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Current Internet Use in Australia: A Closer Look at the Digital Divide

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Abstract

This paper explores recent Australian Bureau of Statistics (ABS) survey micro-data on internet use in Australia. It provides a snapshot of the state of internet usage in Australia and compares and discusses trends over time. Further statistical analysis of the ABS data provides an updated picture of the state of internet use in terms of traditional areas of disadvantage. The analysis results show that more women than men are using the internet across most socio-economic dimensions.

Keywords

Digital divide, Internet, secondary data, social inequality

INTRODUCTION

Australia ranks 6th in the world (Information Economy Index 2004) in the use of information and communication technologies (ICT), in a group of three very similar ranking countries that immediately follow the top three, the US, Canada and Sweden. However, it is well documented that this use of ICT in Australia is not spread evenly across the population (e.g. Curtin 2001, McLaren & Zappalà 2002). This has resulted in what is commonly referred to as a “digital divide”, that is, a gap between the “haves” and the “have nots” with respect to the access and usage of ICT. This “digital divide” appears to mirror the traditional areas of disadvantage with previous studies identifying age, education, income, region, disability and race as important factors (Willis and Tranter 2006).

The effects of the digital divide can be broadly categorised (McLaren & Zappalà 2002) into two areas:

- Economic consequences, with implications for individuals and businesses, and
- Social consequences, with implications for political participation and overall quality of life.

Therefore to participate fully in Australian society today individuals increasingly need to access and use computers and the internet. This entails having both access to the requisite hardware, and the skills to use the technology. The areas of life that can be affected by ICT use are:

- Employment – access to online job advertisements, IT skills are required by employers.
- Ecommerce – access to competitively priced goods and services, the ability to save time in doing everyday tasks (e.g. paying bills, shopping online),
- Government services – increasingly services and information are provided on online (e.g. tax returns, census forms, immigration information),
- Health – information about medical problems, telemedicine for those in remote areas,
- Education – elearning in schools, tertiary institutions, the home and business,
- Political participation – Political movements or protests now use a web presence and email campaigns e.g. the GetUp group (<http://www.getup.org.au/>) seeks to influence Australian government policy.

Since access and use of the internet impacts on such a broad spectrum of everyday life it is important to know more about patterns of ICT access and usage so that decisions regarding public policy in this area can be well informed. In addition, business has a stake in ICT access and usage from both an employer and customer

perspective. Businesses require a workforce with IT skills and ecommerce is dependent on customer access to and use of the internet.

Recent data released by the Australian Bureau of Statistics (ABS) provides information about household and personal access and use of computers and the internet in 2004-05 (ABS 2006a). The accompanying report published by the ABS on this data provides only general information about computer and internet access and usage in Australia. In this study the data was subjected to further statistical analysis. The specific research questions were:

1. *What is the state of knowledge about internet use in Australia?*
2. *How has internet use in Australia changed over time?*
3. *How does internet access and usage vary across a number of socioeconomic dimensions?*

The rest of the paper begins with a brief discussion of previous studies on ICT use in Australia. The scope of the study is defined and the characteristics of the data are outlined. The results and discussion are presented together followed by a conclusion outlining the main results, their implications and areas for future research.

BACKGROUND

Internet use in Australia has been reported on since 1994 in the series of ABS publications on Household Use of Information Technology (HUIT). However it was not until 2001 that questions related to computer and internet access and use first appeared in an Australian census. The data show that internet use in Australia has grown rapidly throughout this period. The HUIT data from 1994 through to 2004-05 provides broad detail about computer and internet access and use in terms of the information elicited from respondents, but only covers a sample of Australia's population. In addition some of these surveys cannot be compared since specific types of respondents were targeted e.g. in 2003 it was people with disabilities amongst others. In contrast the 2001 census data covers the whole population of Australia but is limited in the detail provided by respondents. To further complicate matters comparison of data and reports is made difficult by the different factors used in the analyses and the ways the factors are defined e.g. age ranges, income levels, period of access and use (i.e. in the last week, in the last month, in the last year).

