

NATIONAL VOCATIONAL EDUCATION  
AND TRAINING RESEARCH PROGRAM

## RESEARCH REPORT

# Older Australians and the take-up of new technologies

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AUSTRALIAN NATIONAL UNIVERSITY



Australian Government

Department of Industry, Innovation  
Science, Research and Tertiary Education





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## **RESEARCH REPORT**

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This document should be attributed as Chesters, J, Ryan, C & Sinning, M 2013, *Older Australians and the take-up of new technologies*, NCVER, Adelaide.

COVER IMAGE: GETTY IMAGES/THINKSTOCK

ISBN 978 1 922056 44 3

TD/TNC 111.03

Published by NCVER, ABN 87 007 967 311

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# About the research

## *Older Australians and the take-up of new technologies*

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The increasing availability of high-speed broadband telecommunications provides all people with the opportunity to access the same level of information and online services, regardless of their location, age and level of mobility. But this opportunity is only available to those individuals who have the technical skills that enable them to access computers and the internet.

This research uses data from the Adult Literacy and Life Skills (ALLS) Survey to investigate computer and internet use by older Australians by comparison with younger people.

### Key messages

- Not surprisingly, technology and internet use is negatively associated with age. People over the age of 65 years are much less likely to use the internet than younger people.
- Men show higher levels of computer use than women, and this gender gap increases with age.
- The levels of computer use increase as educational attainment increases. Moreover, the gap in usage due to educational attainment increases with age.
- Older Australians who undertook some form of formal study in the preceding 12 months reported higher levels of computer use. Also, the difference in computer use between those who study and those who don't increases with age.

While computer and internet usage is shown to be lower in older age groups, this is likely to be partly a cohort effect. As the birth cohorts currently exposed to computers get older, the proportion of people of a specific age who have never used a computer will decline.

It should also be noted that this report is based on survey data collected in 2006–07. Much has changed that could affect computer and internet use since then, especially with the growth of the social media. Whether or not this has altered the use of internet by older Australians is uncertain.

Tom Karmel  
Managing Director, NCVET



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# Executive summary

This study aims to examine the characteristics of older Australians who report high levels of internet use. Understanding the characteristics of internet-using older people will enable the development of policies and programs designed to increase internet use amongst older Australians in general. Our data allow us to consider a number of socioeconomic and demographic characteristics that may explain variations in internet use amongst older Australians. These characteristics include gender, age, highest level of education and the occupation of employed persons. We further investigate the relationship between English skills and computer use and recent formal education, including vocational education and training (VET). Our analysis focuses on older Australians, those aged 50 years and above, but also contains comparisons with younger people (aged 15–49 years).

Empirical evidence on the characteristics that determine computer use of older people is rather scarce, although it seems likely that levels of computer use do not only vary considerably across age groups but also across different levels of education, occupations and gender. Examining the differences between men and women, particularly those aged 50 years or more, who report high levels of computer use compared with men and women who report low levels of use or who do not use computers is an important step in developing policy to encourage older Australians to become more active users. As Australia embarks on the roll-out of the National Broadband Network (NBN), the implications of low levels of computer use among older Australians is of particular interest. The NBN will provide the opportunity for all Australians to access the same level of services and information, regardless of their location, age and level of mobility. However, unless all Australians acquire the technical skills required to use computers and the internet, some sections of the Australian community may become more isolated and disadvantaged.

Our study analyses data from the Adult Literacy and Life Skills (ALLS) Survey conducted in 2006 by the Australian Bureau of Statistics (ABS). The data contains information on computer use, gender, age, education, occupation, English skills and engagement in formal and informal education. We further observe information on the frequency with which respondents undertake a range of computer-related tasks. These variables, which exceed the information available for analysis in most studies, are used to construct a continuous measure of computer use. In addition, we make use of information on individual self-assessed English skills, which allows us to determine the relationship between computer use and English skills, controlling for other relevant factors such as age and education.

We provide a comprehensive descriptive analysis of the determinants of computer use of older Australians by considering a number of relevant dimensions. We begin with an analysis of the variations in the types of computer use used to construct the continuous computer use scale. We then consider variations in the computer use scale across gender, age, educational attainment and occupation. We further compare the computer use patterns of older Australians with those of younger Australians and provide a discussion of the relationship between self-assessed English skills and the computer use of older Australians. Finally, we investigate the relationship between education and training and computer use.

The major findings and their implications are highlighted in the points below.

## Variation in types of computer use across the population

- Computer and internet use is indeed negatively associated with age. Over one-third of men and women aged 15–24 years used the internet for browsing on a daily basis compared with 8% of men and just 3% of women aged 65 years or more.
- Sixty-five per cent of men and 73% of women aged 65 years or more have never used the internet to read or send emails.
- Men in each age group use the internet more frequently than women.
- Although women are more likely to use the internet for reading the news than men, their frequency of use is lower than that of men.
- Eighteen per cent of men and 9% of women aged 65 years or more use the internet for shopping.
- Of those who use the internet to access government information, the majority do so only a few times per month.

## Older people's computer use

- Men exhibit higher levels of computer use than women. The gender gap in computer use increases with age.
- The levels of computer use increase as educational attainment increases. Education and occupation explain some of the difference between the computer use of men and that of women.

Being a manager, professional, para-professional or clerk has a statistically positive effect on computer use compared with other occupations.

Employed men and women in each age cohort report higher levels of computer use than their non-employed counterparts.

## Skills and computer use

- Employed women report the highest level of English skills, while non-employed men report the lowest levels of English skills.

English skills are associated with the computer use levels of older Australians, even after controlling for other relevant characteristics, such as age, gender, education and occupation.

## Education, training and computer use

- Older Australians who undertook some form of formal study in the preceding 12 months report the highest average levels of computer use.

The difference in computer use between those who studied and those who did not study increases with age.

While computer and internet usage is shown to be lower in older age groups, this is likely to be partly a cohort effect. As the birth cohorts currently exposed to computers get older, the proportion of people of a specific age who have never used a computer will decline. However, while low use among older Australians will decline as cohorts age, it seems unlikely that usage will change much in the current cohort of older Australians.

# Introduction

The National Broadband Network may change the way Australians interact with service providers in both the public and private sectors, with Australians who do not access the internet being disadvantaged. Therefore, it is timely to consider whether the characteristics of technologically savvy older people might offer us some pointers that could be used to encourage all older people to utilise the new technologies. This study investigates the take-up of new technologies by Australians, with a particular focus on older Australians, defined here as those aged 50 years or more. Although it is well known that older Australians are less likely to use computers or the internet than younger men and women, we focus on the characteristics of older Australians who report high levels of internet use, with the aim of establishing ways to increase internet use in older Australians. We examine the relationship between levels of internet use and various demographic characteristics, including gender, age, highest level of education and occupation if employed. We also examine the relationship between English skills and computer use and recent formal education, including vocational education and training.

The Multipurpose Household Survey (MPHS), conducted by the ABS in 2008, found that 72% of Australian homes had home internet access and 78% had access to a home computer. There was some variation by state, with 82% of households in the Australian Capital Territory having home internet access compared with 75% of households in Western Australia, 74% of households in the Northern Territory, 73% of households in Queensland, 72% of households in Victoria, 71% of households in New South Wales, 66% of households in South Australia and 63% of households in Tasmania.

The rate of internet use increased between 2004–05 and 2006–07 (ABS 2008). People aged between 65 and 74 years recorded the greatest increase in internet use, with 40% more people in this age group using the internet at home in 2006–07 compared with 2004–05. Even so, only 28% of people aged between 65 and 74 years used the internet in 2006–07. This low rate of household internet use may be related to a perception that the internet is not relevant, or it may be that physical constraints such as arthritis and sight restrictions impede the use of the internet. Internet use amongst people aged between 35 and 44 years was much higher at 80%, while 79% of people aged between 45 and 54 years reported using the internet.

Another recent ABS publication (2009) reported that 37% of people aged 55–64 years and 69% of people aged 65 years or more did not use the internet. Research conducted in the United States and in Europe, as well as in Australia, has also found that age is negatively associated with internet use (Loges & Jung 2001; Peacock & Kunemund 2007; Selwyn et al. 2003, Byrne & Staehr 2006). Apart from the clear association between age and internet use, there is also a clear relationship between highest level of education and internet use: only 7% of people with a bachelor degree or higher qualification did not use the internet. By comparison, 36% of people with Year 12 or below level of education did not use the internet.

A number of factors have been suggested as contributing to the low use of computers by older people in Australia and overseas. These factors include decline in physical health, such as in their sight, dexterity or motor functioning, which may make screen-based technologies more difficult to use (Blake 1998; Virokannas et al. 2000), along with declines in cognitive processing. Psychological factors have also been found to influence older people's adoption and use of new technology (Morris & Venkatesh 2000; Rousseau & Rogers 1998). Older people may not have the same exposure to the new technologies, since they tend not to live with children or left employment at times when computer use was less prevalent. Financial costs may also play a role (White & Weatherall 2000). Selwyn et al.

(2003) found from their survey of older adults and computer use, however, that an important reason behind the non-use of computers was simply the perceived irrelevance of computers to the lives of older adults and that for many older people 'dealing with everyday problems' does not involve personal use of computers.

There are many benefits of access to and use of the internet. Using the internet can enhance the quality of life, societal participation and social inclusion of older citizens. As the range of products and services available via the internet increases, avoidance of the internet or the inability to engage with it will disadvantage and socially exclude segments of the population, such as older people. These services include: up-to-date public transport information; health alerts and general health information; information on government services; online banking services such as paying accounts; shopping for essentials such as groceries; news and current affairs; and accessing members of parliament. The internet also provides a cheap and relatively easy means for keeping in regular contact with family members and friends (Peacock & Kunemund 2007; Selwyn et al. 2003). Therefore, the internet provides a means by which some of the physical, psychological and social impairments associated with ageing may be overcome.

In this study, we are interested in the factors that determine higher levels of computer use. Examining the differences between men and women, particularly those aged 50 years or more, who report high levels of computer use compared with men and women who report low levels of use or who do not use computers is an important step in developing policy to encourage older Australians to become more active users of computers. As Australia embarks on the roll-out of the NBN, the implications of low levels of computer use among older Australians is of particular interest. The NBN will provide the opportunity for all Australians to access the same level of services and information, regardless of their location, age and level of mobility. However, some sections of the Australian community will become even more isolated and disadvantaged unless all Australians acquire the technical skills required to use computers and the internet.

Our study analyses data from the Adult Literacy and Life Skills Survey conducted in 2006 by the ABS. The data contain information on computer use, gender, age, education, occupation, English skills and engagement in formal and informal education. We further examine information on the frequency with which they undertake a range of computer-related tasks. These variables, which exceed the information available for analysis in most studies, may be used to construct a continuous measure of computer use. In addition, we make use of information on individual self-assessed English skills, which allows us to determine the relationship between computer use and English skills, controlling for other relevant factors such as age and education. The analysis focuses on people aged 50 years and above but also includes comparisons with younger people (15–49 years).

Our empirical findings support many of those already in the literature: the incidence and intensity of internet use and other computer use indeed falls with age, rises with education level and is higher among men, although the patterns differ across different forms of computer use. The incidence and intensity of use is positively associated with employment status and current participation in education and training. What is new in our approach is the analysis of the relationship between English skills and computer use and participation in education and training, even among older people.

