for a number of women now in IT; this was where they were introduced to computing classes or attended a camp for computing which they found enjoyable. These positive experiences assisted in influencing their decisions to continue with IT through tertiary education and beyond.

Family and friends were also found to be a great influence through their encouragement and support. A number of women reported that they were introduced to computing by a male in informal settings.

University was also an area noted as influential. Several women mentioned university as instrumental in helping them decide on computing as a career.

Most female IT professionals had the view that practicing IT was entirely different to the image borne in education. They found that the work did not entail mere technical focus but a considerable amount of time was spent writing reports as well as interacting with the clients (Clarke and Teague, 1994).

These cases suggest that many students have little idea of what IT entails and that it is not until they accidentally experience it that they find it is something they enjoy.

What has been done so far to address this issue?

As this issue affects the IT industry worldwide, IT workshops aimed at high school girls to encourage them into IT have been held all around the world. As part of the background summary conducted, we reviewed prominent workshops held internationally as well as those within Australia.

APPENDIX 3 THIS SECTION SUMMARISES AND EVALUATES ACTIVITIES DESIGNED TO INTEREST HIGH SCHOOL GIRLS IN IT AROUND THE WORLD.

International Workshops

SWAT computer workshop, Baltimore USA

This workshop consisted of twenty girls participating on one activity for duration of two hours. The activity included taking apart a computer-processing unit, and then reassembling its components, including installing RAM, motherboards, expansion cards, processors, disk drives, and power supplies. The girls were separated into pairs to perform the tasks from start to finish. Throughout there were explanations on what the hardware being installed does and how to install it properly.

The aim of this activity is to teach girls about computer hardware and to show them how easy it is to build their own computer, which in the long run can be far less expensive than buying a pre-made computer. Although in the context of the 'Girls in IT' workshop the main aim would be to introduce the girls to the basics of computer hardware, to explain what each component does and how they work together to make the computer work – at a basic level.

Website: <http://sta.umbc.edu/orgs/swat/>

Computer Mania Day, Baltimore USA

This workshop was a one-day event, which consisted of 634 girls taking part in 20 different seminars and workshops. The entire day was not solely focused on the girl's activities, as there were 18 seminars aimed at helping parents and teachers nurture the girl's talents in the areas of mathematics, science and IT.

The girls were separated into class size groups for the seminars and then further divided into groups of four to undertake the workshops. The workshops included animation, cartooning, and introductions to biometrics as well as seminars on 'Designing for Humans'. The aim of this workshop was to show girls how you can have fun with IT. It introduces them to a variety of technologies including Apple computers and PC's.

The relevance of this workshop to the 'Girls in IT' workshop is that it proves how important it is to introduce girls to the different technologies available, including both Apple and PC technologies. Also the feedback on this workshop shows that interactive tutorials work well with introducing technology to girls whilst keeping with the 'IT can be fun' theme. Girls are likely to retain more information and learn more with interaction and problem solving questions.

Website: http://www.umbc.edu/cwit/computer_mania.html

Get ready for IT, College of DuPage, Glen Ellyn, Illinois

This course was a one-day workshop, which focused on broadening girls' career objectives. The workshop conducted several activities, which introduced girls to the different areas of IT and explained how these skills can be used within different industries.

The day was split up into four activities, the first being an interactive tutorial where the girls were introduced to famous historical women in technology, whilst also learning about the history in computing. The second activity was a virtual scavenger hunt where the girls learnt about the different areas in IT by solving puzzles online to help them navigate through the hunt. The third activity of the day was a seminar, where a panel of female ICT professionals were invited to talk about their experiences with studying different streams of IT, as well as experiences with working in a male dominated profession. Following this the girls were divided into smaller groups and encouraged to informally discuss any concerns they might have, or ask any questions they might have about studying/working in ICT with the female ICT professionals.

The feedback on this particular workshop revealed that the activity girls thought most useful was the informal discussions they had with the professionals, as they felt more inclined to ask questions given the smaller group. They also felt they received honest feedback from the professionals.

The relevance of this workshop to the 'Girls in IT' workshop is that it is important not only to demonstrate the different streams of study within IT, but also to show their applications within the 'real world'. Also it is useful to have time for casual, laid back, discussions since the causal atmosphere promotes more in depth discussion, and the girls feel more confident in asking a wider range of questions. Further it's evident that due to the honesty apparent in the responses the girls felt encouraged to take up IT in future studies.

