

# Where Are They At With IT?

## *Australasian Transition Students (1999)*

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**Abstract:** Students from one Australian and one New Zealand University, entering the first year of an undergraduate business course were surveyed at the commencement of their studies. The study sought information about the IT background of these students. This paper reports on the results of that work and specifically on the accessibility of a home computer to students, and its use. Differences in the confidence levels and perceived knowledge of computers of the male and female students were explored with some comparison of the differences between the two universities. Results suggest that male and female students have equal access to computers in the home, though differences remain in the usage of the technology.

## 1. INTRODUCTION

Studying the world of computers is like studying a moving target [11]. The fundamental nature of Information Technology (IT) is based on continuous change and this is certainly evident in the huge expansion in the last decade in the uses of computers in all sectors of society. It is hard to imagine today how “tomorrow’s adults will need to be technologically literate as citizens and technologically skilled as workers” [6, p.183]. Access to information and skills will be linked to an understanding of computers and, ultimately, an individual’s position in society will depend upon this [3].

Lips [4, p.166] argues that in an era when sophisticated information technology is increasingly used in the workplace, women will become “increasingly segregated if they do not master some aspects of this technology.” The concern is that the highly skilled, technology based jobs

may not be available to women if they do not have appropriate expertise or training.

New technologies bring about changes that have the potential to affect all society and “would be most likely to achieve maximum benefit if each significant section of society was represented in the planning decisions” [5, p.548]. Women need to be actively involved in all levels of the new technologies that have such immense potential for social change. ‘Women who exclude themselves from learning about and using computers risk experiencing even greater vulnerability in a world that is increasingly dependent on the power of computers and telecommunications” [2, p.494]. The means for women to avoid this vulnerability is through education.

There is a large body of literature that discusses the barriers which can account for the low participation rate of women in computing education and, consequently, the computing profession. The factors suggested include the linking of computers with mathematics and science, different learning styles, low self-esteem, the male orientation of computer games and educational software, a lack of role models and support networks and inadequate computer education and career information. The presentation of computers in software, the media, the classroom and the image of the culture associated with computers result in computers being perceived as a male domain by many female students. Most people are not consciously trying to discourage women away from computing, however as,

“...people’s behaviour is often subconsciously influenced by stereotypes that they may not even realise they have. Additionally, when companies direct technical games and products at men, their intention is not to perpetuate stereotypes but to target the largest existing audience. That some women feel uncomfortable in mostly male environments is not primarily a result of men trying to make them feel unwelcome but of dynamics resulting directly from the male majority and societal sex-based differences in behaviour. While perhaps it is comforting to know that no conspiracy exists against female computer scientists, it also means that the problem is harder to fight” [8, p.75].

In the space of fifteen years computer education within the Australian school system has changed from being almost non-existent to being incorporated into every school curriculum. Children now grow up with computers and frequently come into contact with them, not only at school, but also in shopping centres, libraries and the home.

Senjen and Guthrey [7, p.21] envisage a future where women will be as knowledgeable about computer technology as men:

“It is a fact that children in economically advantaged countries are on the whole accustomed to having computers in their homes and schools, and

girls and boys alike are confident using them as both learning tools and for entertainment. Many of the next adult generation won't be burdened with a lack of knowledge and understanding of computer technology and many of the experts...will be women."

Yet, previous research indicates that boys are gaining more computing experience than girls. Boys are more likely to have access to a computer, attend computer camps and extra-curricular activities, belong to a computer club, play computer games, and read computer magazines. Gender differences in attitudes to computers may be the result of many factors, however it has been suggested that differences in computer experiences are a major cause. "Differences in experience lead to differences in opportunities to gain further experiences" [1, p.74].

Is the future foreseen by Senjen et al. any closer? Are students of both genders equally confident and knowledgeable in their use of computer technology? Do male and female students have similar access to, and similar experiences with, computers? Is the situation in Australia any different to that in other parts of the world? This paper seeks to add to the dialogue by presenting the latest results in a five year longitudinal study looking at the changing IT skills of transition students, those students at the end of secondary school starting university.

## **2. METHODOLOGY**

Data was gathered through a survey of all first year commencing business undergraduate students on five campuses of Victoria University (Vic Uni) in Australia. From a possible 1000 students, 585 students completed the survey with 529 useable surveys giving a response rate of 53%. For the first time, the research was extended into another University. A survey was distributed to commencing students undertaking the first year computing subject at Lincoln University in New Zealand. The 345 useable surveys were received from a possible 402 (86%). This questionnaire included 14 questions identical to questions appearing on the survey distributed to the Vic Uni students. These questions related to access, knowledge and confidence with computers. In total, 56% of the participating students were male and 44% were female. Vic Uni students comprised 60% of the entire sample and Lincoln students 40%.