The next chapter describes broad patterns of computer and internet use among the population generally. The following chapter describes the data used for the analysis, while later chapters provide the results of multivariate analyses of computer and internet use among older Australians. A final chapter considers the implications of the findings.

# Variation in types of computer use across the population

This chapter contains an analysis of variations in computer use across the Australian population. Before the data are described in more detail, it may be useful to highlight some of the patterns of computer use among the broader population and among older Australians. We first summarise how computer use in general varies with age, then go on to consider two dimensions of computer use: what the computer is used for and how often it is used. This discussion, which uses data from the 2006 Adult Literacy and Life Skills Survey focuses on:

- the relationship between age and different types of computer use by men and women
- the frequency of different types of computer use by men and women.

Table 1 summarises the associations between computer and internet use, gender and age. Three features stand out. First, older people are less likely to have ever used a computer. Second, most computer users, and almost all young users, have used the internet. Third, there is little difference in use between men and women in each age group, except for those aged 65 years or more. Women in this age group are less likely to have used a computer for the internet than their male counterparts.

From table 1, only 2% of men and 1% of women aged between 15 and 24 years never used a computer. A further 1% of men and 2% of women aged between 15 and 24 years used a computer but did not use the internet. In contrast, 43% of men and 45% of women aged 65 years or more never used a computer. Additionally, 14% of men and 21% of women in this age group used a computer but did not use the internet.

**Table 1 Computer and internet use, by gender and age**

Age	N		Used internet		Not used internet		Not used computer	
	Male	Female	Male %	Female %	Male %	Female %	Male %	Female %
15–24	542	566	97	98	1	2	2	1
25–34	724	900	92	94	4	4	3	2
35–44	880	1016	88	90	6	6	6	4
45–54	839	890	79	81	8	8	14	11
55–64	717	832	65	65	13	14	21	22
65+	460	622	42	34	14	21	43	45

Source: ABS (2006, basic confidentialised unit record file).

Having established these broad patterns of computer use across the population, in the remainder of this chapter we look at the types of tasks people use the internet for. The 2006 Adult Literacy and Life Skills Survey, described in more detail in the next chapter, included questions relating to eight specific computer tasks and 13 questions relating to internet use. Table 2 lists the percentages of men and women in each age group who reported using a computer for each of the eight tasks. As already seen in table 1, the majority of men and women aged between 15 and 64 years reported using a computer to access the internet. Internet use was also relatively high for men and women aged 65 years or more. Writing and editing text was also a common task for which men and women in each age group used the computer. Women in the first four age cohorts were more likely to use a computer

for writing and editing text than their male counterparts; however, women in the two older age cohorts were less likely than their male counterparts to use a computer for this task. Using a computer to play games was more popular with men than women in the first three age cohorts, although men and women aged between 45 and 54 years were equally as likely to use a computer to play games. Prime working-age men (25–54 years) were more likely to use a computer to do accounts, use spreadsheets or undertake statistical analysis than men aged between 15 and 24 years or men aged 55 years or more. On the other hand, women in the first three age cohorts were more likely to use a computer for these tasks than women in older cohorts. Use of the computer for programming was the least common task, with fewer than 20% of young men and just 10% of young women using the computer for this task.

**Table 2 Percentage of men and women in each age group who used a computer for various tasks**

Used the computer for:	Men						Women					
	15–24 %	25–34 %	35–44 %	45–54 %	55–64 %	65+ %	15–24 %	25–34 %	35–44 %	45–54 %	55–64 %	65+ %
Internet	97	92	88	79	65	42	98	94	90	81	65	34
Write text	82	78	76	68	56	43	91	84	80	72	57	31
Play games	73	53	40	31	24	23	58	35	28	31	29	20
Read from CD-ROM	69	70	66	61	45	27	68	65	62	53	36	17
Graphics	55	51	47	41	27	14	59	54	46	35	21	8
Accounts	45	61	60	55	38	21	49	59	53	46	34	11
Calendar	34	50	50	43	28	13	42	49	42	38	24	6
Programming	19	15	14	10	6	3	10	7	4	5	3	1
Number of observations	542	724	880	839	717	460	566	900	1016	890	832	622

Source: ABS (2006, basic confidentialised unit record file).

When we look at the actual tasks people use the internet for in more detail, we find that the percentages of both men and women using the internet for each of the specific tasks also declines with age (see table 3). For example, 88% of men and 90% of women aged 15–24 years report using the internet for browsing. The percentages decline for each age group, with just 31% men and 22% of women aged 65 years or more using the internet for browsing. A similar decline with age is observed for email use, although this is the most common activity undertaken by those aged 65 years or more. A majority of young people aged 15–24 years report using the internet to download music: 68% of men and 62% of women, whereas only 7% of men and 3% of women aged 65 years or more report doing this. The groups most likely to use the internet to locate government information are men aged 35–44 years (47%) and women aged 25–34 years (46%).

**Table 3 Percentage of men and women in each age group who used the internet for each of the 13 tasks**

Used the internet for:	Men						Women					
	15–24 %	25–34 %	35–44 %	45–54 %	55–64 %	65+ %	15–24 %	25–34 %	35–44 %	45–54 %	55–64 %	65+ %
Browsing	88	83	78	66	49	31	90	82	77	63	46	22
Email	79	77	77	68	55	35	88	85	81	71	56	27
Music	68	43	28	19	13	7	62	32	22	14	6	3
Shopping	63	65	58	48	32	18	64	64	54	40	26	9
News	56	63	62	52	38	23	62	60	53	44	34	14
Chat groups	52	26	19	11	9	5	51	21	14	9	6	2
Education	42	29	25	22	11	6	47	30	26	23	10	3
Job search	42	35	28	21	8	<1	41	34	27	22	7	<1
Banking	41	57	49	43	31	17	43	59	50	42	25	6
Weather info	40	54	52	43	31	19	39	40	35	31	23	8
Games	36	14	8	4	1	<1	20	7	4	3	2	<1
Gov. info	26	44	47	43	32	17	29	46	42	38	26	8
Health	24	31	21	30	25	17	43	55	51	45	32	15
Number of observations	542	724	880	839	717	460	566	900	1016	890	832	622

Source: ABS (2006, basic confidentialised unit record file).

We now look at the frequency of use of the internet by men and women for some of these tasks. Table 4 shows how often men and women in each age group use the internet for email. Younger women (aged 15–34 years) are more likely to use the internet for email than younger men; however, men aged 35 years or more are more likely to use the internet for email than women aged 35 years or more. Men aged 65 years or more are more likely to use the internet for email than women in this age group, although this result is reversed in all other age groups. For example, 21% of men aged 15–24 years never used the internet for email compared with 12% of women in this age cohort and 45% of men aged 55–64 years never used the internet for email compared with 44% of women in the 55–64 years age cohort. The other feature of the figures in the table is that both the incidence of computer use for email and the frequency of use decline with age.

**Table 4 Frequency of use of the internet for email, by gender and age**

Age	Male					Female				
	N	Daily %	Few times/ week %	Few times/ month %	Never %	N	Daily %	Few times/ week %	Few times/ month %	Never %
15–24	542	41	27	11	21	566	51	24	13	12
25–34	724	53	14	10	23	900	55	20	11	15
35–44	880	52	15	9	23	1016	49	20	12	19
45–54	839	48	13	8	32	890	44	16	12	29
55–64	717	35	11	9	45	832	31	13	11	44
65+	460	21	6	8	65	622	10	10	7	73

Source: ABS (2006, basic confidentialised unit record file).



Table 5 reports the percentages of men and women who use the internet for general browsing. The percentages of men and women who report that they do not use the internet for browsing are fairly similar for each age group, except for the oldest age cohort. Women aged 65 years or more are more likely than men in this age cohort to report that they never used the internet for browsing. On the other hand, men report more frequent use of the internet for browsing than women in each age group. Of those aged 15–24 years, 39% of men and 34% of women use the internet for browsing on a daily basis and, of those aged 35–44 years, 26% of men and 17% of women use the internet for browsing on a daily basis. The negative association between age and frequency of use is also apparent for both men and women. Over one-third of men and women aged 15–24 years use the internet for browsing on a daily basis compared with 8% of men and just 3% of women aged 65 years or more.

**Table 5 Frequency of use of the internet for general browsing, by gender and age**

Age	Male					Female				
	N	Daily %	Few times/ week %	Few times/ month %	Never %	N	Daily %	Few times/ week %	Few times/ month %	Never %
15–24	542	39	28	20	12	566	34	32	24	10
25–34	724	33	24	26	17	900	25	29	28	18
35–44	880	26	27	25	22	1016	17	25	34	23
45–54	839	19	23	24	34	890	13	21	30	37
55–64	717	12	15	21	51	832	10	11	25	54
65+	460	8	11	13	69	622	3	5	14	78

Source: ABS (2006, basic confidentialised unit record file).

Table 6 shows the frequency of use of the internet for reading the news for men and women in each age cohort. Although women are more likely to use the internet for reading the news than men, their frequency of use is lower than that of men. Just over 60% of women aged 15–24 years report using the internet for reading the news but only 15% do so on a daily basis. On the other hand, 56% of men report using the internet for reading the news and 18% do so on a daily basis. Just over one-quarter of women aged 15–24 years use the internet for reading the news a few times a month compared with fewer than one-fifth of men in this age group. Using the internet to read the news declines dramatically for the older cohorts. Over 60% of men aged 55–64 years and 77% of men aged 65 years or more never used the internet to access the news. The corresponding percentages for women are 66% and 86%.

**Table 6 Frequency of use of the internet for reading the news, by gender and age**

Age	Male					Female				
	N	Daily %	Few times/ week %	Few times/ month %	Never %	N	Daily %	Few times/ week %	Few times/ month %	Never %
15–24	542	18	20	18	44	566	15	22	26	39
25–34	724	25	19	18	37	900	17	18	24	40
35–44	880	19	21	22	38	1016	14	16	23	47
45–54	839	17	16	20	48	890	12	11	21	56
55–64	717	13	11	14	62	832	8	10	16	66
65+	460	7	9	7	77	622	3	4	8	86

Source: ABS (2006, basic confidentialised unit record file).

Although the percentages of men and women using the internet for shopping are quite high, table 7 shows that using the internet for shopping is done so on a less frequent basis. Even though 63% of men aged 15–24 years use the internet for shopping, only 5% do so on a daily basis. Eighteen per cent of men aged 65 years or more use the internet for shopping but only 2% do so on a daily basis. For women in this age group, only 9% use the internet for shopping and fewer than 1% shop online on a daily basis.

**Table 7 Frequency of use of the internet for shopping, by gender and age**

Age	Male					Female				
	N	Daily %	Few times/ week %	Few times/ month %	Never %	N	Daily %	Few times/ week %	Few times/ month %	Never %
15–24	542	5	19	39	37	566	6	21	37	36
25–34	724	5	18	42	35	900	5	17	42	36
35–44	880	5	17	36	42	1016	3	12	38	46
45–54	839	4	12	32	52	890	2	8	29	60
55–64	717	3	8	21	68	832	1	6	20	74
65+	460	2	3	13	82	622	<1	2	7	91

Source: ABS (2006, basic confidentialised unit record file).