Website: <http://www.aauw-il.org/wwfg/archive/71/getready.htm>

What's Working for Girls in Illinois

It had been evident from prior research that the general conception of IT among girls was that it was all about geeks and freaks. Hence the main objective of this workshop was to change girls opinion about IT and to reform the attitudes of "we can but we don't want to" in girls. The duration of the program was 5 days and it catered for approximately 50-60 girls. The age of participants ranged from 6 to 9 graders. The main activity involved in developing their own online business related to a women's sport of their choice. Other activities involved a scavenger hunt and a panel discussion. The scavenger hunt was a game that involved two girls working in a team. The Panel discussion allowed the girls to talk to professional women in the IT field. The girls were introduced to software applications such as Dreamweaver and PowerPoint to create their project. There was a field trip to a high-tech multimedia agency and pairing of the attendees with women mentors who are from the technology professionals. The girls were given handouts with information about technology jobs and recent technological inventions. The girls found it very empowering when they hear that their gender is exceptionally important in the field of IT.

The objectives and the scope of this workshop are similar to that of the proposed workshop. We could adopt the idea of an online business into one of the workshop activities.

Website: <http://www.aauw-il.org/wwfg/archive/62/webcamp.htm>

Girls on Track Information Technology

The objective of this workshop was to build girls' confidence in the field of IT and to increase their interest in computer science and mathematics. The workshop spanned over 14 days and catered for approximately 200 talented 7th – 8th graders.

The main activity included providing the girls an investigative question where they had to use various search engines to uncover the solution. Excel was used to collect, manipulate and graphically display data arising from their investigations. Power Point was used to present their graphic interpretations. Approximately 30 teachers and 15 guidance counsellors were involved in this workshop. Professional women from the field of engineering, information technology were invited to speak to the girls about their careers.

The main activity undertaken by the girls would be appropriate for an introductory session for the Girls in IT workshop.

Website: <http://www.naturalmath.com/research/NM%20Girls%20on%20track%202000.pdf>

Michigan Council of Women Technology

The mission of this workshop was to increase the number of girls getting involved in IT with the specific aim of targeting girls at an early age. The duration of the program was 4 days and it catered for 40 girls ranging from 4th to 7th grade. Main activities included building robots and learning to design and program their own Web pages. Girls learnt how to build a small circuit board coupled with appropriate software could turn a miniature wheeled vehicle constructed of Lego blocks into radio-controlled robot. The sponsors for this workshop were AT&T, IBM, Sun Microsystems, GMAC and Ford Motor Co.

It is likely this activity would not be feasible for this workshop given the limited resources and the level of complexity.

Websites:

http://www.freep.com/money/tech/mwend28_20040628.htm

<http://www.detnews.com/2005/careers/0507/11/C01-234250.htm>

<http://www.ltu.edu/news/detail.asp?ContentId=FDf48905-8887-464C-8404-6F17088993E3>

The College of St Catherine Workshop

The objective of this workshop was to maximize the experience for girls in computer science, math and information systems. The workshop was an introduction for freshman and sophomore high school girls to college academic life and the breadth of career opportunities in business and technology. The duration of the program was two weeks and the activities included dissecting a computer, designing a company logo, designing a webpage, analysing business requirements, planning an Information Systems project, implementing the online store, analysing data requirements, constructing a database of products, managing personal finances and planning for a career. Sources used were HTML for webpage and FrontPage. There were guest speakers from top professions in the IT field.

While this workshop includes more intensive activities than would be suitable for a three-day workshop, the focus is on Information Systems, which is an area we should consider when designing the proposed workshop and which is not addressed in a majority of previous Australian workshops.

Website: <http://minerva.stkate.edu/offices/academic/isys.nsf/pages/biztechcamp2003info>

Australian Workshops

The Rural and Remote IT Stars Workshops

The IT Stars Workshop was organised and run by the James Cook University. The objective of the workshop was to encourage girls to take up IT subjects at high school level and to encourage more high school students to consider IT as a career. The workshop had 30 participants and it was held over a two-day period. It included activities such as creating music, animation and computer graphics to produce an e-portfolio about themselves on a CD. Students were also able to explore various career choices available in IT, their potential salaries and the possibility for working overseas. The workshop also has included sessions where IT teachers and professionals discussed their careers and training in IT. General public was also invited to an information evening as part of the weekend activities. The program was supported and funded by the Queensland department of Innovation and Information Economy as well as James Cook University.