### **2.1 Availability of Computer Access**

A high proportion of the student cohort (79%) indicated they had access to a home computer. The probability of having access to a computer where

they live is slightly better for the female students; 83% of the female students had access compared to 76% of the male students. There was however, a significant difference between the observed and expected frequency of access of the students at the two universities. From Lincoln, 55% of the male students and 60% of the female students were able to access a computer in the home. For students from Vic Uni a total of 93% of the male students and 95% of the female students were able to access a machine ( $\chi^2=165.0$ ,  $df = 1$ ,  $p<0.01$ ). The longitudinal comparison of results indicates that for Vic Uni students access to computers in the home continues to rise; 94 % in 1999, 89% in 1998 [10] increasing from 76% in 1995 [9]. There was no significant difference between the availability of a computer in the home amongst male and female students in any of these years.

## **2.2 Use of the Computer**

Prior to commencing University studies just over 50% of the Lincoln students, and 84% of the Vic Uni students made use of a home computer during an average week. More male students (32%) made no use of the computer at all than female students (24%), however, more male students (9%) used the computer for more than ten hours per week compared to female students (6%).

A cross-tabulation compared the number of hours per week computer use, with the gender and the university of the students. Results indicate that there is a difference in the length of use of computers between the male and female students. The male students use computers for a longer period of time compared with the female students ( $\chi^2=12.98$ ,  $df = 4$ ,  $p<0.05$ ).

## **2.3 Type of Computer Access**

A comparison can be made with the usage of the home computer, over the years, by the Vic Uni students. The 'big 4' applications all showed increased usage with databases being used the least by students. The Internet, chat, and email all showed large increases in transition student usage (see Table 1). An increase in Internet usage by the females is evident, as is a gender gap in the usage of multi-media packages and computer games.

The usage of computer games was also raised in a separate question on the surveys. The results are highly statistically significant ( $\chi^2=41.8$ ,  $df = 4$ ,  $p<0.001$ ). The male students spent more time playing games than did the female students. Only 6% of the women used the computer to play games for more than two hours per week and 65% never used a computer to play games. For the males 19% play games for more than two hours per week though 55% never played games.

**Table 1 Use of IT Applications (by Gender) of Vic Uni students**

	1999 N= 529		1998 N= 575		1997 N=566	
	Male%	Female%	Male%	Female%	Male%	Female%
Word Proc.	82	90	78	85	78	81
Spreadsheets	62	61	50	59	50	46
DataBase	42	42	37	38	37	31
Windows	79	81	78	79	75	73
Internet	58	53	40	28	32	20
Graphics	40	35	37	32	39	27
Chat	31	30	21	18	na	na
Email	54	52	33	25	27	21
Programming	21	17	21	19	22	15
Multi-Media	51	34	50	29	37	22
Comp. games	66	35	63	47	na	na

From the 198 students who had access to a home computer 81% of the male students and 89% of the female students responded affirmatively (84% overall). To establish the quality of the technology the students had access to, the Lincoln students were asked whether Windows 95 or 98 was on the home computer. No comparison can be made with the Vic Uni survey as it asked a slightly different question; however a comparison between males and females from the entire cohort indicated that there was no difference in the type of machines that students had access to.

The continuing rapid growth of Web technology is evident in the home access to the Internet. For Vic Uni students this figure has increased 22% over the 1997-1999 period, from 23% to 45%. The growth in home Internet usage for these transition students outstrips the 19% of homes that have Internet access in the wider Australian population. A total of 42% of all the students from the two Universities had the Internet available at home. There was no significant difference between the male and female students with 41% of all female and 44% of all male students having Internet access.

From those students who had access to a home computer at Lincoln, 69% of the male students and 62% of the females had Internet access. This was significantly greater than the availability of access for the Vic Uni students with only 51% of male students with a home computer and 45% of female students having such access ( $X^2=272.7$ ,  $df = 2$ ,  $p<0.001$ ). This raises the question as to why access to the Internet is so much more prevalent amongst the students from Lincoln. Further investigation is required to establish if there is a difference in access available through the local communities such as schools or libraries, in students' socio-economic background.