Table 8 presents the percentages of men and women in each age group who use the internet to access government information. Prime working-age men and women – those aged between 25 and 54 years – are more likely to use the internet to access government information than men and women aged 15–24 years, or men and women aged 55 years or more. Only a small percentage of men and women use the internet to access government information on a daily or weekly basis. Of those who use the internet for this purpose, the majority do so just a few times per month.

**Table 8 Frequency of use of the internet for government information, by gender and age**

Age	Male					Female				
	N	Daily %	Few times/ week %	Few times/ month %	Never %	N	Daily %	Few times/ week %	Few times/ month %	Never %
15–24	542	2	5	19	74	566	1	5	22	71
25–34	724	4	8	32	56	900	2	8	35	54
35–44	880	4	9	34	53	1016	3	6	33	58
45–54	839	4	8	31	57	890	3	8	28	62
55–64	717	3	5	24	68	832	1	4	22	74
65+	460	1	2	14	83	622	<1	1	7	92

Source: ABS (2006, basic confidentialised unit record file).

Table 9 presents the percentages of men and women in each age group who use the internet to access information on health issues. Women in each of the first five age cohorts were more likely to access the internet for health-related information and to do so more frequently than their male counterparts. Only a small percentage of men and women use the internet to access health-related information on a daily or weekly basis. Of those who use the internet for this purpose, the majority do so just a few times per month.

**Table 9 Frequency of use of the internet for health information, by gender and age**

Age	Male					Female				
	N	Daily %	Few times/ week %	Few times/ month %	Never %	N	Daily %	Few times/ week %	Few times/ month %	Never %
15–24	542	1	4	19	76	566	1	9	32	57
25–34	724	1	4	25	69	900	2	11	41	45
35–44	880	1	3	26	71	1016	2	7	43	49
45–54	839	1	2	27	69	890	2	6	37	55
55–64	717	1	3	22	75	832	1	4	28	68
65+	460	<1	1	16	83	622	<1	2	13	85

Source: ABS (2006, basic confidentialised unit record file).

## Summary

This chapter has described the relationship between age and computer use and the frequency of use by men and women.

The results may be summarised as follows:

- A negative association between age and frequency of internet use is apparent for both men and women. Over one-third of men and women aged 15–24 years use the internet for browsing on a daily basis compared with 8% of men and just 3% of women aged 65 years or more.
- Sixty-five per cent of men and 73% of women aged 65 years or more never used the internet to read or send emails.
- Men in each age group use the internet more frequently than women.
- Although women are more likely to use the internet for reading the news than men, their frequency of use is lower than that of men.
- Although 18% of men aged 65 years or more use the internet for shopping, only 2% do so on a daily basis. For women in this age group, only 9% use the internet for shopping and fewer than 1% shop online on a daily basis.
- Prime working-age men and women (those aged between 25 and 54 years) are more likely to use the internet to access government information than men and women aged 15–24 years or men and women aged 55 years or more. Of those who use the internet for this purpose, the majority do so just a few times per month.

# Description of the data and the computer use scale

The analysis in this paper uses information from the 2006 Adult Literacy and Life Skills Survey, conducted in Australia as part of an international study coordinated by Statistics Canada and the Organisation for Economic Co-operation and Development (OECD). Personal interviews were carried out from July 2006 to January 2007 with individuals from private dwellings throughout non-remote areas of Australia. The sample consists of 8988 respondents aged 15–74 years.

The Adult Literacy and Life Skills Survey is divided into two sections:

- Each respondent was asked to complete a background questionnaire, including individual and household information such as general demographic information, linguistic information, parental information, labour force activities, literacy and numeracy practices in daily life and at work, the frequency of reading and writing activities, participation in education and learning, social capital and wellbeing, information and communication technology and personal and household income.
- Each respondent was then asked to complete a set of six basic questions. Only respondents who correctly answered a minimum of three questions of this basic component moved on to the main component, which consisted of three blocks designed to measure their document and prose literacy skills, their numeracy skills, their problem-solving skills and their health literacy.

Individuals also provided self-assessments of their English reading and writing skills for the needs of daily life and of their main job.

Further, the data collected by the survey included multiple indicators of the use of information and communication technology and covered the use of:

- a computer to access the internet, write text, read from CD-ROMs and DVDs
- a computer for accounts, spreadsheets and statistical analysis; programming
- a computer to keep a schedule or calendar; play games; create graphics
- the internet for email; shopping; banking; formal education and training; reading about news or current affairs; general browsing
- the internet to search for health-related information; weather-related information; government information; employment opportunities
- the internet to play games; obtain or save music
- the internet to participate in chat groups or online discussions.

Respondents were asked to indicate whether they used a computer and/or the internet for any of these purposes daily, a few times a week, a few times a month or never. The responses to the incidence and frequency of use were described in the previous chapter.

## Indicators

The computer use measures in the data reflect reports by individuals on the frequency with which they undertook computer-related tasks. We use the set of 13 questions relating to the use of the internet to construct a scale of computer use. The computer use scale is constructed such that it ranges from 0 (did not use the internet) to 500 (high-level use of the internet, in terms of both frequency and across the set of uses). We also constructed a scale based on the self-assessment of individual's reading and writing skills for everyday life and work-related tasks, from 0 (poor) to 500 (excellent). Ryan and Sinning (2008) provide a more detailed description of the underlying items of this scale.

The purpose of constructing the computer use scale is to summarise the information contained in the questions on the incidence and frequency of internet use. While the intensity of internet use is not observed directly in the data, we can employ item response theory (IRT) to model the relationship between the responses to the set of 13 tasks and this unobserved intensity. The most common IRT model is the Rasch model (Rasch 1960, 1961), which models the probability of a positive response to any question as a function of an item parameter and a person parameter. The Rasch model may be used for items with dichotomous responses ('right' or 'wrong'). Since some of the items in our data include ordered response categories, we employ an extension of the Rasch model for ordered response categories (Masters 1982).<sup>1</sup> After estimating the parameters of this model, we derive scores for each individual which capture their internet use intensity. These scores are used to obtain the measures of computer use and English skills, which we scaled to take values of between 0 and 500.

In what follows we show the patterns of association between the derived computer use scale and a set of key variables where we think the patterns should be clear, as a way of demonstrating that the constructed scale has the properties we would like. The association between the scale is described in relation to age (we anticipate a negative association), education (we anticipate a broadly positive association) and occupation (we expect internet use intensity to be higher among white-collar occupations).

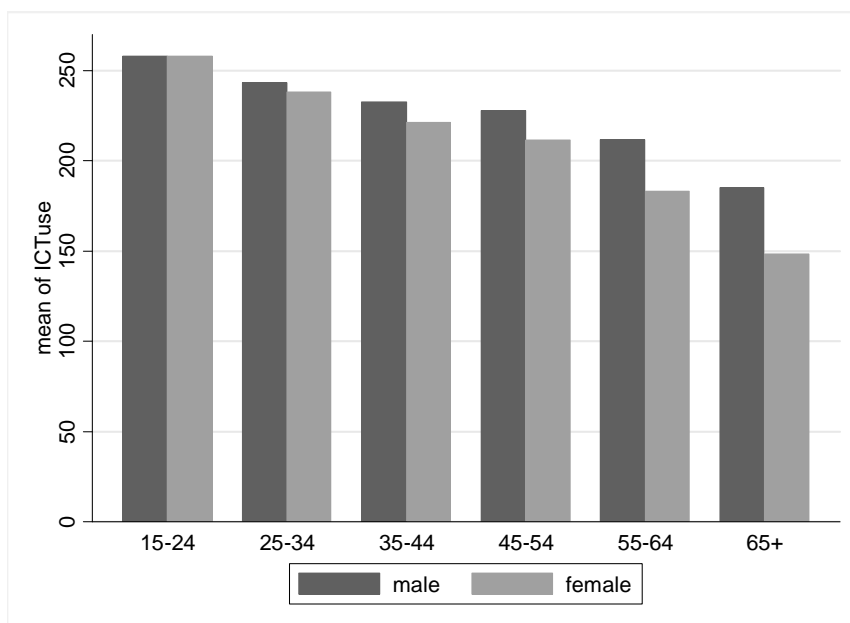
## Age and computer use

The graph in figure 1 plots computer use means for men and women in each age group. As expected, the graph indicates that computer use declines with age. Although the average levels of computer use for men and women aged between 15 and 24 years are the same (258), women in all of the remaining age cohorts report lower levels of computer use than their male counterparts. The gender gap increases with age, from around five points for those aged between 25 and 34 years, to around 36 points for those aged 65 years or more. The means are reported in appendix table A1.

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<sup>1</sup> This model (a so-called partial credit model) for ordinal items can be fitted by Stata® using the generalised linear latent and mixed modelling (GLLAMM) framework (see Rabe-Hesketh, Skrondal & Pickles 2004; Zheng & Rabe-Hesketh 2007).

**Figure 1 Mean computer use, by sex and age**



Notes: Weighted numbers based on weights provided by ABS.

Source: ABS (2006, basic confidentialised unit record file).

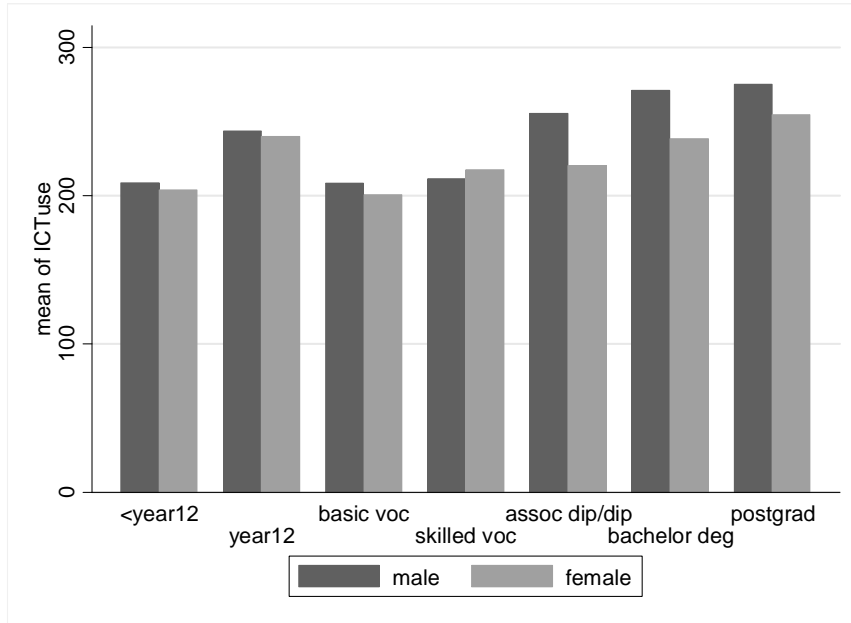
## Educational attainment and computer use

When we estimate the mean computer use by highest level of education for men and women, we find that men report higher levels of computer use than women in all educational categories except skilled vocational (see figure 2). Men with a skilled vocational qualification average 211, whereas women in this educational category average 218. Men and women with a basic vocational qualification of education have the lowest average levels of computer use (208 for men and 201 for women) and men and women with postgraduate degrees have the highest levels of computer use (275 for men and 254 for women). The graph also suggests that the gender gaps between average levels of computer use for men and women with lower levels of education are not as large as those between men and women with higher levels of education. The means are reported in appendix table A2.