The objectives of this workshop are closely related to the objectives of the Girls in IT workshop and the scope (content, duration and number of participants) of the workshop seems to be fairly similar. The idea of an e-portfolio is excellent since it provides a tangible output from the workshop for each participant. However, we should include a wider variety of IT areas (like networking, hardware, software) within the Girls in IT workshop.

Website: <http://media.jcu.edu.au/story.cfm?id=187>

Zonta E-girls, Glen Innes and Armidale, NSW

This workshop was organised by the Armidale Zonta Club (An International Women's Organization). The objective of the workshop was to give schoolgirls a greater understanding of the creative side of the Information Communication Technology Industry and to encourage more year 10 girls to pursue ICT careers. It involved a group of 40 schoolgirls in Year 10 and was held over one day at the Armidale TAFE. It included activities such as building a light-and-touch sensing robot, creating digital media, programming HTML, Networking, installing LINUX, security, code breaking and an introduction to System Analysis. It focuses more on the programming side of I.T. teaching the basic elements of computer algorithms, including sequencing, decisions and control loops. Sponsors included the University of New England, National Centre of Science, Information and Communication Technology, Armidale Film and Television School, IBM, Linux Australia.

The objectives of this workshop are similar to the objectives of the Girls in IT workshop and the number of participants are fairly close however it was only a 1-day course. Nevertheless the variety of areas covered within this workshop is impressive. The basic principals of simple programming techniques such as if statements and for loops may be used in the proposed Girls in IT workshop. Since our resources are limited it is unlikely that we will be able to implement something as complex as a robot but we may incorporate decisions and control loops in Javascript applications for the websites the students are to build. For example they could create a simple program where they can see what character profile they fit by setting some questions.

Website: <http://www.une.edu.au/news/archives/000273.html>

The Girls in Maths, Technology and Science Summer School (GMTS)

This workshop was organised and run in January 2005 by the University of Southern Queensland. The objective of the workshop was to influence the subject selection of girls in year 11 and 12 and to encourage more girls to enrol in engineering, science, mathematics and

technology courses at the tertiary level. Activities undertaken by students included video conferencing, GIS and authoring their own web page. Sponsors included Powerlink Queensland and the Queensland State Government.

The objectives of this course are broader than the objectives of the Girls in IT workshop since it covers various areas such as engineering, science, mathematics and as well as information technology. Information relating to the number of participants and age groups were also minimal. However, it is excellent that the workshop has emphasised the practical applications of IT in different industries, which we will need to consider for the purposes of the Girls in IT workshop.

Website: <http://www.usq.edu.au/opacs/aboutopacs/specprogs/summerschool.htm>

Exploring your Future in Information Technology, Illawara

This workshop was organised and run by the IT sections of the Illawara TAFE Institute. The objective of the workshop was to broaden the understanding of IT career opportunities and the various fields within the industry to young women. It included activities that provided hands-on-experience with looking at hardware, using digital cameras and chat sessions with professional women in the IT industry.

The objectives of this course are similar to ours however the scope in terms of the number of participants and duration was not disclosed. While not much information was provided on the specific activities conducted, the skills covered within the workshop appear to be very basic and broad. However, it included chat sessions with professional women in IT.

Website: http://www.illawarra.tafensw.edu.au/corp_info/AR_2002/community.htm

Technology workshops for primary school girls

This workshop was organised and run by the computer science and engineering faculty of the University of New South Wales. The objectives of the course were to engage girls in the process of creating the technology of the future, while giving them a better understanding of today's technology. It involved about 35-40 participants (girls) from years 5 and 6. The activities conducted included a brainstorming session, lab experience in human computer interface, the use of state of the art Macintosh computers as well as a university tour and an introduction to the research environment. The main sponsor was UNSW.

The objectives of this workshop were broader since it covered areas of computer science as well as engineering. The activities seem more general compared to the scope of the Girls in IT workshop and the skills that we need to cover. The Girls in IT workshop should cover a wide range of areas within IT like web design, software, hardware, networking and multimedia. However, the idea of exposing girls to Macintosh as well as windows is excellent.