Previous studies have identified age (The Current State of Play 2004), education (Lloyd and Hellwig 2000), income (Lloyd and Hellwig 2000; McLaren and Zuppala 2002) geographical area (Curtin 2001), gender (The Current State of Play 2004), disability and indigenous people (ABS 2003) as the socio-economic dimensions of the digital divide in Australia. A projection of internet use for the next three years by Lloyd and Hellwig in 2000 identified the three most disadvantaged groups as retirees, the unemployed and those not in the workforce, and low income groups, in that order. The study looked at household access to the internet which is perhaps less appropriate today with wider access available through libraries, internet cafes, public internet access points and mobile technologies. And, in a recent study Willis and Tranter (2006) postulate "an egalitarian diffusion" of the internet in Australia. They claim that direct gender differences no longer exist and that geographical location is not a primary cause of internet inequality in Australia. However, the 2001 census data shows an interesting trend in women's internet use. In the age group 15 to early twenties women are more likely to be using the internet than men (a difference of six percentage points). In the older age groups internet use by men gradually increases relative to women culminating in men being more likely to use the internet than women in the 55-64 years group by eight percentage points (Lloyd and Bill 2004).

This study uses the most recent, reliable data on internet use in Australia (ABS 2006b). This paper contributes to knowledge about internet use in Australia in three ways. First, it provides the most current picture of internet use in Australia and reports on changes over the previous eight years. Second, the conclusions of Willis and Tranter (2006) regarding the role of gender differences and geographical location in internet use in Australia are updated. Third, the projections of Lloyd and Hellwig (2000) of the three most disadvantaged groups in Australian society are tested.

METHOD

The scope of this study can be defined according to three characteristics suggested by Hüsing and Selhofer (2002):

1. The *unit of observation* is reported internet use by individuals 18 years old and over. It was decided to concentrate on internet use as it is highly correlated with computer use. In addition internet use impacts on all six areas of life in today's society (as outlined in the Introduction).
2. The *independent variables* considered are income, level of education, geographic location (city/other), age, gender, occupation, employment status, family type, marital status and labour force status.

3. The *indicator*, i.e. the operationalisation of the digital divide, is use of the internet at any location. Internet use refers to the 12 months prior to interview and includes its availability through either dial-up, broadband, or cable technologies.

The data

The data for this study were taken from the Multipurpose Household Survey (MPHS) conducted by the Australian Bureau of Statistics in the 2004 to 2005 period (ABS 2006b). The micro-data consists of 13,337 records of responses by adults aged 18 and over. The questions solicited information about respondents' computer and internet use, gender, age, education level, occupation, income, area of residence, labour force status and many other items not directly relevant to this study. The interested reader is referred to the MPHS documentation available from the Australian Bureau of Statistics (ABS 2006a, ABS 2006b).

The analysis

The analysis began by summarising internet use along some of the more important socio-economic dimensions with the aim of identifying the primary factors of influence. Based on these results further analysis of the employed sector was conducted using logistic regression enabling both main and interaction effects to be examined. The model constructed was compatible with that of Willis and Tranter (2006) and so comparisons over time were possible.

RESULTS AND DISCUSSION

Within the literature, there is some variation in reported internet use in Australia with Willis and Tranter (2006) finding that 69% of Australians used the internet in 2003 while Bean, Gow and McAllister (2002) found a value of 57% for 2001. It should be noted that the 2001 census figure was 39% using the internet at any location (Primrose 2003). The most recent work by ABS (2006a) reports a value of 63% based on the same data used for this study. The overall value of 60.7% given in Table 1 is based on the sample data only whereas the ABS figure has apparently been calculated using a weighting process to scale the sample estimates up to the relevant population subgroup (see ABS, 2006a p. 34 for details). Since the main purpose of this work is to examine the differential effects of various socio-economic dimensions which do not correspond to the subgroups for which weights are available, we use the unadjusted data. Although this may result in slightly biased parameter estimates, it is not expected to affect the overall conclusions made since the observed effects are quite large.