## Occupation and computer use

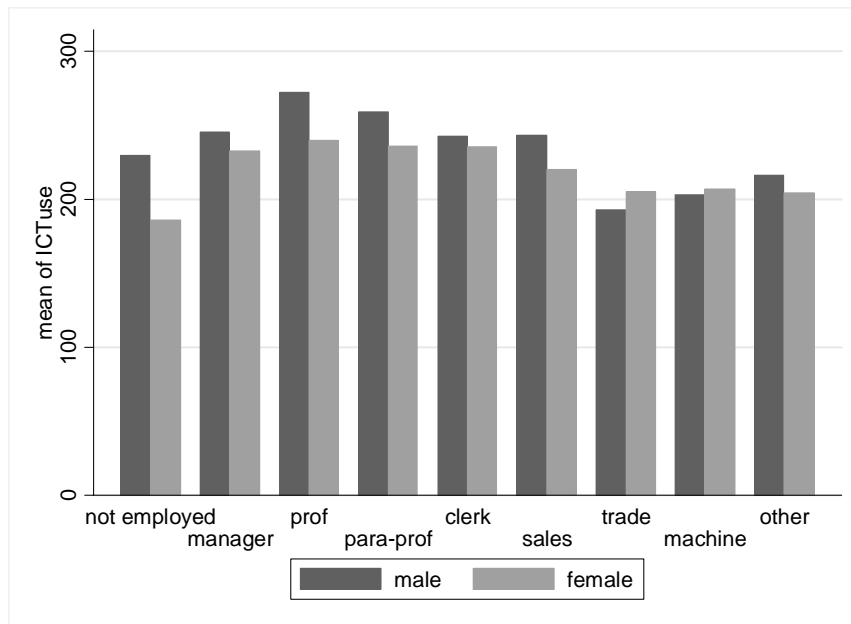
Figure 3 shows the differences in average computer use for men and women in each occupational category. Women who are not employed reported the lowest levels of computer use (186), and men employed as professionals report the highest levels of computer use (272). In most occupational categories, men reported higher levels of computer use than their female counterparts; however, women working in crafts and trades report higher average levels of computer use than men (205 compared with 193), as do women employed as plant or machine operators and drivers (207 compared with 203). The smallest gender gap occurs between men and women employed as plant or machinery operators or drivers (203 for men and 207 for women). The figure broadly exhibits a difference between 'white' and 'blue' collar occupations, with computer use substantially higher in white-collar occupations. The means used in the figure are reported in appendix table A3.

**Figure 2 Mean computer use, by sex and highest level of education**



Notes: Weighted numbers based on weights provided by ABS.  
Source: ABS (2006, basic confidentialised unit record file).

**Figure 3 Mean computer use, by sex and occupation**

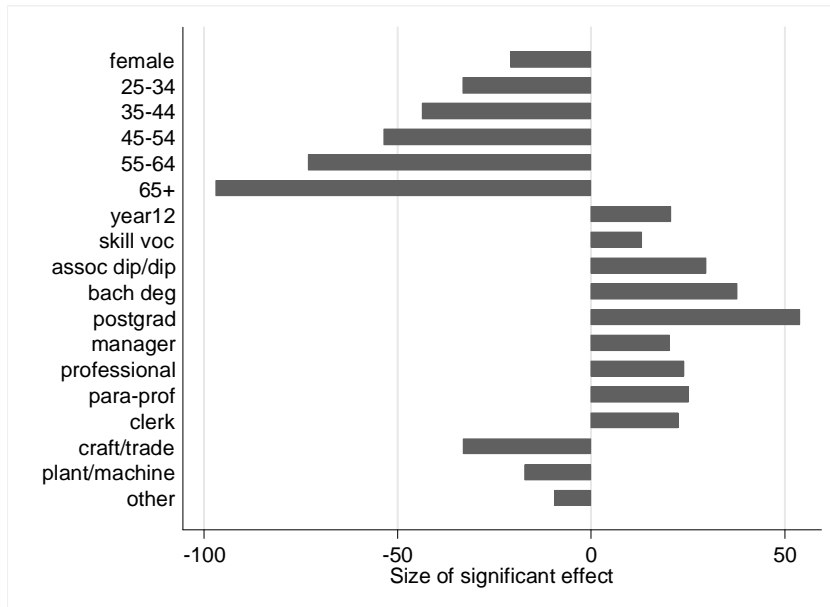


Notes: Occupation 0 = not employed; 1 = Managers/administrators; 2 = Professionals; 3 = Para-professionals; 4 = Clerks; 5 = Salespersons /personal service workers; 6 = Craft/trades workers; 7 = Plant/machine operators/drivers; 8 = Other. Weighted numbers based on weights provided by ABS.  
Source: ABS (2006, basic confidentialised unit record file).

To determine the extent to which the associations between computer use and other factors remain once we account for other factors, we conduct multiple regression analysis with the computer use scale as the dependent variable. The coefficients and standard errors are presented in appendix table A4. Figure 4 shows the size of the significant coefficients of sex, age, education and occupation. Only statistically significant coefficients are included in the graph. The results confirm the direction of the associations just described. The coefficient for being female is negative and significant, indicating that, even after controlling for other factors, women report lower levels of use than men. Computer

use also falls with age. Each older age cohort reports lower levels of computer use than the previous age cohort. Computer use is higher among those with higher levels of education and among white-collar occupations.

**Figure 4 Size of the significant effect of sex, age, education and occupation on computer use**



Notes: Weighted numbers based on weights provided by ABS; reference categories are: male, aged 50–54 years, < Year 12 education, not employed.

Source: ABS (2006, basic confidentialised unit record file).

## Control variables

In the analysis just described and in the remainder of the paper we make use of a number of control variables involving specific classifications of data. These include:

- **Age:** we include two age variables in our analysis. The first variable divides respondents into ten-year age cohorts: 15–24, 25–34, 35–44, 45–54, 55–64, 65+ years. The second age variable divides older people into five-year age cohorts: 50–54, 55–59, 60–64 and 65+ years.
- **Education:** respondents are divided into seven categories according to their highest level of education: < Year 12, Year 12, basic vocational, skilled vocational, associate diploma/diploma, bachelor degree, postgraduate degree. We expect educational level to be positively associated with internet use, given that people who have a high level of formal schooling are more likely to have internet skills.
- **Occupation:** respondents are divided into nine occupational categories: managers/administrators, professionals, para-professionals, clerks, sales/personal service workers, crafts/tradespersons, plant and machinery operators/drivers, and other. We also include a variable for respondents who are not employed.

The sample characteristics are listed in table 10. Women are over-represented in the sample: 54% vs 46%. We have addressed this over-representation by including a weight variable in our analyses. The distribution of men and women across age groups is fairly similar, with the difference for any category confined to just 1–2%. There are some notable differences between men and women in regard to highest level of education. Around 34% of men and 40% of women have a less than Year 12 level of education. Men are twice as likely as women to have a skilled vocational level of education. There are, however, only small differences in the percentages of men and women with university-level



qualifications. On the other hand, there are some quite large differences in the proportions of men and women in each occupational category, indicating the level of occupational sex segregation in the labour market. Over 14% of men and nearly 26% of women are not employed. Only 1% of women are crafts or trades workers compared with nearly 16% of men. Only 6% of men are clerks compared with nearly 15% of women. The proportion of men and women in the professions are more or less even: 13% of men and 15% of women. The proportion of men and women from each state is quite similar, with around 22% of men and women living in New South Wales, 19% living in Victoria and 18% living in Queensland. Although the proportion of men and women living in each state is fairly even, there is an over-representation of respondents from South Australia and Western Australia. This over-representation by state is also addressed in the weight variable.

**Table 10 Descriptive statistics**

	Male (%)	Female (%)
Male	46	
Female		54
<b>Age</b>		
15–24 years	13	12
25–34 years	17	19
35–44 years	21	21
45–54 years	20	18
55–64 years	17	17
65+ years	11	13
<b>Years of formal education</b>		
< Year 12	34	40
Year 12	14	15
Basic vocational	2	3
Skilled vocational	23	11
Associate diploma/undergraduate diploma	8	10
Bachelor degree	13	16
Postgraduate	6	6
<b>Occupation</b>		
Managers/administrators	12	8
Professionals	13	15
Para-professionals	9	13
Clerks	6	15
Sales/service workers	8	14
Craft/trades workers	16	1
Plant operators/drivers	9	1
Other	13	7
Not employed	14	26
<b>State</b>		
New South Wales	22	22
Victoria	19	20
Queensland	19	18
South Australia	12	12
Western Australia	14	14
Balance of Australia	15	14
Number of observations	4162	4826

Source: ABS (2006, basic confidentialised unit record file).

## Summary

This chapter has described the data and summarises some of the broad associations between the internet use scale and gender, age, educational attainment and occupation.

The results may be summarised as follows:

- Men exhibit higher levels of computer use than women. The gender gap in computer use increases with age from around five points for those aged between 25 and 34 years to around 36 points for those aged 65 years or more.
- Levels of computer use increase as educational attainment increases. Education and occupation explain some of the difference between the computer use of men and that of women.
- However, even after controlling for other factors, women report lower levels of computer use than men.

# Computer use among older people

Having described patterns of computer and internet use among the broader Australian population, we now turn to an analysis of computer use among older Australians. In this chapter we focus on:

- the relationship between age and computer use among older people, controlling for level of education and occupation
- the relationship between age and computer use among older people who were not employed, controlling for level of education
- the relationship between occupation and computer use among employed older people, controlling for level of education and occupation
- access to computers among older Australians and levels of interest in using them among those who have never done so.

In this chapter we confine our sample to men and women aged 50 years or more and examine their levels of computer use. Table 11 lists the percentages of older people who reported using a computer and those reporting that they used the internet. Computer use in general, and internet use in particular, are negatively associated with age, even among individuals aged 50 years or more. Over 40% of men and women aged 65 years or more had not used a computer and just 42% of men and 34% of women in this age group had used the internet.

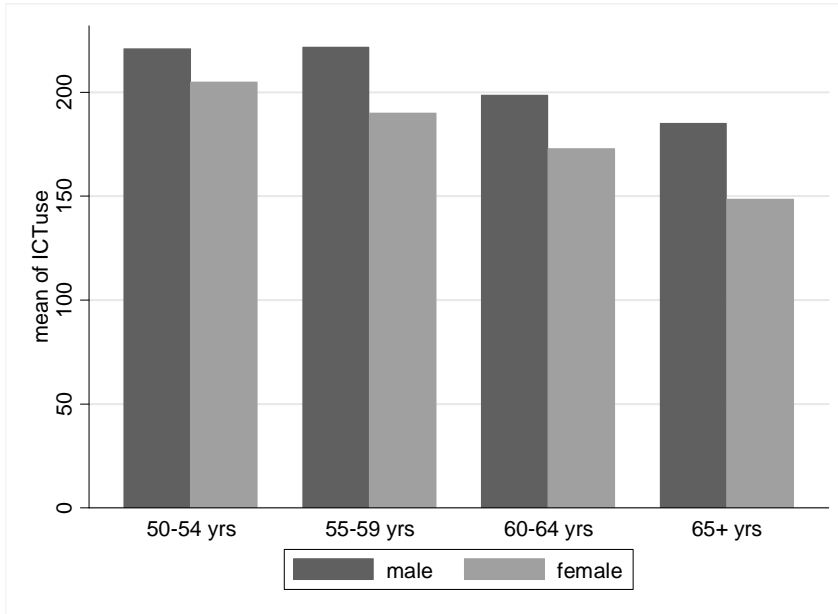
**Table 11 Computer and internet use by older people, by gender**

Age	N		Used internet		Not used internet		Not used computer	
	Male	Female	Male %	Female %	Male %	Female %	Male %	Female %
50–54	393	417	76	80	7	8	17	12
55–59	381	435	68	69	12	13	20	17
60–64	336	397	63	59	15	14	23	26
65+	460	622	42	34	14	21	43	45

Source: ABS (2006, basic confidentialised unit record file).