Website: <http://www.eng.unsw.edu.au/alumni/unsweng/issue8/comp.htm>

2001 IT Spring School for Girls

This workshop was organised and run at the University of Wollongong. The objective of the course was to attempt to correct the information technology gender imbalance. It involved participants from 50 schools over two days. Activities included Digital Media sessions and computer graphics and movie sessions. Sponsors included the National Women in Information Technology, ACS and IBM.

While the objectives of this workshop are similar to that of the Girls in IT workshop, there was limited information available about the course. The content covered was likely to have been more interesting and motivating for high school girls since they can relate better to cartoons and movies. However in the context of the Girls in IT workshop consideration needs to be given in covering a wider range of areas in IT.

Website: <http://media.uow.edu.au/archive/latest/2002/extra/ITgirls.html>

CQU Workshops

These workshops were organised by the Women in IT group and run at the Central Queensland University over 3 days. There were between 60-70 female student participants for each workshop. The objective was to increase the female participation rate in this university's computing courses and the skill level required was little or none at all. Activities included an introductory session to e-mail and a WWW session. Feedback from students showed that the workshops were interesting and motivating. The main sponsor of the workshop was the Central Queensland University.

Here the objectives seem a bit narrower than those of the proposed workshop but the duration and the number of participants is relatively similar. It is however an absolute introduction to IT. In the context of the Girls in IT workshop consideration should be given to exploring in depth and giving some insight into more IT applications and areas. However this workshop still provides useful ideas for the introductory session for the 1st day. We could consider an e-mail session to get to know each other and a Google quiz to start off.

Website:

The Girls Can Do IT Breakfast, ignTe breakfast

These workshops were held in Queensland in 2003. It was designed as a breakfast event held in one morning/day that included both students and parents/teachers/career counsellors. These workshops targeted high school girls from Years 8 to 10 and aimed to inform the girls of the possibilities offered within IT. They also aimed to inform parents and educators of the opportunities available in IT for girls and how to assist the girls in following those opportunities.

These events didn't include many practical elements; rather the girls were given talks, seminars and demonstrations. The talks were given by industry professionals and the demonstrations included were of current and emerging technologies in the industry. There were opportunities for girls to interact with the industry professionals by way of question sessions and informal discussions.

While these events received positive (albeit limited) feedback, the scope of their activities (the objective being introducing IT to high school girls) didn't include any workshops, tutorials or allow the girls to interact with technology.

Websites:

<http://www.learningplace.com.au/deliver/content.asp?pid=15436>

<http://www.learningplace.com.au/deliver/content.asp?pid=12332>

Sunshine Coast Glitter

Sunshine Coast Glitter was an event held for Year 8 to 10 students, it consisted of talks from women in ICT about the paths they each took into ICT, a demonstration of a tablet PC from

Toshiba, a workshop for video editing and a questioning session with the speakers. Feedback received from the girls highlighted that one favourite aspect of the event was the video editing. Another issue addressed was that the speakers took too long and got boring.

These events included one or more workshops that involved the girls using technology, however the activities did not last very long as the events only took place over one day. With regards to the Girls in IT workshop we should aim to attain a balance between the use of seminar sessions and practical workshops in order to keep participants motivated.

Website: <http://www.learningplace.com.au/deliver/content.asp?pid=13388>

GIDGITS Multimedia Workshops

GIDGITS Multimedia Workshops targeted Year 9 and 10 girls and included multiple workshops - introduction to multimedia and cover content development, design concepts, digital video editing and multimedia authoring. These workshops aimed at encouraging more girls to study IT. From the feedback received from the participants, the workshops showed the girls the ease of technology use and removed some of the stigma attached to computer science in general. They also found that the “hands on” aspect of the workshops was more beneficial than “sitting and listening to instructions”, the fact that they were able to put into practice the skills that have been demonstrated to them rather than simply look on greatly increased their enjoyment of the workshop.

From these one day workshops, it seems evident that the girls found those with a practical element and hands-on experience more engaging and interesting than a seminar or talk. Given that the events held lasted only one day the activities in the workshops were limited to those that could be accomplished within a 1 hour or 2 hour session.

Website: <http://www.learningplace.com.au/deliver/content.asp?pid=11118>

Emerald District Girls and ICTs Event

The Emerald District Girls and ICTs Event was hosted for 24 girls aged between 12 and 14 years and aimed to encourage high school girls to enter into IT. The workshop topics included robotics, digital video, digital albums, animations, digital art (design a T-shirt print, or a CD cover) and calendar creations. A virtual classroom course was created and all participants were enrolled. The girls were encouraged to provide feedback via the communication tools in the virtual classroom.