The overall age effect is shown in column four of Table 1 where a general decrease in internet use with increasing age can be seen. The decrease of around 7% between the 18–29 year olds and the 30–49 year olds is consistent with earlier findings as is the much larger decrease of around 37% between 30–49 year olds and those in the 50+ age group (ABS 2006a, Lloyd and Bill 2004). As we show later in this paper, the age effect appears to have increased in the past few years mainly due to a large increase in usage by those in the 18–49 age group rather than a decrease in usage by the 50+ age group. It is also worth noting that internet usage by 18–29 year old women is around 5% higher than men in the same age group with a small difference (2%) between 30–49 year old men and women while about 7% fewer women in the 50+ age group use the internet than men in this age group.

Table 1: Percent internet use by age and gender 2004–5

Age	Men	Women	All
18–29	79.6%	84.5%	82.2%
30–49	74.2%	76.2%	75.2%
50+	41.7%	35.1%	38.1%
Total	61.7%	59.8%	60.7%

The data in Table 1 show similar percent internet use overall by both males and females and support Willis and Tranter's (2006) contention that there is "egalitarian diffusion" of the internet in Australia. However, this effect is only superficial, since the age related gender gap noted by Lloyd and Bill (2004) persists, with only a small narrowing of approximately 1% when compared with the 2001 census results. In the youngest age group the use of the internet is quite high but in the oldest age group internet use is relatively low.

Labour force status also appears to be a determinant of internet use as shown by the decreasing trend in the group totals of column five in Table 2. Overall 76.6% of employed persons, 69.7% of the unemployed and just 31.9% of those not in the labour force (retired or not looking for work) used the internet in 2004–05. The very low figure for those not in the labour force is mainly due to the low usage (21.2%) in the numerically dominant 50+ age group which includes a large number of retirees. Within each of the labour force groups there is also a

downward trend with increasing age which is most pronounced for those not in the labour force. These trends are also present for both sexes however women outperform men in all but the 50+ unemployed and the 18–29 and 50+ not in the labour force groups. Basic statistical analysis (Bonferonni corrected z-tests) shows that employed women in all age groups use the internet at significantly ($p < 0.01$) higher rates than men and with the exception of the 50+ not in the labour force group where women's internet use is significantly less than men's, no other significant differences between men and women are present.

Thus, with respect to internet use, the digital gender divide appears to exist mainly within the employed sector where women are dominant and in the 50+ not in the labour force group (mainly retirees) where men are dominant. A detailed analysis of the employed sector involving age and a number of other dimensions is presented later in this paper.

Table 2: Percent internet use by labour force status, age and gender 2004–05

<i>Labour Force Status</i>	<i>Age</i>	<i>Men</i>	<i>Women</i>	<i>All</i>
Employed	18–29	80.5%	90.9%	85.5%
	30–49	77.4%	82.4%	79.7%
	50+	59.2%	68.3%	63.3%
	Group Total	73.0%	80.6%	76.6%
Unemployed	18–29	76.5%	85.9%	81.1%
	30–49	56.4%	72.9%	64.5%
	50+	68.0%	56.7%	63.8%
	Group Total	65.3%	74.7%	69.7%
Not in the Labour Force	18–29	74.5%	64.8%	67.6%
	30–49	45.7%	59.2%	56.3%
	50+	24.9%	18.8%	21.2%
	Group Total	30.8%	32.5%	31.9%
<i>n = 13,337</i>	Overall	61.7%	59.8%	60.7%

Some authors (e.g. Aisbett 2001, Wasserman 2005) report that marital status and whether a person has young children or not has an effect on internet usage and, when examined in isolation, this does appear to be the case. In Table 3 we see that internet usage by those with children under 15 is nearly 20% higher than those without children under 15 while married persons' use of the internet is 8.4% higher than non-married persons. However, as we discuss later in this paper, when these variables are examined together with other socio-economic dimensions they do not exert a significant effect on internet use.