Using the computer use scale described in the previous chapter, we estimated the average levels of use for men and women aged 50 years or more. These means across age categories are presented in figure 5. Men aged between 55 and 59 years report slightly higher levels of internet use than men aged 50 to 54 years (221 compared with 222). Men aged between 60 and 64 years average 199 and men aged 65 years or more average 185. For women, internet use declines with age. Women aged between 50 and 54 years average 205, women aged between 55 and 59 years average 190, women aged between 60 and 64 years average 173 and women aged 65 years or more average 149 on the internet use scale. The means are reported in appendix table A5.

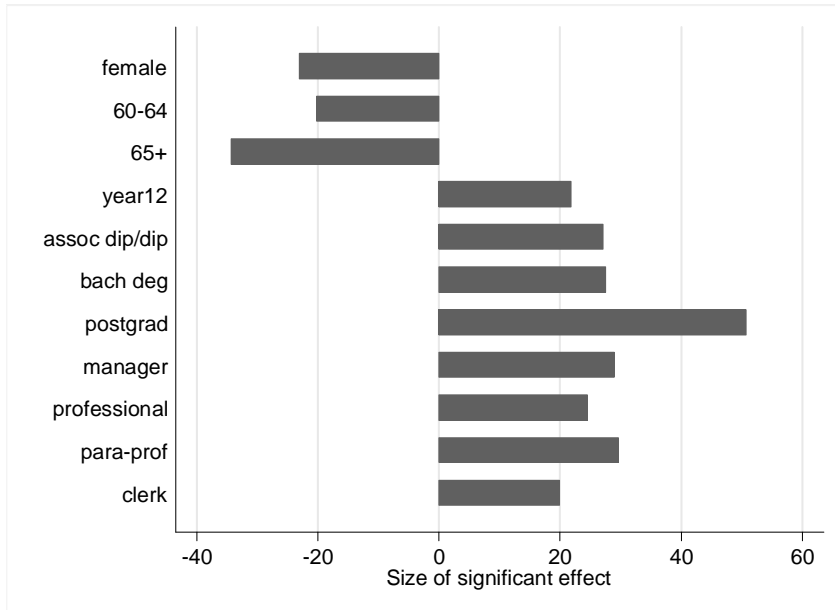
**Figure 5 Mean computer use by older people, by gender and age**



Notes: Weighted numbers based on weights provided by ABS.  
Source: ABS (2006, basic confidentialised unit record file).

To determine whether the differences in internet use are related to education and occupation, we again employ regression analysis. The coefficients and standard errors are reported in appendix table A6. The graph in figure 6 shows the size of the significant effect of the coefficients for gender, age, highest level of education and occupation. Once more, only statistically significant coefficients are included in the graph. The estimated effects are similar in direction and magnitude to those presented for the population in figure 4. As before, being female is negatively associated with internet use, as is being aged between 60 and 64 years or 65 years or more. Having a Year 12 level of education, an associate diploma, diploma, bachelor degree or postgraduate degree is associated with higher levels of computer use. The coefficients for being a white-collar worker are also positive and statistically significant.

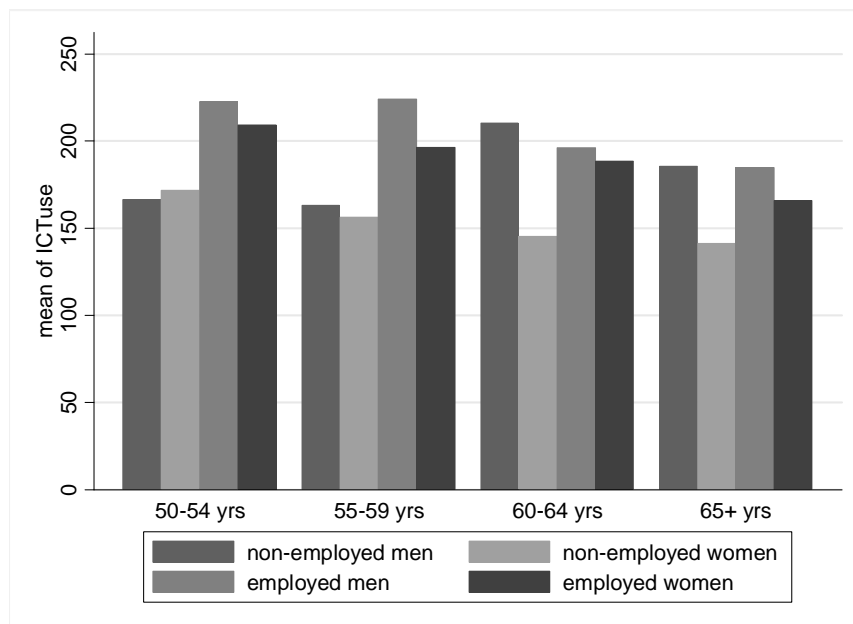
**Figure 6 Size of significant effects of sex, age, education and occupation on computer use by older people**



Notes: Weighted numbers based on weights provided by ABS; reference categories are: male, aged 50–54 years, < Year 12 education, not employed.

Source: ABS (2006, basic confidentialised unit record file).

**Figure 7 Mean ICT use by older people, by employment status, gender and age**



Notes: Weighted numbers based on weights provided by ABS.

Source: ABS (2006, basic confidentialised unit record file).

The results presented in figure 6 refer to the effects of gender, age, education and occupation for all older people; however, as we discussed earlier (see figure 3) men and women who are not employed generally have lower levels of computer use than men and women who are employed. Therefore to determine the effect of gender, age and education on computer use, we estimate the means on the computer use scale for employed men and women and non-employed men and women, controlling for age. The means are presented as figure 7. Employed men and women in each age cohort report higher levels of use than their non-employed counterparts. Employed men aged between 55 and 59 years

report the highest levels of use (224) and non-employed women aged 65 years or more report the lowest average levels of use (141). The means are reported in appendix table A7.

We also conduct regression analysis to determine whether the effects of gender, age and education on the levels of computer use of non-employed older people are statistically significant. The coefficients and standard errors are reported in appendix table A8. Only two coefficients are statistically significant: being female is also negatively associated with computer use among this group, while having a Year 12 level of education is positively associated with computer use.

## Access to a computer

Given that access to an internet-connected personal computer is a necessary pre-condition for internet use, we now examine levels of access to computers. The 2006 Adult Literacy and Life Skills Survey asked respondents if they had personal access to a computer at home and whether their home computer was connected to the internet. Respondents were also asked if they used a computer at various other locations. Table 12 lists the percentages of men and women who had personal access to a computer at home, whether their home computer was connected to the internet and where else they had used a computer. Table 12 shows that having access to a computer at home is no guarantee that an individual will have access to the internet. The percentages of men and women with a computer at home are higher in each age group than the percentages who had access to the internet at home. For example, 74% of men and 78% of women aged between 50 and 54 years had personal access to a computer at home but only 67% of men and 69% of women in this age group had access to the internet at home. For those aged 65 years or more, access to the internet at home is even more limited: 47% of men and 40% of women in this age group have access to a home computer, and 38% of men and 31% of women have access to the internet at home. Only a small percentage of men and women in each age group used a computer in other places. Fewer than 5% had used a computer in an internet cafe or community centre. Between 3 and 8% had used computers in public libraries and 10% or less had used computers in educational institutions. Women were more likely to report using a computer at a relative's home than men in each age group.

**Table 12 Access to computer and internet: older people, by age and gender**

	Men				Women			
	50–54 years %	55–59 years %	60–64 years %	65+ years %	50–54 years %	55–59 years %	60–64 years %	65+ years %
Personal access to computer	74	65	63	47	78	69	61	40
Internet-connected	67	55	54	38	69	59	51	31
Friend's home	6	7	5	3	8	6	5	2
Relative's home	8	8	7	4	10	9	8	6
Public library	3	5	3	3	8	6	4	4
Internet cafe	2	2	1	<1	3	3	1	1
Community centre	1	1	1	1	3	2	2	2
Educational institution	8	5	3	1	9	10	4	2
N =	393	381	336	460	417	435	397	622

Source: ABS (2006, basic confidentialised unit record file).

## Interest in using a computer

Table 11 shows that between 12 and 45% of older people had never used a computer, while table 13 shows the percentages of older people who had never used a computer and who were interested in using a computer and those who expect to use a computer within the next 12 months. Although 27% of men aged between 50 and 54 years who had never used a computer expressed an interest in using a computer, fewer than half expected to use a computer within the next 12 months. Women in this age group were also more likely to express a desire to use a computer than have an expectation that they would do so in the next 12 months. Fewer than 15% of men and women aged 65 years or more who had never used a computer expressed an interest in using one and just 8% of men and 6% of women in this age cohort held any expectation of actually using a computer within the next 12 months.

**Table 13 Percentages of older people who are interested in using a computer, by gender and age**

Age	N		Interested in starting to use a computer		Expect to use computer within 12 months	
	Male	Female	Male %	Female %	Male %	Female %
50–54	67	48	27	29	13	13
55–59	77	76	14	22	13	11
60–64	77	104	26	23	12	9
65+	200	282	13	14	8	6

Source: ABS (2006, basic confidentialised unit record file).

## Summary

This chapter has described the relationship between age and computer use of older people, controlling for level of education and occupation; the relationship between age and computer use of older people who were not employed, controlling for level of education, and the relationship between occupation and computer use of employed older people, controlling for level of education and occupation.

The results may be summarised as follows:

- Being female is negatively associated with internet use; the gender gap in computer use is statistically significant.
- Age has a significantly negative effect on computer use.
- Educational attainment has a significantly positive effect on the computer use of older Australians.
- Being a manager, professional, para-professional or clerk has a statistically positive effect on computer use compared with other occupations.
- Employed men and women in each age cohort report higher levels of computer use than their non-employed counterparts.
- Access to an internet-connected computer at home decreases with age, as do expectations among older Australians who have never used a computer that they will in the forthcoming year.