## 2.4 Computer self-efficacy

How confident are transition students in their own computing ability and how knowledgeable do students think they themselves are? The outcomes are presented in Tables 2 and 3.

Confidence Level		Not confident	A little confident	Average	Confident	Very Confident
Male	Lincoln	20.8%	25.5%	31.1%	17.0%	5.7%
	Vic Uni	7.6%	13.5%	33.5%	26.5%	18.9%
	Total	<b>13.3%</b>	<b>18.7%</b>	<b>32.4%</b>	<b>22.4%</b>	<b>13.1%</b>
Female	Lincoln	15.8%	30.8%	37.6%	14.3%	1.5%
	Vic Uni	6.3%	18.5%	38.2%	33.1%	3.9%
	Total	<b>9.6%</b>	<b>22.7%</b>	<b>38.0%</b>	<b>26.6%</b>	<b>3.1%</b>

Only 3.1% of the girls felt *very confident* in their use of a computer compared with 13.1% of the male students. However, 67.7% of the female students felt their level of confidence was average or higher. This compared to 67.9% of the male students. There was a significant difference in the confidence level of students at the different universities ( $X^2=69.6$ ,  $df=4$ ,  $p<0.001$ ). Vic Uni students felt much more confident in their own computing ability than Lincoln students did.

Perceived Knowledge		Absolute beginner	Some knowledge	Average knowledge	Pretty Know'able	Expert
Male	Lincoln	18.9%	39.2%	31.1%	9.4%	1.4%
	Vic Uni	9.5%	18.5%	36.0%	28.4%	7.6%
	Total	<b>13.6%</b>	<b>27.5%</b>	<b>33.9%</b>	<b>20.1%</b>	<b>4.9%</b>
Female	Lincoln	12.8%	45.1%	36.8%	5.3%	0.0%
	Vic Uni	7.9%	19.7%	49.6%	20.9%	2.0%
	Total	<b>9.6%</b>	<b>28.4%</b>	<b>45.2%</b>	<b>15.5%</b>	<b>1.3%</b>

How did students perceive their level of computer knowledge at the start of their course? More male students perceived themselves to be pretty knowledgeable or expert, than females. Female students however, were more likely to regard themselves as having average knowledge ( $X^2=21.2$ ,  $df=4$ ,  $p<0.001$ ). Of the female students, 62% felt their level of knowledge was average or higher, as compared to 58.9% of the male students. Again, Victoria University students felt they were more knowledgeable compared to how their peers at Lincoln perceived themselves ( $X^2=96.2$ ,  $df=4$ ,  $p<0.001$ ).

### 3. DISCUSSION

Amongst the surveyed students, male and female students had similar access to similar technology. The literature well documents problems with female students obtaining equal access to computer technology, so for female students to actually have a slightly higher level of access to a home computer is a significant change.

There was a difference between men and women in the length of time students used the home computer in an average week and also what they used it for. While some of the male students used the computer a lot, the female students were as confident and knowledgeable in their use of computers as the male students. Computer game playing is one major area where there continues to be a significant difference between the male and female students.

Unexpectedly, Lincoln students had much less access to a computer in their home environment. Quite possibly, as a direct result of this lesser access, Lincoln students were less confident and perceived themselves to be less knowledgeable about computers. Access to the Internet was much more prevalent however, amongst the students at Lincoln with a home computer than the Vic Uni students who had access to a home computer.

On further investigation, there is a difference amongst the school systems from both countries as to how they adopt technology. In New Zealand the government has not yet implemented a technology curriculum and there is no final year nationally assessed computing subject. This contrasts to the proactive push by the Australian government to incorporate technology into the school curriculum. In the state of Victoria for example, there are three different computing subjects, which can be taken in the final year of school. This access to computing within the school system is likely to be a factor contributing to the greater confidence and knowledge level of the Vic Uni students.

Could the uptake of technology in the school system be linked to the purchase of a home computer? If a school incorporates the use of technology widely throughout its curriculum, would parents see a need to support their child's education by the purchase of a machine for home use? This would enable a child to complete homework and extend their learning and is, of course, likely to impact on the students' confidence and knowledge levels. Consequently this may account for the differing levels of computer access between the two cohorts of students and requires further investigation as to why families purchase a home computer.

This research shows that for the female students in this study some improvements have been made. There appears to be more equal access to

computers and greater confidence and knowledge of computers by the female students than ever before.

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