Table 3: Percent internet use by family status and marital status 2004-05

<i>Family Status</i>	<i>All</i>	<i>Marital status</i>	<i>All</i>
Has children under 15	74.3%	Married	64.4%
No children under 15	55.2%	Not Married	56.0%

Personal income has also been found to be a major determinant of internet use (Lloyd and Hellwig 2000, Willis and Tranter 2006) and as Figure 1 shows, for those earning above \$70,000 per annum the effect is small. However, for those on annual incomes of less than \$70,000 there is a pronounced downward trend in internet use with decreasing income. The only exception to this trend is for those on incomes below \$10,000 which includes many students who may access the internet at their school or university.

The above overview of the data shows that the projections of Lloyd and Hellwig (2000) were not only correct but have persisted past the projected date of 2003. That is, the three most disadvantaged groups in Australian society with respect to internet use are retirees, the unemployed and those not in the workforce, and those on low incomes

Analysis

Our approach follows the work of Willis and Tranter (2006) who used logistic regression to assess the effect of gender, age, education, occupation, income and area of residence on internet use compared to non-use. After initial screening, the same broad dimensions were used in this study. In addition to the variables used by Willis and Tranter, family and marital status were included in our initial model and found to be non-significant and were therefore deleted from the model.

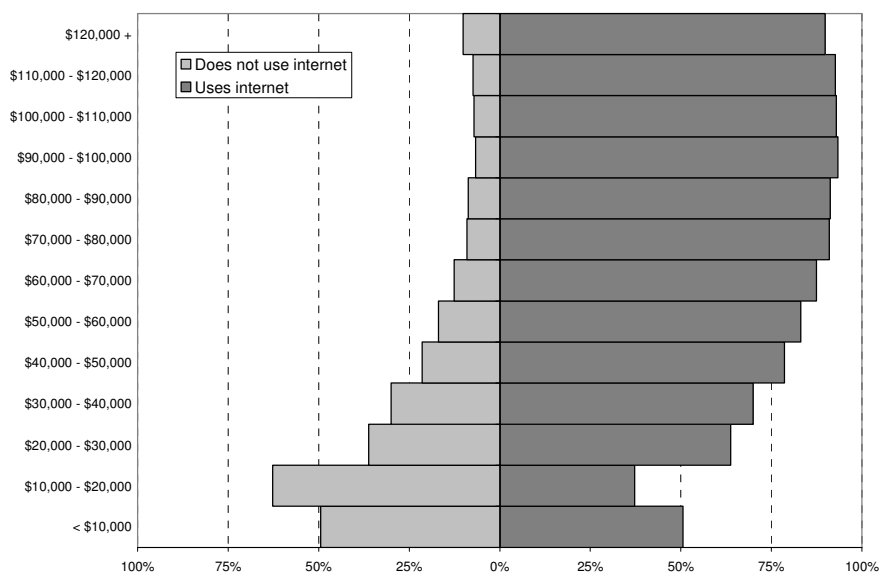


Figure 1: Percent internet use by income 2004-05

Willis and Tranter were able to separate the professional occupation class into three subgroups corresponding to Brint's (1984) 'new class' schema. Since the MPHS coding scheme does not permit these subgroups to be identified, we compare the ranges found by Willis and Tranter to the values found for the Professional occupation class in the current work. It should also be noted that including the above dimensions in the model reduces the amount of data available for analysis to 3,056 records. This severe reduction is due to the exclusion of unemployed persons and those not in the labour force combined with patterns of missing values in the income, occupation and education variables.

Table 4 below shows the odds ratios from the current work, and for comparison purposes, those of Willis and Tranter (2006). For each group, the ratio gives the estimated likelihood that the group concerned uses the internet relative to the reference group. For example, the odds ratio of 10.2 for the 18–29 year old group indicates that this group is 10.2 times more likely than the 50+ age group to use the internet. While our results are generally consistent with previous work, the r-squared value is considerably less than those found by Willis and Tranter (2006) indicating higher variability in the MPHS data than in the data used by others. While this affects the power of statistical tests carried out and may result in some possibly real effects not being detected, it in no way invalidates conclusions based on effects found to be significant.