# Skills and computer use among older people

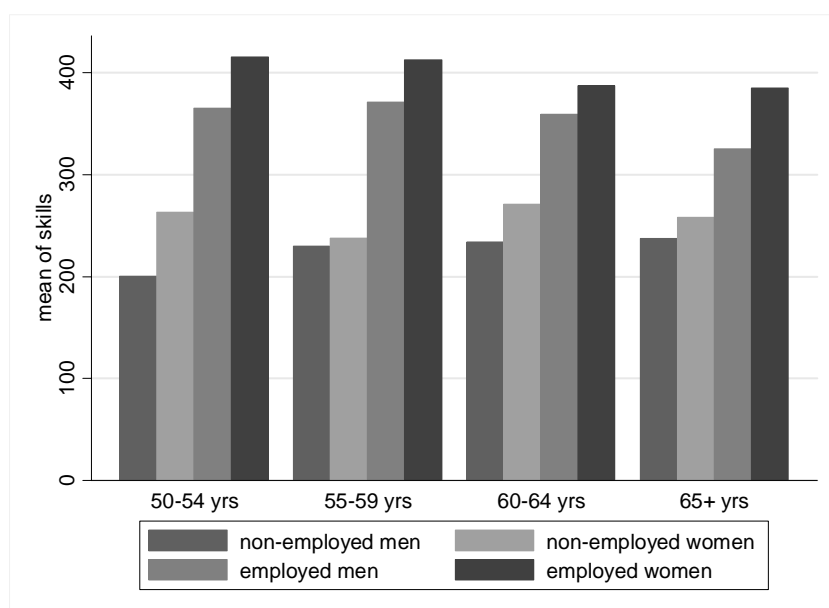
This chapter contains an analysis of the association between skills and computer use. It focuses on:

- the level of self-assessed English skills of men and women aged 50 years or more
- the relationship between English skills and computer use among this group.

The analyses in each of the previous chapters show a consistent pattern of computer use: men use computers more than women and computer use declines with age. In this chapter we look at the association between computer use and self-assessed English skills. We may expect that English skills determine the extent to which older Australians use the internet since better English skills are positively correlated with educational attainment and employment. However, we do not know whether English skills affect the computer use levels of older Australians indirectly through factors such as education or occupation or whether they have a direct effect on computer use, even after controlling for other factors. If English skills have a direct effect on the computer use of older Australians, then it seems likely that policies aiming to improve the English skills of older Australians will also increase their computer use.

The mean values on the self-assessed English skills scale, controlling for the effects of employment status, gender and age, are reported in appendix table A9. Figure 8 shows that employed women in each age group reported the highest levels of English skills and non-employed men reported the lowest levels of English skills in each age group. The English skills of non-employed men increase with age from 200 for those aged between 50 and 54 years to 237 for those aged 65 or more years, whereas the English skills of employed women decline with age from 415 for those aged between 50 and 54 years to 385 for those aged 65 years or more.

**Figure 8 English skills, by employment status, gender and age**



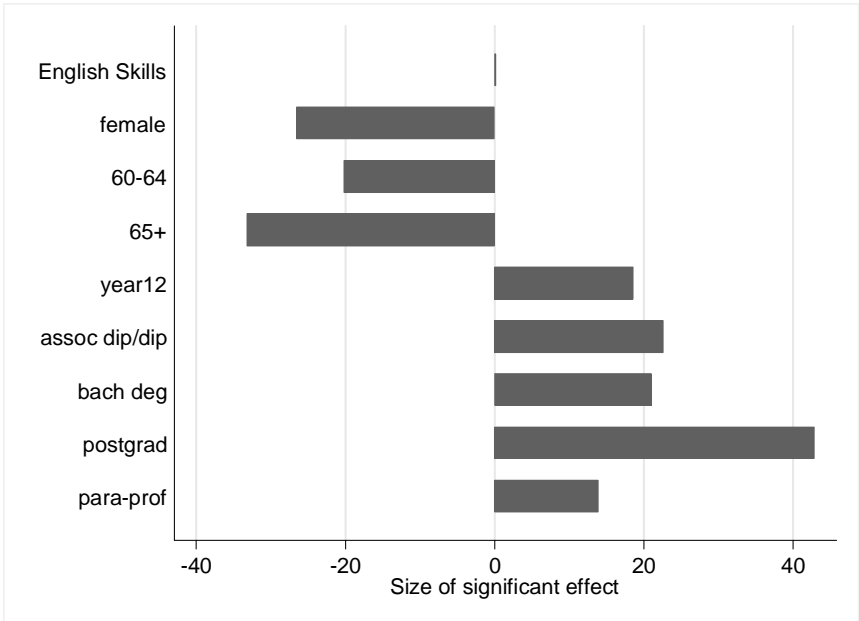
Notes: Weighted numbers based on weights provided by ABS.

Source: ABS (2006, basic confidentialised unit record file).



To determine the association between computer use and English skills, we conducted multiple regression analyses, controlling for the effects of gender, age, education and occupation. The regression coefficients and standard errors are reported in appendix table A10. Figure 9 shows the size of the significant effect of the coefficients for English skills, gender, age, highest level of education and occupation. Again, only statistically significant coefficients are included in the graph. Scoring higher on the English skills scale is associated with higher levels of computer use. Each extra point on the English skills scale is associated with an increase of 0.13 points on the internet use scale, indicating that English skills are associated with computer use, even after controlling for gender, age, education and occupation.<sup>2</sup> The inclusion of the English skills scale lowered the size of the parameters on most of the occupation variables, such that they were no longer significantly different from zero. Only the coefficient for being a para-professional remained positive and significant. However, being female remained negatively associated with internet use, as did being aged between 60 and 64 years or 65 years or more. The education effects were slightly smaller.

**Figure 9 Size of the significant effect of English skills, sex, age, education and occupation on computer use of older people**



Notes: Weighted numbers based on weights provided by ABS; reference categories are: male, aged 50–54 years, < Year 12 education, not employed.

Source: ABS (2006, basic confidentialised unit record file).

We re-ran this analysis, substituting the self-assessed English skills scale with literacy and numeracy skills measures and found that higher scores on these scales had a similar effect on computer use. For each one-point increase in either literacy or numeracy skills there is a slight increase in computer use of 0.22, about double the impact of the self-assessed scale.

<sup>2</sup> This relationship seems very small because it is measured on a continuous scale, while the coefficients of other variables denote the impact of a change from zero to one. In fact, an increase of 0.13 points is relatively large (and statistically significant). Given the variation in this variable, the coefficient translates into a 5–10 point change in ICT use with an increase of a standard deviation in the self-assessed skills measure.

## Summary

This chapter has described the relationship between English skills and the computer use of older Australians. The results may be summarised as follows:

- Employed women report the highest level of English skills and non-employed men report the lowest levels of English skills.
- English skills are associated with increased computer use levels in older Australians, even after controlling for other relevant characteristics, such as age, gender, education and occupation.

# Education, training and computer use among older people

This chapter contains an analysis of the association between current education and training and computer use. It focuses on:

- the association between current participation in education and training and the computer use of people aged 50 years or more
- the association between education and training and the self-assessed numeracy and literacy skills of employed people aged 50 years or more.

Figure 2 revealed that internet use is positively associated with educational attainment, that is, as years of formal education increase, so does computer use. In this chapter we examine the relationship between computer use and current engagement in formal and/or informal learning for people aged 50 years or more. Formal learning is defined as participation in an educational program to obtain a formal qualification. Informal learning includes activities such as visiting trade fairs, professional conferences or expos, attending lectures, seminars or workshops, reading manuals or reference books or using computers or the internet (ABS 2006).

Only a small percentage of men and women aged 50 years or more had undertaken formal study in the 12 months preceding the survey and even fewer had engaged in VET. The proportions of men and women who had undertaken some form of informal study is quite high, with 88% of men and women aged between 50 to 54 years and 68% of men and 63% of women aged 65 years or more reporting that they had engaged in some form of informal education (see table 14).

**Table 14 Percentage of older people undertaking formal education, VET or informal study in previous 12 months**

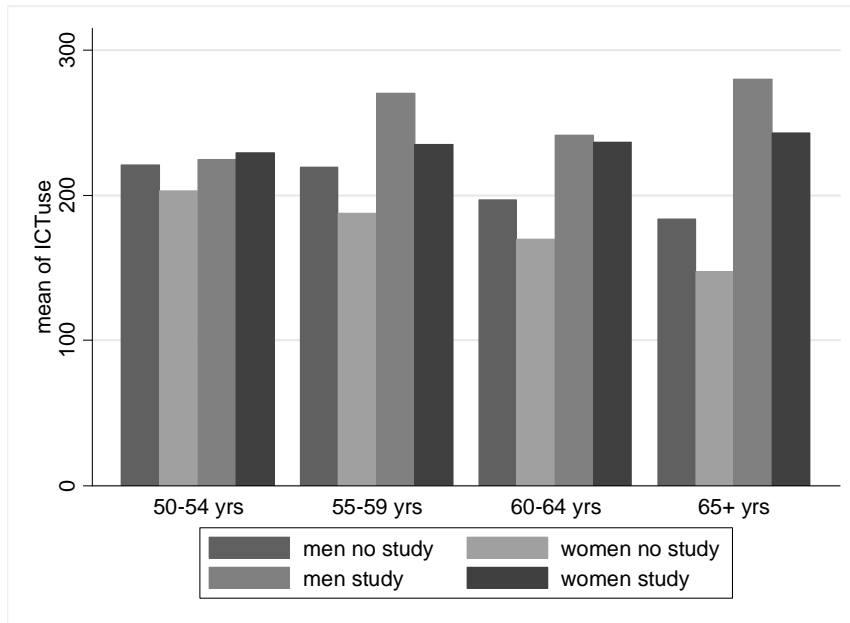
	Men				Women			
	N	Study %	VET %	Informal %	N	Study %	VET %	Informal %
50–54 years	393	4	2	88	417	6	4	88
55–59 years	381	3	2	86	435	4	2	86
60–64 years	336	2	1	82	397	2	2	76
65+ years	460	1	<1	68	622	<1	<1	63

Source: ABS (2006, basic confidentialised unit record file).

We estimate the mean computer use for older people by gender, age and whether or not they undertook any formal education in the preceding 12 months (see appendix table A11). The means are presented in figure 10. Men aged 65 years or more who undertook some form of formal study in the preceding 12 months report the highest average levels of computer use (280) and women aged 65 years or more who did not undertake any form of formal study report the lowest average levels of computer use (147). For men and women who did not undertake any formal study, the average levels of computer use decline with age. Average levels of computer use increase by age for women who undertook some formal study.

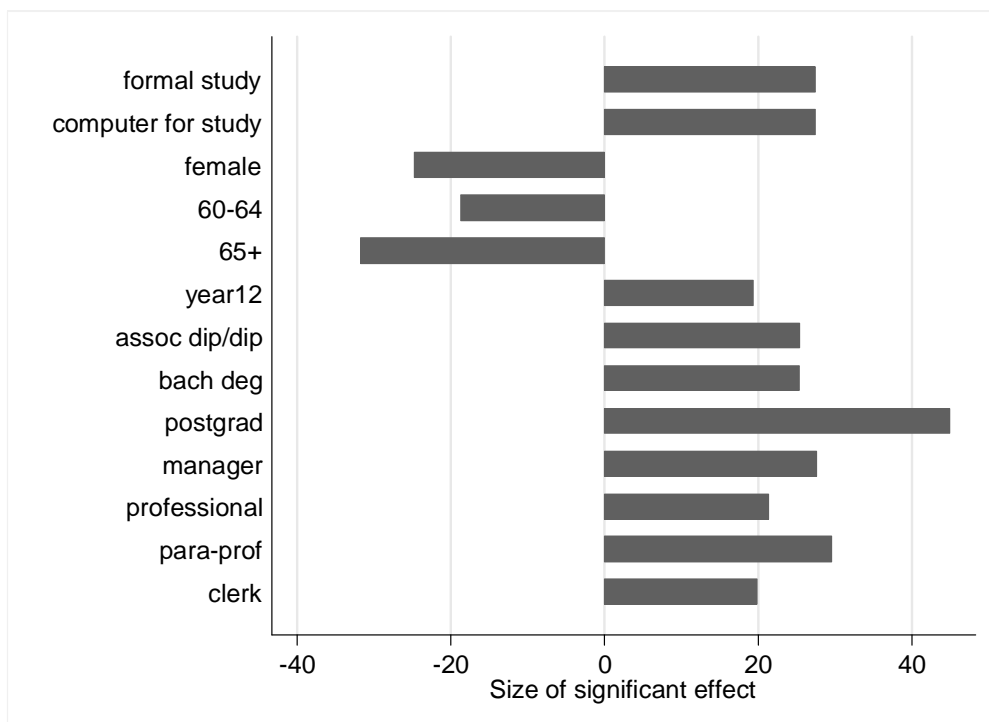
To determine the association between computer use and formal study, controlling for other factors, we again use regression analyses. The regression coefficients and standard errors are reported in appendix table A12. Figure 11 shows the size of the significant effect of the coefficients for formal study, computer use at educational institutions, gender, age, highest level of education and occupation.