The use of a virtual classroom in the Emerald District Girls and ICTs Event allowed the girls to interact via technology and also assisted in obtaining feedback from the participants. This would be a useful tool in our workshop to efficiently obtain feedback from the girls while at the same time exposing them to as much technology as possible and make an otherwise tedious task (of filling out a survey or questionnaire) somewhat more enjoyable.

Website: <http://www.learningplace.com.au/deliver/content.asp?pid=20183>

GIDGITS in the outback

GIDGITS in the Outback featured four workshops presented by local teachers: Garage Band using iMacs; making movies with photographs and music using PowerPoint; personalised calendars using Publisher and Clay Animation. The girls then presented their creations to the others during a “show and tell” session at the end of the day.

The topics covered in this workshop are likely to be very interesting to young girls since they can relate better to movies, animation and music. The idea of presenting the final product to the rest of the participants is also a great idea to consider for the Girls in IT workshop, as this would complement the IT skills with communication skill development, which is vital to the IT industry.

Website: <http://www.learningplace.com.au/deliver/content.asp?pid=19088>

Girls, Gadgets and Gigabytes

Girls, Gadgets and Gigabytes was an event hosted for 100 primary school and Year 7 girls to introduce the girls to how IT is used in different industries. They were given opportunities to speak with women about how they utilise IT in their chosen careers as well as participate in workshops demonstrating how IT is used in music, media, medicine and tourism. The students worked with digital cameras, digital microscopes, robotics, photo editing software and digital music software.

An element that was well received was the workshops demonstrating the use of IT within other industries. This allowed girls to learn about the extent to which IT can be utilised in the career choice and helped break the stereotype that IT is only for geeks/nerds.

Website: <http://www.learningplace.com.au/deliver/content.asp?pid=22424>

GIFTS Conference Mackay

GIFTS Conference: two-day conference for Years 10, 11, 12 girls that included workshops, role models and career and study opportunities. Feedback in the form of a survey was completed by the girls at the completion of the event, which is provided in the link below. The workshops included multimedia, robotics, engineering, and science. Group discussions were held with working professionals: occupational therapist, physiotherapist, engineer, pharmacist, radiographer, speech pathologist, research scientist and veterinarian.

These events were hosted over multiple days, which allowed for more intensive activities in the workshop and in the talks provided. There was also great focus on how IT can be integrated into several different career paths. In the context of the Girls in IT workshop we should consider covering a variety of areas of IT (software, hardware, networking, multimedia) as well as showing their application in different industries. Further we should strive to attain a good balance between interactive talk sessions and the hands-on workshops.

Website:

<http://www.learningplace.com.au/deliver/content.asp?pid=22846>

http://www.learningplace.com.au/uploads/documents/store/resources/res_22846_conferenceevaluationformfilledin.doc

Go Girl, Go For IT

Go Girl, Go For IT largest event with 1500 in 2002 program. It was a two-day program that was targeted at Year 8 to 11 girls. There were no practical elements involved; the program consisted of interactive talks given by industry professionals. Not all speakers were from the IT industry. Talks included use of IT in dentistry, veterinary science, defense force, and geology. Some feedback from teachers and students provided.

Website: <http://www.gogirlwa.org.au/program.html>

IBM EXCITE camp

IBM excite camp is a four day camp given for 30 girls in Year 8 and 9. (Camps are localised so separate camps were held in Melbourne, Sydney etc). The activities include webpage coding and multimedia tools. The girls are assigned a tutor and at the conclusion of the camp a 10 – week mentoring program was undertaken. The girls learned about technologies such as wearable computers, wireless technology, virtual design and voice recognition.

One aspect of the IBM camp that was different from the other events was the continued interaction between the girls and their mentors after the completion of the camp. It was a method which (given a certain amount of commitment from the mentor) assists in maintaining the interest and involvement of the girls in IT.

While our mentors may not be able to provide such commitment beyond the workshop, it would be great if there were an aspect of the workshop, which allowed the girls to continue their interest and involvement in IT (e.g. online community, message board/forum, competitions).

Website: <http://www.ibm.com/news/au/2004/10/2004101403.html>