The odds ratios in the last column of

Table 4 show that the influence of social background on internet use has generally continued to decline over time within the employed sector. The one exception to this is the increased disparity between 18–19 year olds and the 50+ age group in 2004–05 where the odds ratio for this period is almost twice the 2003 value found by Willis and Tranter (2006). As discussed earlier, this is a consequence of increased use by 18–29 year olds rather than any decrease in usage by the 50+ age group.

Of particular interest is the odds ratio of 0.7 for men indicating that **in 2004–05 women were overall 1.4 times more likely than men to use the internet**. This surprising observation is discussed in terms of gender-occupation interactions below. Education level continues to play a significant role with persons having a university degree being almost three times more likely to use the internet than those without a degree. Occupation also continues to affect the likelihood of internet use with Managers, Professionals and Associate professionals all being at least twice as likely to use the internet as the working class group. As in the past, income also plays a major role with high income earners (\$80,000+) being around four times more likely to use the internet than those with incomes below \$80,000. Area of residence (large city versus balance of state) no longer appears to have a significant impact on internet access which possibly reflects government policy in improving the infrastructure in regional and rural areas (Networking the Nation 1997). However, it should be noted that the category “Live in a large city” included the six state capital cities and “Balance of state“ covered all other regions including Canberra and Darwin. In addition, the 2004–05 MPHS data excluded people in private dwellings living in very remote parts of Australia.

Table 4: Internet usage and social dimensions main effect odds ratios (employed sector)

	<i>Willis and Tranter (2006)</i>			<i>Current</i>
	1998	2001	2003	2004-05
Men	1.9*	1.6*	1.1	0.7*
Women (reference)	1	1	1	1
Aged 18-29	9.0**	6.3**	5.2**	10.2**
Aged 30-49	2.6**	3.4**	3.5**	2.2**
Aged 50+ (reference)	1	1	1	1
Degree	6.7**	2.7**	3.6**	2.9**
No degree (reference)	1	1	1	1
Managers	3.8**	3.7**	3.2**	2.1**
Professionals	4.3 - 17.9	5.0 - 9.2	2.6 - 5.8*	4.9**
Assoc. Professionals	3.3**	3.2**	2.7	2.9**
Working class (reference)	1	1	1	1
\$80,000+	5.1**	3.7**	4.5**	4.1**
<\$80,000 (reference)	1	1	1	1
Live in large city	2.7**	1.7**	1.2	1.1
Balance of state (reference)	1	1	1	1
Cox and Snell R ²	.59	.39	.33	0.18
Sample size (n)	(839)	(1435)	(3590)	(3056)

* $p < .01$ ** $p < .001$

Interactions

In addition to the main effects estimates shown in

Table 4, interaction effects between gender and all other dimensions were estimated with only the gender by occupation interaction being statistically significant. Within this interaction term only the Professional and Associate professionals groups exhibited significant differences between men and women and so the effect of gender on internet access depends on whether an individual belongs to the professional or associate professional groups.

Table 5: Internet usage and occupation by gender interaction effect odds ratios 2004–05

Occupation Group	Men	<i>Women</i>
Managers	2.2	2.7
Professionals	8.6	3.4*
Assoc. Professionals	5.1	1.6**
Working class (reference)	1	1

* $p < .01$ ** $p < .001$ and denotes a significant difference between men and women.

The nature of this dependence is best explained with reference to the odds ratios in Table 5. Here we find that professional men are 8.6 times more likely and associate professional men are 5.1 times more likely to use the internet than working class men. Similarly, professional women are 3.4 times more likely and associate professional women just 1.6 times more likely to use the internet than working class women. The observed difference between men and women in the managers group is not significant so we may use the management odds ratio from

Table 4 without reference to gender as is the case for odds ratios of other non-interacting variables.