**Figure 10 Mean computer use, by gender, whether engaged in study and age**



Notes: Weighted numbers based on weights provided by ABS.  
Source: ABS (2006, basic confidentialised unit record file).

**Figure 11 Size of the significant effect of whether engaged in formal study, sex, age, education and occupation on computer use by older people**

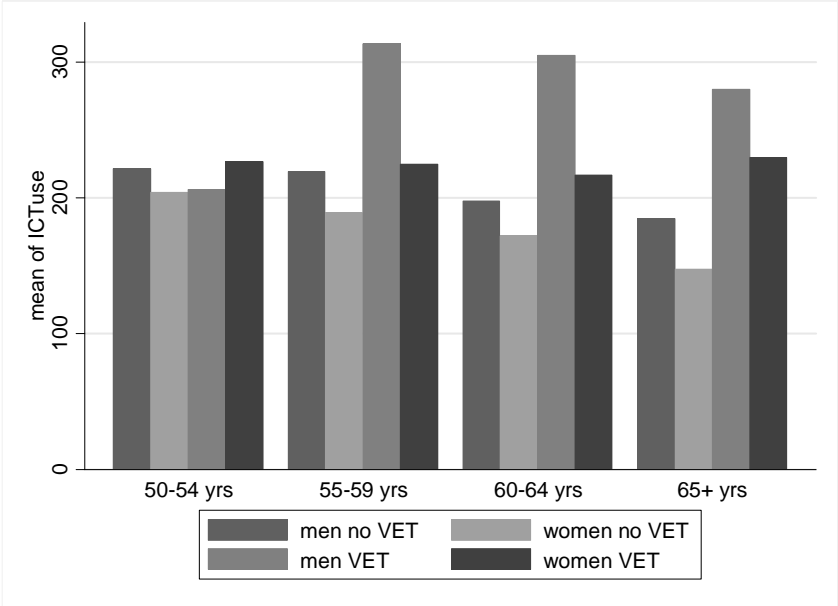


Notes: Weighted numbers based on weights provided by ABS; reference categories are: male, aged 50-54 years, < Year 12 education, not employed.  
Source: ABS (2006, basic confidentialised unit record file).

When we control for using a computer at school or education or training institution, having undertaken formal study in the preceding 12 months is positively associated with computer use. Hence, study seems to be positively associated with computer use, regardless of whether the actual course of study specifically requires computer use. Other effects are largely similar to those presented in figure 6.

We also estimate the mean computer use for older people by gender, age and whether or not they took part in any vocational education and training (see appendix table A13). The means are presented in figure 12. Men aged between 55 and 59 years who undertook VET report the highest average levels of computer use (314) and women aged 65 years or more who did not undertake VET report the lowest average levels of computer use (147). For men and women who did not undertake VET, average levels of computer use decline with age.

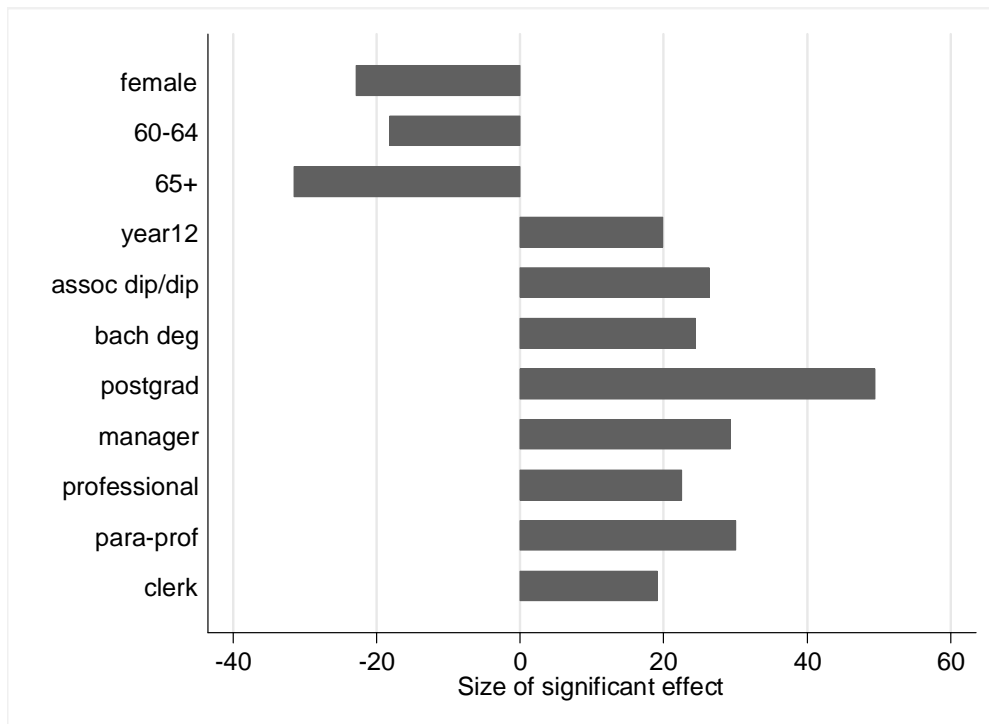
**Figure 12 Mean computer use, by gender, whether engaged in VET and age**



Notes: Weighted numbers based on weights provided by ABS.  
 Source: ABS (2006, basic confidentialised unit record file).

We conduct regression analyses to determine whether there is any association between computer use and VET, controlling for the effects of gender, age, education and occupation. Given that our dependent variable is mean computer use and our key explanatory variable of interest is engagement in VET, we exclude older people who indicated that they used a computer at an educational institution (n = 134). The regression coefficients and standard errors are reported in appendix table A14. Figure 13 shows the size of the significant effect of the coefficients for VET, gender, age, highest level of education and occupation. While other effects remain as before, being involved in VET studies does not have a statistically significant impact on computer use.

**Figure 13 Size of the significant effect of whether engaged in VET, sex, age, education and occupation on computer use by older people**



Notes: Weighted numbers based on weights provided by ABS; reference categories are: male, aged 50–54 years, < Year 12 education, not employed.

Source: ABS (2006, basic confidentialised unit record file).

## Reasons for not undertaking study

Respondents were also asked to list the reasons why they had not participated in any form of education and training during the previous 12 months. Table 15 lists the percentages of men and women who selected each of the nominated reasons. The most common reason given by both men and women in each age group was that they faced time constraints. Although working-age men and women in particular cited time constraints, fewer than 30% of men and just 35% of women aged between 50 and 54 years were too busy to undertake education and training. Fewer than 10% of men and women aged 65 years or more selected time constraints as a reason for not undertaking education or training. Women were more likely than men to indicate that courses were too expensive or that they had family responsibilities preventing them from undertaking education and training. Only 3% of men and 6% of women cited personal health as a reason for not engaging in education and training. A similar proportion of men and women cited a lack of confidence.

**Table 15 Reasons why older people do not undertake education and training**

	Men				Women			
	50–54 years %	55–59 years %	60–64 years %	65+ years %	50–54 years %	55–59 years %	60–64 years %	65+ years %
Time constraints	27	21	12	8	35	29	23	9
Courses not match needs	6	5	4	3	10	9	6	3
Lack of confidence	4	2	2	1	6	7	4	2
Not high priority	10	9	7	5	13	12	8	4
Too expensive	10	7	5	5	20	16	14	5
Family responsibilities	10	5	4	2	18	13	12	6
Personal health	3	3	3	3	6	8	6	4
N =	393	381	336	460	417	435	397	622

Source: ABS (2006, basic confidentialised unit record file).

## Summary

This chapter has described the association between education and training and computer use for people aged 50 years or more.

The results may be summarised as follows:

- Men and women who undertook some form of formal study in the preceding 12 months report the highest average levels of computer use.
- The difference between those who studied and those who did not study increases with age; that is, the difference is rather small in the group of 50 to 54-year-olds and very large in the group of those older than 65 years.
- Having undertaken formal study in the preceding 12 months is positively associated with the computer use of older Australians, even after controlling for gender, age, education and occupation.

# Implications

The data used in this paper – from the Adult Literacy and Life Skills Survey, a nationally representative survey of Australians – clearly demonstrate that computer use and internet use, both their incidence and frequency, decline with age. This is no doubt partly a cohort phenomenon. As the birth cohorts currently exposed to computers in the workforce get older, the proportion of people of a specific age who have never used a computer will decline.

Just as clearly, the current cohorts of older Australians exhibit low levels of computer and internet use. There is little in the reported interest in using computers or expectations about doing so among these cohorts that would suggest that these low rates of usage will change significantly. Hence, while the ‘problem’ of low use among older Australians will decline as cohorts age, it seems unlikely to diminish significantly for the specific cohorts of current seniors.

Why might this be a problem for government? If the internet provides a low-cost mechanism for providing information and the delivery of some services to citizens, then the existence of a substantial population unable or unwilling to access information and services through this medium means that governments must use duplicate approaches to ensure that they engage with all citizens. Depending on the circumstances and the programs delivered, such duplication may be costly and arrangements more complex and more prone to error through failures of consistency across delivery mechanisms. While this seems impossible to escape at this time, we can nevertheless ask what might be done about the low levels of computer and internet use among current cohorts of senior Australians, which might prevent governments from delivering information, programs and services more efficiently and effectively.

First, it should be noted that the issue does not appear to be one solely of access to a computer. Most older Australians appear to have access to a computer in their homes, although not necessarily with the internet connected. Yet low levels of computer use among this group arise through both low usage rates and low frequency of use among those who have used computers. Access does not appear to lead to the same frequency rates among older Australians as younger groups. Hence, initiatives aimed, for example, at increasing access outside older Australians’ homes may do little to really influence internet use if frequency-of-use levels remain low.

Second, the majority of those who have not used a computer did not indicate that they had an interest in using one in the future. Providing greater access to groups unwilling to use computers seems unlikely, in itself, to change usage patterns very much.

Third, those currently employed or currently engaged in education and training have higher internet use rates, since computer use seems intrinsically associated with aspects of these activities, but it is not clear how these states can be used to change computer use much among cohorts of older people. Specifically, people of this age who have left employment do not tend to find ways back into the workplace readily, while rates of participation in general education and training tend to be relatively low among older people. Again, cohort effects will work in favour of increasing computer use as people work to older ages and as attitudes change towards lifelong learning, but this will not change usage among the current cohorts of seniors.

The best prospects for increasing computer use among the current cohorts of older Australians seem to require steps in two directions: giving people reasons to use computers and the internet, and in



providing mechanisms that will enable such usage. The first seems to be consistent with where governments' interests lie – putting onto the web more valuable information and which is available most readily there. This could include health, diet and lifestyle-related information, which will be facilitated through the roll-out of the National Broadband Network.

The second element involves lowering the access 'costs' for older people, either by enabling them to obtain the skills to use the internet or to find help from those who do so already. The provision of skills for older people via VET and adult education providers would be one way to encourage the development of greater skills among this group. Furthermore, it may not be necessary for older Australians themselves to use the internet physically to make greater use of it. It is possible to imagine brokers servicing the technology needs of senior Australians, potentially providing access to mobile internet services in the homes of older Australians, even delivered by older Australians prepared to keep developing their skills.

As long as some older Australians choose not to or are unable to use computers and the internet, it will be necessary to maintain alternative mechanisms for the delivery of information and services to this group. There are many factors working in the direction of diminishing this necessity in the longer-term.

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# Appendix

**Table A1 Mean computer use, by sex and age for figure 1**

Age	Sex	
	Male	Female
15–24	258.04	258.06
25–34	243.32	238.31
35–44	232.93	221.30
45–54	227.81	211.52
55–64	211.91	183.10
65+	185.15	148.52

Source: ABS (2006, basic confidentialised unit record file).

**Table A2 Mean computer use, by sex and education for figure 2**

Education	Sex	
	Male	Female
< Year 12	208.75	204.02
Year 12	243.82	239.91
Basic vocational	208.37	200.88
Skilled vocational	211.46	217.60
Assoc. diploma/diploma	255.46	220.45
Bachelor degree	271.05	238.47
Postgraduate	275.24	254.45

Source: ABS (2006, basic confidentialised unit record file).

**Table A3 Mean computer use, by sex and occupation for figure 3**

Occupation	Sex	
	Male	Female
Not employed	229.82	186.11
Manager	245.53	232.79
Professional	272.44	239.76
Para-professional	258.92	236.09
Clerk	242.60	235.58
Sales/personal service	243.46	220.34
Craft/trade	193.06	205.32
Plant/machine/driver	203.09	207.02
Other	216.53	204.71

Source: ABS (2006, basic confidentialised unit record file).

**Table A4 Regression coefficients for figure 4**

	Coefficient	Standard error
Female	-20.85***	1.94
15–24 (ref.)		
25–34	-33.14***	2.85
35–44	-43.64***	2.82
45–54	-53.56***	2.96
55–64	-73.11***	3.31
65+	-97.07***	4.83
< Year 12 (ref.)		
Year 12	20.52***	2.69
Basic vocational	6.07	6.96
Skilled vocational	13.18***	2.86
Assoc. diploma/diploma	29.82***	3.41
Bachelor degree	37.68***	3.13
Postgraduate	53.99***	4.02
Not employed (ref.)		
Manager	20.36***	3.96
Professional	23.87***	3.88
Para-professional	25.24***	3.78
Clerk	22.49***	3.75
Sales/personal service	2.06	3.73
Craft/trade	-33.00***	4.41
Plant/machine/driver	-17.20***	5.34
Other	-9.45***	4.13
Constant	272.25***	4.53
Adjusted R-squared	0.1880	
N =	7079	

Note: \*\*\*, \*\* and \* indicate significant at the 1, 5 and 10% levels, respectively.  
Source: ABS (2006, basic confidentialised unit record file).

**Table A5 Mean computer use by older people, by sex and age for figure 5**

Age	Sex	
	Male	Female
50–54	220.89	205.09
55–59	221.76	189.87
60–64	198.55	172.99
65+	185.15	148.52

Source: ABS (2006, basic confidentialised unit record file).

**Table A6 Regression coefficients for figure 6**

	Coefficient	Standard error
Female	23.12***	3.87
50–54 (ref.)		
55–59	-6.44	4.57
60–64	-20.29***	5.16
65+	-34.34***	5.82
< Year 12 (ref.)		6.52
Year 12	21.86***	12.27
Basic vocational	0.03	5.54
Skilled vocational	4.97	6.02
Assoc. diploma/diploma	27.17***	6.22
Bachelor degree	27.64***	7.10
Postgraduate	50.72***	
Not employed (ref.)		6.87
Manager	28.96***	6.80
Professional	24.46***	6.74
Para-professional	29.66***	7.09
Clerk	19.95**	8.35
Sales/personal service	1.08	9.16
Craft/trade	5.60	12.24
Plant/machine/driver	-9.57	7.95
Other	-0.51	9.22
Constant	213.49***	
Adjusted R-squared	0.1275	
N =	2043	

Source: ABS (2006, basic confidentialised unit record file).

**Table A7 Mean computer use by older people, by employment status, sex and age for figure 7**

Employment status	Age			
	50–54	55–59	60–64	65+
Non-employed men	166.39	163.33	210.49	185.48
Non-employed women	171.95	156.42	145.32	141.28
Employed men	222.73	224.01	196.36	184.88
Employed women	209.21	196.50	188.65	165.89

Source: ABS (2006, basic confidentialised unit record file).

**Table A8 Regression coefficients for computer use controlling for sex, age and education for non-employed older people**

	Coefficient	Standard error
Female	-38.19***	8.92
50–54 (ref.)		
55–59	-8.44	15.87
60–64	-5.90	14.22
65+	-18.48	13.01
< Year 12 (ref.)		
Year 12	28.20*	13.92
Basic vocational	-12.01	19.60
Skilled vocational	14.55	14.01
Assoc. diploma/diploma	9.45	13.17
Bachelor degree	11.13	14.77
Postgraduate	19.87	20.05
Constant	230.99***	20.36
Adjusted R-squared	0.0422	
N =	465	

Source: ABS (2006, basic confidentialised unit record file).

**Table A9 Mean English skills of older people, by employment status, sex and age for figure 8**

Employment status	Age			
	50–54	55–59	60–64	65+
Non-employed men	200.12	229.90	233.64	237.22
Non-employed women	262.79	237.77	270.62	257.81
Employed men	365.21	371.24	359.10	324.86
Employed women	415.46	412.48	387.41	384.74

Source: ABS (2006, basic confidentialised unit record file).

**Table A10 Regression coefficients for figure 9**

	Coefficient	Standard error
English skills	0.13***	0.02
Female	-26.53***	3.87
50–54 (ref.)		
55–59	-7.56	4.53
60–64	-20.19***	5.11
65+	-33.24***	5.77
< Year 12 (ref.)		
Year 12	18.60**	6.47
Basic vocational	1.99	12.16
Skilled vocational	4.18	5.49
Assoc. diploma/diploma	22.58***	6.00
Bachelor degree	20.95***	6.25
Postgraduate	42.94***	7.14
Not employed (ref.)		
Manager	13.12	7.24
Professional	8.58	7.18
Para-professional	14.00	7.11
Clerk	3.96	7.46
Sales/personal service	-11.85	8.52
Craft/trade	-1.87	9.15
Plant/machine/driver	-22.48	12.29
Other	-12.82	8.11
Constant	184.73***	10.19
Adjusted R-squared	0.1442	
N =	2043	

Source: ABS (2006, basic confidentialised unit record file).

**Table A11 Mean computer use, by sex and age for figure 10**

	Age			
	50–54	55–59	60–64	65+
Men no study	220.68	219.32	197.14	183.86
Women no study	203.15	187.56	170.07	147.50
Men study	224.71	270.48	241.40	280.12
Women study	229.45	235.09	236.66	242.93

Source: ABS (2006, basic confidentialised unit record file).

**Table A12 Regression coefficients for figure 11**

	Coefficient	Standard error
Formal study	27.52**	8.78
Computer use at educational institution	27.51***	7.71
Female	-24.78***	3.87
50–54 (ref.)		
55–59	-6.19	4.55
60–64	-18.75***	5.14
65+	-31.77***	5.80
< Year 12 (ref.)		
Year 12	19.38**	6.49
Basic vocational	-1.20	12.20
Skilled vocational	3.10	5.51
Assoc. diploma/diploma	25.42***	5.99
Bachelor degree	25.33***	6.20
Postgraduate	45.98***	7.17
Not employed (ref.)		
Manager	27.69***	6.83
Professional	21.30***	6.79
Para-professional	29.60***	6.70
Clerk	19.79**	7.05
Sales/personal service	-0.18	8.30
Craft/trade	5.23	9.11
Plant/machine/driver	-12.82	12.20
Other	-0.62	7.90
Constant	214.85***	9.17
Adjusted R-squared	0.1381	
N =	2043	

Source: ABS (2006, basic confidentialised unit record file).

**Table A13 Mean computer use, by sex and age for figure 12**

	Age			
	50–54	55–59	60–64	65+
Men no VET	221.40	219.13	197.57	184.65
Women no VET	204.13	188.98	171.99	147.41
Men VET	206.38	313.56	304.83	280.04
Women VET	226.62	224.71	216.83	229.73

Source: ABS (2006, basic confidentialised unit record file).



**Table A14 Regression coefficients for figure 13**

	Coefficient	Standard error
VET	24.86	13.81
Female	-22.81***	4.05
50–54 (ref.)		
55–59	-5.84	4.83
60–64	-18.17***	5.34
65+	-31.46***	5.97
< Year 12 (ref.)		
Year 12	19.99**	6.72
Basic vocational	-0.69	12.35
Skilled vocational	3.64	5.67
Assoc. diploma/diploma	26.46***	6.19
Bachelor degree	24.41***	6.51
Postgraduate	49.39***	7.74
Not employed (ref.)		
Manager	29.24***	7.06
Professional	22.50**	7.13
Para-professional	30.07***	6.90
Clerk	19.12**	7.23
Sales/personal service	-1.11	8.60
Craft/trade	8.37	9.38
Plant/machine/driver	-11.35	12.47
Other	0.36	8.09
Constant	210.97***	9.54
Adjusted R-squared	0.1162	
N =	1913	

Source: ABS (2006, basic confidentialised unit record file).

# NVETR Program funding

This work has been produced by NCVET under the National Vocational Education and Training Research (NVETR) Program, which is coordinated and managed by NCVET on behalf of the Australian Government and state and territory governments. Funding is provided through the Department of Industry, Innovation, Science, Research and Tertiary Education.

The NVETR Program is based on national research priorities approved by ministers with responsibility for vocational education and training.

The author/project team was funded to undertake this research via a grant under the NVETR Program. The research grants are awarded to organisations through a competitive process, in which NCVET does not participate. To ensure the quality and relevance of the research, projects are selected using an independent and transparent process and research reports are peer-reviewed.

The NVETR Program aims to improve policy and practice in the VET sector. The research effort itself is collaborative and requires strong relationships with the research community in Australia's universities and beyond. NCVET may also involve various stakeholders, including state and territory governments, industry and practitioners, to inform the commissioned research and using a variety of mechanisms such as project roundtables and forums.

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