The main implication of the foregoing discussion is that working class men are still a long way behind professional and associate professional men in their use of the internet while the gap between professional and associate professional women and working class women is considerably smaller.

The figures in

Table 6 show the percentages of those in each occupation group who use the internet by gender. For example, 70.2% of male managers use the internet and 89.2% of female professionals use the internet. Note that only 50.5% of working class men use the internet compared with 66.3% of working class women. Also note that the gap between working class, professionals and associate professionals is considerably greater for men than for women. This pattern is the basis for the significant gender by occupation interaction described above and strongly indicates that working class women are using the internet in much greater numbers than working class men.

Since the numbers of working class men and women are far greater than the other occupation groups combined, we can conclude that working class women have led the way in internet usage and are largely responsible for women's overall higher usage of this technology.

Table 6: Percentage of occupation groups who use the internet by gender 2004–05

<i>Occupation</i>	<i>Men</i>	<i>Women</i>
Managers	70.2%	82.0%
Professionals	94.5%	89.2%
Associate professionals	83.8%	75.7%
Working class	50.5%	66.3%
Total	73.0%	80.6%

CONCLUSION

The results of the initial analysis of the data gave an overview of the major factors influencing internet use in Australia in 2004–05. Unfortunately, Lloyd and Hellwig's (2000) projections of internet use by the most disadvantaged groups in society were borne out more than three years after they were made. This study found that internet use by retirees, the unemployed and those not in the workforce, and low income groups has remained relatively low. In addition gender differences in internet use in the youngest and oldest age groups were found to have persisted when compared with the 2001 census data (Lloyd and Bill 2004). Females have the highest usage in the younger age group, while it is males in the older group. Although there is a gender difference in the 15 to twenties age group, internet use by both males and females is relatively high. However, in the 50 plus age group the gender difference is combined with relatively low usage rates by both males and females, indicating an ongoing need for government programs to target this age group in particular..

Analysis of the employed sector only, showed that the differences within the socio-economic factors used by Willis and Tranter (2006) have all continued to diminish with the exception of age, where persons aged 18–29 are far more likely to use the internet than all older age groups. However, age, education, occupation and income continue to be the significant factors influencing internet use within the employed sector.

The most surprising result was that employed women are overall 1.4 times more likely than employed men to use the internet and that this is primarily due to the take up of internet use by working class women. These findings support those from the 2001 census data (Lloyd and Bill 2004). Possible reasons behind the increased internet use by working class women may lie in their usage patterns (Dholakia 2006, Jackson et al. 2001, Kennedy et al. 2003). For example, a US study by Kennedy et al (2003) found that women use the internet more for social reasons and that men use it more for seeking information and recreational activities indicating underlying inequalities related to the type of use. Another possible explanation may lie in the different types of work that men and women are involved in. For example, working class men may be more likely to be involved in outdoor work that does not currently require the use of the internet and therefore they are not introduced to the technology in the workplace.

Future work on internet use should reveal a decrease in the disparities due to age as today's young internet users mature. It is unclear if the disparities found within the occupation, income and education areas will also disappear. The gender difference observed may persist especially if the work patterns of men and women are the main cause. The 2006 census will provide an opportunity to explore these issues further. However, it will not provide a lot of detail in this regard but will allow for a more accurate assessment of overall internet use. If census micro-data becomes available, a much closer examination of the effect of many socio-economic dimensions will be possible. At the moment it is unknown whether such data will be released by the ABS as confidentiality issues play a major role in the decision.

This study has presented the socio-economic areas in Australia where differences in internet use exist. However, it does not explain why these differences exist and further work is required in this area. For example, a deeper understanding of the effects observed in this work could be found using qualitative research that probes the underlying issues. Of particular interest would be a study that examines the different attitudes, motivations and internet usage patterns of working class men and women in Australia.

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